July 2013

NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM

Legal Research Digest 61

LEGAL ASPECTS OF PERFORMANCE-BASED SPECIFICATIONS FOR HIGHWAY CONSTRUCTION AND MAINTENANCE CONTRACTS

This report was prepared under NCHRP Project 20-6, "Legal Problems Arising Out of Highway Programs," for which the Transportation Research Board is the agency coordinating the research. The report was prepared by Michael C. Loulakis, Esq., Capital Project Strategies, LLC. James B. McDaniel, TRB Counsel for Legal Research Projects, was the principal investigator and content editor.

The Problem and Its Solution

State highway departments and transportation agencies have a continuing need to keep abreast of operating practices and legal elements of specific problems in highway law. This report continues NCHRP's practice of keeping departments up-to-date on laws that will affect their operations.

Applications

As state agencies have moved toward greater use of alternative contracting, including design-build, warranty contracting, performance-based maintenance, and public–private partnerships for highway construction projects, these contracts use performance-based specifications to give contracting entities more flexibility to meet contract requirements. Whether delivered under a design-build or a traditional design-bid-build contract, construction contracts often contain both prescriptive and performance-based specifications. Under the doctrine from the landmark United States Supreme Court case, *United States v. Spearin*, 248 U.S. 132 (1918), an owner using detailed design or method-based specifications is deemed to warrant that the specifications and other design information it provides to the contractor are accurate and suitable. However, when an owner decides to use a performance-based specification, setting forth general performance objectives and allowing the contractor to select design solutions, materials, and methods to meet or exceed specified performance criteria, responsibility for the accuracy and sufficiency of the design and construction generally falls upon the contractor.

Should the constructed product prove defective or fail to meet specified performance requirements, disputes have arisen over responsibility for curing defects or achieving the required performance. Sorting out issues of liability often hinges upon 1) which aspects are considered design or prescriptive requirements prescribed by the owner; 2) which aspects of construction are based on a performance requirement and, hence, are under the contractor's control; and 3) whether these requirements conflict in the specifications.

A technical and legal overview is provided to help in determining the appropriateness of performance-based specifications. Since highway agency legal and contracting staff are drafting or will most likely be called upon to draft or review specifications, a better understanding of performance-based specifications—including how they differ from traditional design or method-based specifications and how risk allocation changes—should be useful.

Overall, this digest should be useful to transportation agencies' administrators, attorneys, contracting officers, contract administrators, construction managers, engineers, contractors, and financial managers.

TRANSPORTATION RESEARCH BOARD
OF THE NATIONAL ACADEMIES

CONTENTS

LEGAL ASPECTS OF PERFORMANCE-BASED SPECIFICATIONS FOR HIGHWAY CONSTRUCTION AND MAINTENANCE CONTRACTS

By Michael C. Loulakis, Esq., Capital Project Strategies, LLC

I. INTRODUCTION

Most public sector agencies have historically used a "how to" acquisition strategy, routinely providing contractors with detailed instructions on how to meet the results that the agency wanted relative to the goods, product, or service being acquired. In an industry like defense, this meant specifying what parts could be used and how manufacturing processes were to be performed. In the construction industry, it meant providing the contractor with a complete and detailed design, often specifying the "means and methods" of achieving this design, and giving the contractor no design or construction latitudes, even if there were better ways to accomplish what the owner wanted.

These practices gave agencies something they truly wanted—maximum control over the end product. However, by exercising this control, the agencies experienced an unintended consequence—they were found responsible for any problems associated with their prescriptive specifications, under what has become commonly known as the *Spearin*[1] doctrine. Under the *Spearin* doctrine, owners are deemed to impliedly warrant the accuracy and suitability of their detailed designs and method-based specifications. A contractor that reasonably relies upon these designs and specifications has the right to receive an adjustment in the contract price and contract times if the designs and specifications are erroneous.

Things have changed over time. During the 1980s and early 1990s, the Federal Government began an extensive assessment of its procurement approaches, having concluded, among other things, that it was not taking full advantage of everything that the private sector had to offer. Among the major areas of reform were project delivery (which eventually led to the use of design-build) and procurement approaches (which produced a more robust use of best value selection). Additionally, reforms placed an added emphasis on the benefits and adoption of performance-based contracting, where an agency identifies its desired outcomes and gives contractors the discretion as to how to achieve those outcomes.

These changes were evident in the procurement reforms adopted by the Department of Defense. The Department was not only directed to make greater use of performance requirements, but was also told that "performance specifications are preferred over detail specifications" and therefore to convert its specifications to performance specifications.[2] The philosophy behind this direction is particularly noteworthy:

> Sometimes we think we know exactly how a needed product should be manufactured, and we know that the manufacturer does not know how to manufacture it. If we can communicate that knowledge clearly, then we have done little harm. If all goes well, we will get a product that will meet our needs. On the other hand, if the manufacturer knows how to make the product, we may be missing an opportunity. By using a detail specification we have automatically limited the possibility of obtaining an improved, less costly, or more reliable product because we have constrained the ability of the manufacturer to be innovative. Consider the manufacture of common tools. Hand saws have not changed for generations, and they are still used in many applications. They're not circular saws, or band saws, or jig saws, but they are still useful. It would be shortsighted, however, to constrain manufacturers to produce hand saws when they may have a better item to propose.
>
> The problem becomes more acute when we are not absolutely sure how to make a product, or we communicate our knowledge poorly, or we truly need improved products. In these cases, then we may have done serious harm by including "how to" information in our specification. That is why we need performance specifications. Performance specifications leave out *unnecessary* "how to" or detail and give the manufacturer latitude to determine how to best meet our stated needs. The word "unnecessary" is emphasized because some detail requirements are necessary in a performance specification. Almost always the need for detail is generated by interface requirements.[3]

The U.S. construction industry has been less robust in the adoption of performance-based specifications (PBS). This is partly due to the fact that until the past 15 years or so, public sector construction projects were delivered through design-bid-build, where the contractor had no involvement in the design process and was awarded a contract on the basis of low bid. The modern age of construction project delivery has resulted in an ever-increasing use of 1) design-build and construction management at-risk, each of which emphasizes collabo-

---

[1] United States v. Spearin, 248 U.S. 132, 39 S. Ct. 59, 63 L. Ed. 166 (1918).

[2] *Performance Specification Guide*, SD-15, Defense Standardization Program, Office of the Assistant Secretary of Defense for Economic Security, June 29, 1995. Under the Defense Standardization Program, the Defense Department had an extensive change in its military specifications and standards from prescriptive to performance-based. This Guide is available at https://www.acquisition.gov/sevensteps/library/DODperform-spec.pdf.

[3] *Id*. at 5.

ration between designers and contractors; 2) public–private partnerships (PPP) and contracts that include not only design and construction services, but also operation, maintenance, and financing; and (c) procurement practices that focus on best value and life-cycle costing considerations, instead of simply low price. Given the pragmatics of how these delivery and procurement systems work, owners find performance specifications to be a valuable tool for obtaining creative solutions to their stated goals and needs. As a result, the construction industry is seeing more and more real life examples of performance specifying, not only in the highway sector, but also in terms of "green" initiatives (e.g., energy consumption), creative equipment layout, and technology systems that guarantee certain levels of performance.

From a liability perspective, performance specifications also offer, at least theoretically, a major advantage to an owner. The longstanding legal principle is that the *Spearin* doctrine does not apply to performance specifications, and the contractor is the party who assumes the risk of designing and constructing to meet the performance specification. However, as with many construction law issues, one must look beyond general principles. As noted in the quotation above relative to the Defense Standardization Program, most owners share the perspective that "some detail requirements are necessary in a performance specification." This creates one of the most thorny issues in dealing with liability arising out of performance specifications—is the problem actually the result of a defective design specification embedded within a performance specification, and, if so, who bears the responsibility for that defect?

The purpose of this digest is to examine the legal aspects of performance specifying in the highway sector. The centerpiece of the digest is Section VIII, which focuses on caselaw addressing performance specifications and how the above questions, as well as many others involving performance specifications, have been handled to date by courts. Sections II through IV are intended to provide context to these legal issues.[4] Section II will explain the different types of specifications used in the highway sector, with a particular focus on the differences between "method specifications" and the umbrella of "performance specifications" commonly used (e.g., end-result, quality assurance (QA), and warranty specifications). Sections III and IV discuss the "state of the practice" in the use and challenges of performance specifications in the highway sector. Sections V through VII address some quasi-legal issues relative to specifying performance, focusing on several of the commercial and contractual issues arising from their use, as well as on how performance specifications are used under alternative delivery systems. Finally, Section IX discusses how to best manage the legal issues associated with performance specifications on highway projects.

II. COMPARISONS OF TYPES OF SPECIFICATIONS

A substantial amount of technical literature describes and compares various specifications used on highway projects. Depending upon the individual's perspective, an author of a particular paper may choose from more than a dozen different terms to describe the universe of specification types, including the following:

- Materials and method specifications.
- Method specifications.
- Recipe specifications.
- Design specifications.
- Prescriptive specifications.
- End result specifications.
- QA specifications.
- Statistically-based specifications.
- Performance specifications.
- PBS.
- Performance-related specifications (PRS).
- Proprietary or proprietary product specifications.
- Warranty specifications.
- Composite specifications.
- Reference standards.

Technical literature sometimes explains that certain terms—such as "method specifications," "recipe specifications," and "prescriptive specifications"—are synonymous.[5] However, there are times when this is not done, particularly in the discussion of "performance specifications" and related terms (e.g., "performance-based specifications," "performance-related specifications," and "quality assurance specifications"). This can lead to confusion over what a particular specification descrip-

[4] Readers should note at the outset that the broad spectrum of issues involving the use and best practices associated with performance-based outcomes on highway and other transportation projects are discussed in myriad industry publications. This is an area that has great interest domestically and internationally, and its implications affect other important issues, particularly in relation to PPPs. While this digest discusses the current use of performance specifications, it is largely contextual—aimed at providing the reader background information that will help to orient the reader to the legal issues that are its focus. Readers who would like more information about performance contracting will find an abundance of information contained in the publications cited in the footnotes.

[5] *See*, *e.g.*, Glossary of Highway Quality Assurance Terms, Transportation Research Circular E-C074, 3d Update, (Transportation Research Board, May 2005), http://onlinepubs.trb.org/onlinepubs/circulars/ec074.pdf; Development and Review of Specifications, Attachment 1, Federal Highway Administration Technical Advisory, Mar. 10, 2010 (referred to herein as "FHWA 2010 Technical Advisory"), http://www.fhwa.dot.gov/construction/specrevattach1.cfm; Major Types of Transportation Construction Specifications: A Guideline to Understanding Their Evolution and Application (AASHTO Highway Subcommittee on Construction, Quality Construction Task Force, Aug. 2003) (referred to herein as "AASHTO 2003 Guidelines"), http://www.fhwa.dot.gov/construction/specs.pdf; New or Emerging Technical Specification Definitions, National Highway Specifications Library, at http://fhwapap04.fhwa.dot.gov/nhswp/browseEmergingSpecs.jsp.

tion means and the legal and contractual implications of using such a term.

In contrast, when considering construction specifications in the context of legal literature and caselaw, the terminology options narrow substantially. There are generally only three terms that are used. “Design” and “prescriptive” specifications are considered synonymous, and are generally used to describe a rigid design or construction requirement established by the project owner. Design/prescriptive specifications are distinguished from “performance specifications,” which is a term used in legal literature and caselaw to describe specifications that give the contractor some (and often complete) discretion in terms of how to design or construct a particular element of the work to meet a specified need.

The terms “design specification” and “performance specification” will be discussed throughout this digest. The purpose of this section of the digest is to provide a historical perspective of construction specifications in the highway sector, as well as an overview of the attributes of and nuances among the more commonly-used construction specification terms on highway projects.

A. The Evolution of Construction Specifications in the Highway Sector

When road building was in its infancy in the early 1900s, the public was highly reliant on contractors to design, build, and maintain the road system. “Toll roads connected major cities and industrial areas,” and there were many small, unconnected, public road-building agencies scattered around the country. The agencies knew little about what it took to build a successful road. As a result, they generally required their contractors to provide guarantees that they would maintain and repair the roads “for a specified time period after construction.”[6]

Things changed as contractors complained about warranties and state governments became more informed about road design and construction. Central to this change was the formation of the American Association of State Highway Officials in 1914, which, among other things, accelerated the movement to uniformity in road specifications and maximum agency control over the design and construction process. All of this led to the development of what has become commonly referred to as “method specifications.” Method specifications, as discussed more fully below, give precise, detailed requirements that the contractor must follow, and leave the contractor with no discretion to make any changes.

Method specifications have been commonly used since the 1940s.[7] However, in the 1960s, industry leaders began questioning whether they were the best way to deliver high quality roads. These questions were prompted by a variety of concerns, including 1) high variability in construction and materials on the completed work; 2) the lack of effective agency sampling and testing programs to determine overall compliance with the specifications; and 3) the inhibition of innovation, as method specifications did not reward a contractor for performing better than the minimum requirement.

By the 1970s, industry researchers began promoting the idea of creating new specifications that had an end result in mind—where the contractor would be told what the agency expected for a completed product and would have discretion in how to achieve those expectations. The researchers thought this could lead to more innovation and a more accurate assessment of in-place quality, with the understanding that agencies would have to establish a more structured sampling and testing program on the in-place product. This concept led to a variety of questions on how it was to be implemented, including 1) what in-place properties most directly influence product performance; 2) how should these properties be tested; 3) what elements of the work should remain under the control of the agency; and 4) how should noncompliance be evaluated?[8]

The major output from this research was the creation of a new type of specification that addressed a variety of issues on a statistically-derived basis, such as testing and test variability, sample size, and pay factors. This type was known as a “quality control specification.” While these specifications improved the methods for assessing contractor compliance, they did not necessarily address product performance, as the drivers of product performance and the test procedures needed to measure the performance characteristics did not exist. The connection to product performance was developed in the early 1980s, when researchers began focusing on life-cycle cost analysis to correlate the relationship between the designed product and future preservation, maintenance, and repair of that product. This focus on life-cycle costing led to consideration and discussion around various types of “performance specifications” and attempts to determine analytically the performance aspect of the product.[9]

Since the 1980s, the industry has spent considerable time attempting to assess how to address performance specifications, and much has been written on the subject.[10] In other highway components, such as bridges,

[6] *See* Federal Highway Administration, Performance Specifications Strategic Roadmap: A Vision for the Future, Spring 2004, updated Apr. 4, 2011; http://www.fhwa.dot.gov/construction/pssr04tc.cfm. This is generally referred to herein as “Performance Specifications Strategic Roadmap.”

[7] AASHTO 2003 Guidelines, *supra* note 5.

[8] *See* Performance Specifications Strategic Roadmap, *supra* note 6.

[9] *Id.*

[10] *See* Performance Contracting for Construction: A Guide to Using Performance Goals and Measures to Improve Project Delivery, published by the Federal Highway Administration in August 2012 and generally referred to in this digest as “FHWA’s Performance Contracting for Construction Guide” (available at http://www.fhwa.dot.gov/construction/contracts/pcfc_2012/pcfc06.cfm#content). It is the first update to FHWA’s 2006 Performance Contracting Framework, fostered by High-

there are fewer examples of the use of performance specifications. One resource is a March 2011 report released by the Federal Highway Administration (FHWA) Office of Innovative Program Delivery entitled, *Key Performance Indicators in Public-Private Partnerships, A State-of-the-Practice Report*.[11]

B. Construction Specifications Generally

Specifications are contract documents that are used to communicate a project's requirements and the criteria by which the owner will verify conformance with those requirements:

> They communicate to bidders prior to contract award, and to the selected contractor thereafter, the definitive directions, procedures, and material and equipment requirements the State DOT considers necessary for completing the contract work. As a result, they can directly affect the quality of design and construction of every highway product, as well as the cost of construction and maintenance.[12]

Specifications enable a project owner to have a standard set of procedures for managing a project, including changes, and also the minimum standards against which to evaluate the contractor's work, including allowable tolerances. In addition to telling a contractor what is expected of it, specifications serve the purpose of informing a contractor of quality and acceptability of work, allowable tolerances, and how payment will be handled.[13]

As noted earlier, there are a number of ways that specifications have been characterized. For purposes of this section, the specifications have generally been organized into four categories: 1) method,[14] 2) performance, 3) composite/mixed, and 4) proprietary.[15] When the final product is described in terms of component materials, dimensions, tolerances, weights, and required construction methodology (e.g., equipment type, size, speed), the specifications are commonly known in the highway sector as "method specifications." When the contractor is given some discretion as to how to perform the work, the specification structure is commonly described as a "performance specification."

C. Method Specifications

Method specifications are also known as "material and method," "recipe," "design," and "prescriptive" specifications. They explicitly identify the materials and work methods or procedures a contractor should use to complete the work included in the contract, placing maximum control in the hands of the specifying agency. The American Association of State Highway and Transportation Officials (AASHTO) has characterized method specifications as providing the contractor with a "cookbook" with specific "recipes" to follow.[16] "In effect, the Agency rents the Contractor's personnel and equipment."[17] Method specifications are the predominate type of specification used in the United States highway industry.[18]

As an example, a typical compaction method specification would detail items such as the 1) moisture content of soils or granular material; 2) minimum rolling temperatures for bituminous materials; 3) maximum thickness of each layer to be compacted; 4) type of roller (e.g., smooth, sheep's foot, vibratory); 5) weight of the roller; 6) minimum number of passes of the roller; and 7) minimum ambient/surface temperature for bituminous materials. If the contractor followed the "recipe," then the agency would presumably have an acceptable product.

There are several reasons why method specifications have been used so extensively in the highway industry. As noted by FHWA, "Method specifications typically operate on the principle that if the specified materials and methods worked in the past, then the end product is likely to perform well in service so long as the contractor strictly adheres to the prescribed requirements."[19] Consequently, because the details of a method specification are typically based on methods that historically provided satisfactory results, they eliminate risk associated with newer, less proven methods as well as the risk associated with varying contractor performance. They are also familiar, straightforward to write, and can be implemented with minimal agency involvement. This is particularly helpful to those agencies that

---

ways for LIFE. *See also* Performance-Based Contracting for the Highway Construction Industry (Battelle, Feb. 2003) (generally referred to herein as "Performance-Based Contracting for the Highway Construction Industry"), http://www.ncppp.org/resources/papers/battellereport.pdf; Performance Specifications Strategic Roadmap, *supra* note 6.

[11] FHWA-PL-10-029, http://international.fhwa.dot.gov/pubs/pl10029/pl10029.pdf. This report provides a state-of-the-practice description of domestic and international practices for key performance indicators in PPPs. The report is based on a comprehensive literature review and eight case studies from Australia, British Columbia, the United Kingdom, and the United States. It identifies how government-developed performance measures reflecting societal goals such as congestion management or environmental impact are translated through key performance indicators and included in project documents for designing, constructing, operating, and maintaining transportation facilities.

[12] FHWA 2010 Technical Advisory, *supra* note 5.

[13] *Id.*

[14] Note that in later sections, "method specifications" will be referred to as "design specifications"—consistent with the term used in legal literature.

[15] FHWA also considers "reference standards" to be a type of specification. *See* FHWA 2010 Technical Advisory, *supra* note 5. These are standards developed by organizations such as AASHTO, ANSI, ASTM, and ACI that provide national standards of performance or measurement. Because of their limited application to this digest, they will not be discussed any further than this footnote.

[16] AASHTO 2003 Guidelines, *supra* note 5, at 2.

[17] *Id*. at 3.

[18] PERFORMANCE SPECIFICATIONS STRATEGIC ROADMAP, *supra* note 6.

[19] FHWA 2010 Technical Advisory, *supra* note 5.

lack the expertise and resources required to use performance specifications.[20]

Method specifications have several key disadvantages. The contractor has little, if any, opportunity to deviate from the specifications. It has no responsibility for performance deficiencies in the end product and no incentive to innovate or use better, more efficient construction methods. The contractor's only responsibility is to follow the specifications.

Another major disadvantage of method specifications is the associated inability of an agency to determine the actual quality of the contractor's work. Method specifications typically base acceptance on the "reasonable conformance" or "substantial compliance" of the work with the specification requirements, based on the agency's inspection of the work. Individual or representative field sample results may not recognize the inherent variability in construction materials—particularly when the sample is intended to address quantities of materials. Consequently, this can create some problems, where one field sample could be truly representative of the in-place conditions and another sample might be an aberration of the actual in-place conditions. This can lead to conflicts between the contractor and agency if work is rejected.

Most method specifications do not indicate whether or how contract prices should be adjusted for nonconforming work. In fact, a contractor's payment is not linked to product quality or long-term performance—it is simply tied to a demonstration that the contractor met the specifications it was furnished. As a result, contractors usually receive 100 percent payment for the work completed, regardless of the level of quality.[21]

The use of method (i.e., design and prescriptive) specifications is certainly not unique to the highway industry. However, it should be noted that other construction sectors seem to afford construction contractors far more latitude in terms of means and methods of construction. This is one reason that other construction sectors tend to use the terms "design" and "prescriptive" specifications, rather than "method" specifications, as their nomenclature for this category of specification. For example, while owners in the water and wastewater sector have historically been quite prescriptive in terms of specifying the type and layout of equipment, they largely leave the means and methods for installation of process piping to the contractor. Similarly, building contractors have substantial discretion over most of the means and methods of the construction process, such as support of excavation and shoring of concrete slabs, even though they are bound to comply with design specifications relating to these activities.

D. Performance Specifications

The term "performance specification" is an "umbrella" concept that incorporates end result specifications, PRS, PBS, QA specifications, and warranty specifications. A performance specification describes the desired final product in terms of operational characteristics or ultimate use and gives the contractor significant latitude in how it achieves the final product. As an example, with respect to concrete pavement, one might see a performance specification tied to strength (e.g., 28-day compressive strength), slab thickness, and smoothness levels (e.g., mean profile index). For soil used as fill in an embankment, one might see a compaction performance specification tied to maximum air voids content, without dictating the type of roller or number of roller passes. Note that results may also be expressed in terms of time, safety, work zone management, quality, and cost. With all performance specifications, it is critical to identify criteria for verifying compliance and the consequences if the contractor fails to comply.

It is beyond the scope of this digest to thoroughly review the nuances, policies, and "how-to's" associated with the terms falling under the performance specification umbrella.[22] However, it is important to have a general understanding of what distinguishes one from another:

- *End-Result Specifications*. These specifications require the contractor to take the entire responsibility for producing and placing a product. The agency's responsibility is to either accept or reject the final product or to apply a price adjustment commensurate with the degree of noncompliance with the specifications. Agency acceptance is based on sampling and testing of the final in-place product. Because they make the contractor completely responsible for supplying a product or an item, these specifications offer the contractor the greatest degree of flexibility in exercising options for developing new techniques and procedures to perform the work and to improve the quality of the end product. While there may be some prescriptive elements to the specification, they are generally minimized.[23]
- *Quality Assurance Specifications*. QA specifications require contractor quality control and agency acceptance activities throughout the production and placement of a product. Final acceptance of the product is usually based on a statistical sampling of the measured quality level for key quality characteristics. Stated differently, QA specifications establish acceptance by identifying, for each quality characteristic, the percentage of measured materials within a lot that must be within specified limits. This has the benefit of providing an objective process for assessing acceptance. The critical

[20] AASHTO 2003 Guidelines, *supra* note 5.

[21] AASHTO 2003 Guidelines, *supra* note 5; FHWA 2010 Technical Advisory, *supra* note 5.

[22] For further information on these terms, *see generally* Performance Specifications Strategic Roadmap, *supra* note 6; FHWA 2010 Technical Advisory, *supra* note 5; AASHTO 2003 Guidelines, *supra* note 5; Performance-Based Contracting for the Highway Construction Industry, *supra* note 10; FHWA's Performance Contracting for Construction Guide, *supra* note 10.

[23] *Id*. at 6.

aspect of developing a QA specification is to identify the material attributes that are essential to good performance and the associated limits within which the work can be produced to suggest good performance over the design life of the product. For asphalt pavements, quality characteristics might include asphalt content, density of the compacted pavement, and pavement smoothness.[24] QA specifications also link the measured quality levels to payment. For example, the contractor might receive an increased payment (e.g., 1 to 105 percent) for superior quality work, and a reduced payment (0 to 99 percent) for lesser quality work. Work below a minimum quality level may be subject to removal and replacement or another corrective action.[25]

• *Performance-Related Specifications*. PRS are QA specifications that use quality characteristics and life-cycle cost relationships that are correlated to product performance through mathematical models. The quality characteristics are amenable to acceptance testing during construction. For asphalt pavements, these characteristics might include total in-place air voids or ride smoothness; for concrete pavements, they might include concrete permeability and strength. The models attempt to predict when and to what extent a construction product (e.g., pavement) will exhibit a given type of distress (e.g., fatigue cracking or joint spalling), as well as the post-construction life-cycle cost for maintenance and rehabilitation. PRS may use empirical data, engineering judgment, and life cycle costing as a basis for acceptance and pay adjustments.[26]

• *Performance-Based Specifications*. PBS are concerned with the performance of the final in-place product, not how it was built.[27] These are QA specifications that describe the desired levels of fundamental engineering properties (e.g., resilient modulus, creep properties, and fatigue properties) that are predictors of performance and appear in primary prediction relationships (i.e., models that can be used to predict pavement stress, distress, or performance from combinations of predictors that represent traffic, environmental, roadbed, and structural conditions). They differ from PRS in that they specify the desired levels of fundamental engineering properties rather than key quality characteristics.[28]

• *Warranty Specifications*. These are performance specifications where the condition of the product is measured after some predetermined time. FHWA has defined them as "a guarantee of the integrity of a product and of responsibility for the repair or replacement of defects by the contractor."[29] For example, the agency could use a warranty specification to specify pavement performance (e.g., rut depths, transverse or longitudinal cracking) or metrics such as the Pavement Condition Index, pavement smoothness, and surface friction.[30] The agency could require the contractor to warrant this performance over a period of time (e.g., 2 to 10 years). The agency monitors pavement performance during the warranty period, and any defects attributable to construction are to be repaired by the contractor. This can be an advancement to a typical end-result specification, in that it can specify actual performance of the pavement rather than quality characteristics that are indicative of performance. Warranty specifications do have some major challenges, however, relative to the financial burdens that accompany partial or complete product failures.

Each of the above-referenced performance specification terms gives some discretion to the contractor over how to perform the required work. As is evident from the above descriptions, the primary differences among them lie in how and when contract compliance is measured, as well as the consequences for failing to meet the contract's requirements.

To accomplish the goals behind performance specifying, a well-drafted performance specification needs to consider a number of items. While these items are addressed further in Section IV below, they include 1) an identification of the agency's needs or goals; 2) performance parameters that can be measured or tested to ensure that the goals are satisfied (e.g., pavement smoothness); 3) measurement or testing techniques (e.g., using a high-speed profilograph to measure pavement smoothness); 4) performance values for each performance parameter (e.g., maximum International Roughness Index in inches per mile); 5) inspection and verification testing regimens for both the contractor and the agency; and 6) price adjustments to reflect the range of acceptable work.[31]

E. Composite/Mixed Specifications

As will be discussed in detail in the caselaw review in Section VIII, it is rare that a performance specification will not contain some prescriptive requirements. For example, if a bridge project involved the driving of concrete cylinder piles, a performance specification might say, "Drive the 50-foot diameter piles to a minimum tip elevation of -55 feet and to a bearing capacity of 650 tons." However, the agency might choose to impose some specific restraints on the contractor's flexibility in achieving these results. Consequently, it may add

[24] FHWA 2010 Technical Advisory, *supra* note 5.

[25] AASHTO 2003 Guidelines, *supra* note 5.

[26] FHWA 2010 Technical Advisory, *supra* note 5. As of the date of the Advisory, the sole PRS has been piloted on concrete pavements, with a notation that research is being performed on asphalt.

[27] AASHTO 2003 Guidelines, *supra* note 5.

[28] *Id.* As of the date of the Advisory, complete PBS had not been applied in highway construction, "primarily because the most fundamental engineering properties are only now becoming amenable to timely acceptance testing."

[29] National Highway Specifications Library, *supra* note 5.

[30] Design-Build Contracts: Performance Specifications, FHWA, Highways for Life, http://www.fhwa.dot.gov/hfl/innovations/designbuildperformspecs.cfm.

[31] *See generally* FHWA 2010 Technical Advisory, *supra* note 5.

requirements such as hammer size, cushion replacement, jetting limitations, and maximum stress levels in driving the piles. These combined performance and design specifications are often referred to as "composite specifications" or "mixed specifications."[32]

While liability will be discussed in depth later, it is worthwhile for readers to note that composite specifications are often the most complicated to resolve when problems arise, as contractors and owners will each view the specification as being "more" one way or the other—depending on what it is in dispute. For example, in the bridge scenario described above, assume that the specification precluded any type of pre-jetting. When the contractor starts driving the piles, it finds that it is exceeding the maximum stress levels and that the piles are starting to crack at elevations well above the minimum tip elevation. Assume further that the owner and contractor agree that the solution to this is to pre-jet to within 5 ft of the minimum tip elevation, which operation costs the contractor more money and time than it had planned. The contractor would likely argue that the specification was defective, in that the design requirements led it to believe that it need not price any pre-jetting operations. The owner would likely argue that it had drafted a performance specification and that the relaxation of the jetting requirements was to accommodate the contractor. As discussed in more detail in Section VIII, the answer to this situation is very much dependent upon how much discretion the contractor truly had in meeting the performance specification, and whether the owner's design specifications were so "cookbook" as to make the owner responsible for the consequences of the change in approach.

F. Proprietary Specifications

The term "proprietary specifications" is intended to identify desired products or processes by manufacturer's name, brand name, model number, or other unique characteristic. Even if a manufacturer is not explicitly stated, a specification is considered proprietary if only one manufacturer can meet the specified requirements. These are used when an owner wants to closely control product selection and, in some circumstances, develop a higher level of design based on more precise information obtained from the manufacturer's data. Their use introduces the potential disadvantage of unnecessarily eliminating/narrowing competition. They might also require products with which the contractor has perhaps had little or poor experience (e.g., slow delivery); this can lead to higher bid prices or charges of favoritism.[33]

"Brand name or equal" clauses fall within this category of specifications, with the presumption that there is an "equal" to the "brand name" specified. While FHWA allows the use of a proprietary product (i.e., a "sole source" or "brand name with no equal"), there are severe constraints on this practice, and the agency is generally required to demonstrate that there is no suitable alternative to the specified product.[34]

G. Application of Specifications to the Compaction Process

While it is beyond the scope of this digest to discuss the technical aspects of specifications in any detail, it is useful to see how the specifications apply to a common element of highway work such as compaction:

- A method specification would establish all of the steps for the compaction process. This would include the type and mass of the compaction equipment, the number of passes, the moisture content of the fill, and its layer thickness.
- A performance specification using an "end product" approach would specify compaction in terms of a required value for properties of the fill when placed, such as density, moisture content, and air voids.
- A performance specification using a "warranty" approach would specify behavior over a period of time in terms of maximum permissible settlement.

As discussed above, all of these approaches lead to a series of questions that the agency needs to consider related to measurement, verification of compliance, and recourse against the contractor for noncompliance.

III. CURRENT HIGHWAY INDUSTRY USE OF PERFORMANCE SPECIFICATIONS

As described previously, there are myriad reasons why highway agencies have expressed dissatisfaction with method specifications. FHWA's 2004 publication, *Performance Specifications Strategic Roadmap: A Vision for the Future*[35] summarizes them well. Method specifications "could not deal with rewarding a contractor for better-than-minimum practice" and "could not consistently deal with work that was outside the bounds of 'reasonably close conformance.'" Method specifications "inhibited innovation" and provided no incentive to a project manager to consider "departures from standards" and "departures from procedure."

These observations are similar to those made in other construction sectors, even though other sectors generally afford their construction contractors more latitude in terms of implementing the means and methods of construction. Building owners concluded that the broad use of prescriptive specifications impeded general and trade contractors from using their vast knowledge of the construction process to develop better solutions. Owners also concluded that they faced exposure to

[32] This example is derived from a Maryland DOT project constructed in the mid-1980s, known as "Removal and Replacement of Bridge No. 3097 on Maryland Route 150 (Eastern Avenue) over the Back River," Contract No. B 752-501-471.

[33] FHWA 2010 Technical Advisory, *supra* note 5.

[34] 23 C.F.R. 635.411(a); *see generally* FHWA 2010 Technical Advisory, *supra* note 5.

[35] Available at http://www.fhwa.dot.gov/construction/pssr04tc.cfm, *supra* note 5.

change orders when the prescriptive specification was inadequate.

Consider the area of fire protection sprinkler systems. These systems were historically designed by the owner's architect/engineer. However, many of these designs had to be totally redesigned, at great expense to the owner, to deal with field conditions and the vagaries of local code officials. This prompted the building industry to shift to the use of performance specifications for this work, leaving it to the fire protection trade contractors to determine the precise design that would be needed to satisfy code requirements.

While the move to performance specifications in other construction industry sectors was originally triggered, to a large extent, by risk considerations (i.e., eliminating change orders for defective design specifications), the interest in using them has gone far beyond managing change order exposure. Owners discovered that contractors often had better technical approaches than designers to meet the owner's ultimate objectives, particularly when factoring in price and constructability. Performance specifications were convenient vehicles for letting contractors provide this value. The growth of construction management at-risk and design-build, which place a high value on integrating the design and construction teams early in the design process, has also prompted a greater use of performance specifications in other industry sectors. Performance specifications are routinely used on buildings that seek Leadership in Energy and Environmental Design (LEED) certifications and energy savings.[36]

While the highway sector has been discussing the use of performance specifications and performance-based contracting for quite some time, progress in transitioning to a wider use of these techniques has been relatively slow. There has been progress in using performance specifications in areas driven by technology, such as traffic management systems, tolling facilities, and other systems using instrumentation and communications platforms. The same is true with operation and maintenance services, particularly on concession contracts. However, the design and construction of physical structures, such as roads and bridges, has not routinely used performance specifications, other than for pavements.

[36] *See*, for example, Nadine M. Post, *Fee Holdback Raises Eyebrows*, ENGINEERING NEWS RECORD, May 14, 2012, available by subscription at https://enr.construction.com/engineering/subscription/LoginSubscribe.aspx?cid=22847.

A. Pavement

Major progress has taken place in moving pavement from a predominately method specification process to one where the state of the practice is replete with examples of end result and statistically-based QA specifications. This move started with pavement research supporting the benefits of performance specifying, and has resulted in their use around the country.

In recent years, pavement research has largely focused on developing prediction models for both rigid pavement (i.e., portland cement concrete (PCC) pavement) and flexible pavement (i.e., hot-mix asphalt (HMA) pavement) that can support the development and use of PRS. This has resulted in a number of trial PRS projects in the United States and the development of the PaveSpec software to help state highway agencies develop PRS for their state,[37] as well as FHWA's creation of the WesTrack facility in Nevada.[38]

Several states have developed PRS for PCC pavement, including Indiana, Wisconsin, Florida, and Tennessee. The PRS for each state was developed using PaveSpec software and local climatic conditions (for pavement performance prediction) and local costs for maintenance and rehabilitation. Relative to HMA, a number of tests have occurred at WesTrack, including the use of full-scale accelerated load testing, to support the adoption of PRS.

As evident by the examples cited above, warranty specifications have been broadly used for both PCC and HMA pavements to address actual performance over time. A warranty specification has the advantage of being able to cover certain types of distresses that could not be predicted under a PRS (e.g., corner cracking and scaling). It can also cover certain functional characteristics that would be difficult to predict using predictive

[37] PaveSpec (currently version 3.0) is a software program available through FHWA that enables transportation agencies to develop PRS and predict the performance of a constructed pavement. It is also considered a technology transfer tool to enable contractors and highway agencies to get a better understanding of what it takes to construct highway performance pavements. According to FHWA, some of its specific capabilities include:

- Simulation of pavement in terms of 1) transverse cracking, 2) transverse joint faulting, 3) transverse joint spalling, and 4) pavement smoothness over time.
- Application of a user-defined maintenance and rehabilitation plan to compute life-cycle costs.
- Development of pay factor charts for the following acceptance quality characteristics: 1) strength, 2) thickness, 3) air content, 4) smoothness, and 5) consolidation around dowels.
- Computation of contractor pay factors from actual construction test results for the above five acceptance quality characteristics.
- Assistance in executing sensitivity analyses on a given developed PRS.

More information is available at http://www.fhwa.dot.gov/pavement/pccp/pavespec/index.cfm.

[38] WesTrack was FHWA's test facility in Nevada for developing PRS for HMA pavement construction.

models, such as texture/texture loss and skid resistance.

Warranties have been more widely applied to HMA pavements than to PCC pavements. This may be due to the fact that short-term (e.g., 5-year) warranties on PCC pavement are not useful—even poorly designed and constructed PCC pavements will often last 5 years before showing significant distress and deterioration. As discussed later in this digest, while longer-term warranties can overcome this, there are commercial problems with obtaining them given the perspective of the surety bond industry. This issue is not as significant on HMA pavements, where typical performance characteristics (e.g., ride quality, rutting, friction, and cracking) can be observed in a short-term period.

B. Bridges

There are a number of research studies on the use of performance specifications for bridges, with the focus being on structural concrete and bridge decks. The typical quality characteristics for these specifications were strength, stiffness, permeability, and air content. Some of these research studies addressed optimizing mix design, sampling and testing, selection of specification limits, and pay factors. However, while there has been research in these areas, it appears that bridge specifications have remained relatively prescriptive, requiring that concrete be batched, mixed, placed, and cured in accordance with the plans and specifications. There is also little evidence that performance specifications are being used robustly on long-term contracts (e.g., design-build-operate-maintain (DBOM) and concession contracts), as underlying design requirements for those contracts referenced agency or other FHWA-approved standards.

There are several practical challenges with using performance specifications for bridges. There is a general reluctance by "safety-conscious bridge engineers" to give contractors decisionmaking responsibility—creating few opportunities for innovation and risk transfer. The long service life of most bridge components also makes short-term warranties or maintenance agreements ineffective from a risk-transfer perspective, as there is a likelihood that the contracting entity will dissolve over time or its initial costs to put in place life-cycle costing would make the initial costs of the construction too high.

C. Geotechnical Features

Most geotechnical-related specifications on highway projects seem to be currently based upon either method specifications (e.g., number of roller passes for earthwork construction) or end-result specifications (e.g., achievement of 95 percent compaction). Method specifications have been relied upon because of the high correlation between construction methods and performance, and the absence of widely-accepted methods to evaluate performance characteristics during construction. While end-result specifications are used, they are often combined or substituted with prescriptive specifications.

There is a practical challenge in balancing geotechnical variability and test methods that could validate performance over the life cycle of the geotechnical feature—i.e., during construction, after project completion, and long term. Low-frequency testing is the state of the practice, and a move to PBS requires, among other things, statistically valid assessments of performance characteristics based on high-frequency testing and monitoring.

D. Work Zone Traffic Control

The majority of work zone traffic control specifications currently in use are method specifications that require the contractor to perform to a set of clear, specific steps for work zone management, with no opportunity to deviate or innovate. This is in spite of industry findings that these traditional method-based specifications for work zone traffic control do not provide an efficient and cost-effective means of managing the work zone. It appears that even those agencies that have included performance specifications for work zone traffic control have done so in title only. For example, some of these performance specifications will identify performance goals that are aspirational (e.g., "Provide a safe travel corridor"), but do not tie these aspirations/objectives to a quantitative measurement strategy (e.g., "Limit work-zone crashes to two per month.").

Agencies have been more successful in effecting positive changes to work zone traffic management by implementing innovative contracting techniques—as opposed to strict performance-based traffic control specifications. Among the techniques that have reduced construction durations and minimized traffic disruption are A+B bidding and lane rental.[39]

E. Intelligent Transportation Systems and Operations and Maintenance

Performance specifications are routinely used by agencies when they contract with an entity to develop intelligent transportation. This is similar to what occurs in other industries where innovative technology and management approaches are the centerpiece of the contract and the party seeking the approach is looking for innovation from the system's developer.

Consider a recent request for proposal (RFP) issued by the Virginia Department of Transportation (VDOT).[40] The RFP contains a broad set of performance

---

[39] *See, e.g.*, Washington State DOT discussion of A+B bidding method (http://www.wsdot.wa.gov/Projects/delivery/alternative/ABBidding), and lane rental (http://www.wsdot.wa.gov/Projects/delivery/alternative/LaneRental.htm).

[40] *See* VDOT's July 10, 2012, RFP (RFP # 150401) for "Transportation Operations Centers and Statewide Advanced Traffic Management Systems Services." The purpose of the RFP is to establish a contract to provide VDOT with, among other things, Transportation Operation Center Floor Operations, Intelligent Transportation System Infrastructure and Field Network Maintenance, and design of a Statewide Advanced Traffic Management System (ATMS) Solution and Technology Support, http://www.virginiadot.org/business/

requirements associated with, among other things, the Advanced Traffic Management System (ATMS), that address functional capabilities, interfaces, technology support, and transition planning.[41] These performance requirements are expressed in broad terms such as 1) providing "the functionality currently provided by the existing ATMS as well as additional desired capabilities"; and 2) having an architecture that includes "redundancy" and "shall be modular, allowing for rewrite or replacement of functional components that do not require reengineering of the entire system." Readers should note that this RFP also includes prescriptive requirements that are intended to augment the performance specifications.

It is also noteworthy that agencies routinely use performance specifications when they outsource the operation and maintenance (O&M) of their highway assets (e.g., through a PPP). Common PPP performance specifications related to operations (e.g., average vehicle speed, incident response, lane availability, and customer services) and maintenance (e.g., mowing, litter pickup, and winter maintenance) can be specified as processes in detailed maintenance plans or as outcomes to be achieved. Readers should further understand that performance standards are commonly used for measuring the condition of a facility at the end of a PPP concession when it reverts to public control (commonly called "handback"). These handback performance measures often consider residual asset value and remaining design life. Obviously, one of the benefits of these handback requirements is that they can influence the design and construction of the facility, causing the concessionaire to think in terms of life-cycle costing as it recognizes its handback obligations.

IV. DECIDING WHEN AND HOW TO USE PERFORMANCE SPECIFICATIONS

As noted in the preceding section, performance specifications have not been frequently used for the design and construction aspect of a highway project, except in some limited areas. This is in stark contrast to what we see in other construction industry sectors, where the decision to use performance specifications was a fairly easy one to make.

Consider, for example, how the developer of a project-financed, 200-MW gas-fired power plant will contract for design and construction. It will undoubtedly use a lump sum engineering, procurement, and construction (EPC) contract, requiring the EPC contractor to guarantee that it will deliver 200 MW of electricity on a fixed date, while achieving, among other things, specified levels of fuel consumption (i.e., heat rate), emissions, and noise. The contract may direct the EPC contractor to use certain vendors for key equipment (e.g., gas turbine, heat recovery steam generator, and instrumentation and controls). However, the bulk of the technical components of the contract will be written around performance specifications that give the EPC contractor substantial latitude in how it will achieve its contractual guarantees.

What are the reasons for using performance specifications on power plants like the one described above? It is clear that a developer needs the EPC contractor's skills, expertise, and ideas, which are a natural fit for performance specifying for any industry. However, the primary driver is based on the developer's need to preserve the contractor's responsibility for achieving the performance guarantees. These guarantees are the cornerstones to obtaining project financing and achieving the project's expected financial performance. If the developer dictates any aspect of the design or construction to the contractor, it creates a potential excuse for the contractor if there are problems in meeting the guarantees. More than one contractor has blamed performance shortfalls on design elements dictated by an owner. A power plant developer simply cannot take this risk.

While the process, power, and petrochemical sectors routinely use performance guarantees and performance specifications, this is not the case in other sectors of the construction industry. As noted above, the construction of buildings and civil works projects was historically delivered through design-bid-build, where owners and their architects and engineers fully controlled the design process, and, in the highway sector, also the construction means and methods. As a result, they did not generally think about performance specifications.

The move to design-build and other integrated delivery systems should have resulted in a quicker shift to performance-based contracting, as it would enable the owner to take advantage of the design and construction teams working together. However, while owners have theoretically espoused interest in using performance specifications, they find the process of converting to a performance-based culture challenging. Conversion not only requires these owners to give up some design and construction control, but also that they think about performance attributes and convert their longstanding prescriptive specifications to PBS. Many owners say, in essence, "the cure is worse than the disease," and have (often through inaction) maintained the course of using prescriptive specifications, even on design-build projects.

Given this, the answer to the question about which projects are appropriate for performance specifications begins with a pragmatic point—the project's owner needs to be committed to using them. For owners that

---

transportation_operations_centers.asp (last visited Jan. 16, 2012).

[41] An ATMS is a computerized transportation communication system that employs communication technology to gather traffic information from field devices, and uses traffic sensors, environmental sensors, cameras, and other devices deployed along the roadside to monitor traffic conditions. A key function of the ATMS is to enable Transportation Operations Centers to detect traffic incidents and congestion rapidly, and subsequently dispatch resources to the incident scene. It also allows ramp metering, active traffic management strategies to smooth the flow of traffic, and the dissemination of other real-time travel information.

have not previously used performance specifications in any meaningful way, this means having a strong owner advocate with the power to commit the resources needed to develop appropriate performance specification language. It means bringing in expertise to facilitate defining project elements in terms of expected outcomes, and moving away from stating the detailed way to achieve those outcomes. It means being able to balance objectively those prescriptive specifications that should survive (i.e., they are either essential or represent the time-tested best solution for the particular owner) with those that are discretionary and can be replaced if a contractor has a better way of achieving the ultimate performance outcome. It means having an owner with the patience to absorb the growing pains of converting to a performance-based culture and to use the lessons learned from one project to improve the next project. Owners exhibiting these characteristics will put themselves in a strong position to successfully implement a performance specification process when they make the decision that these specifications are warranted on a particular project feature.

Owners on some commercial projects find it important to develop a performance-based culture. For example, owners seeking to achieve a specific level of LEED certification could give the contractor a design that prescribes specific LEED prerequisites and credits to be achieved. However, the use of a performance specification, coupled with a design-build relationship, would allow the contractor to make this determination, and face the consequences if it failed to accomplish this certification. The same holds true with support of excavation for a building, where owners have become accustomed to giving the contractor geotechnical data and letting knowledgeable trade subcontractors provide the engineering and construction solutions to accomplish the goal. In fact, the American Institute of Architects has, for many years, placed in its standard form construction contract a concept called "design delegation," whereby performance specifications are given to a contractor in a specific area (e.g., mechanical and electrical systems) and the contractor is obligated to, in essence, "design-build" a solution that meets the specification.[42]

As noted in the preceding section, the use of performance specifications in the highway sector is relatively narrow. To answer the question of which types of highway projects are well-suited to their use, an agency should focus on project elements where the industry can innovate and influence performance outcomes.

Among the projects well-suited for performance specifications are complex ones involving major reconstruction or new capacity, multiphased work zone management, major or nonstandard structures, and high average annual daily flow traffic that requires accelerated design and construction. Projects least likely to benefit from performance specifications are those involving minor resurfacing or restoration, with the caveat that even these projects can benefit from them if the agency allows the contractor significant latitude through the selection of alternative designs, materials, or construction methods. Given this, among the types of projects agencies might find suitable for performance specifications are new highways and interchanges with nonconventional designs and complex geometry, high-profile projects with significant public impacts and multiple stakeholders, and projects requiring right-of-way (ROW) plans with significant relocations. Complex projects with high traffic flow can particularly benefit from their use, as the contractor will have the flexibility to plan and phase the work in a manner that best suits its design and construction operations.

After project types and desired outcomes are determined, agencies should think about how to define performance in terms of desired outcomes and user needs, and how to measure and test the finished product. For example, if enhancing the construction quality of a bridge deck is the primary desired outcome, an owner might think about end-result performance parameters that consider concrete permeability, cover depth, deck cracking, strength, and air content. Similarly, if quality of geotechnical features is the primary desired outcome, an owner might consider establishing end-result performance parameters relating to density, moisture, and stiffness/modulus.

Relative to measuring and testing the finished product, there is a benefit to the agency if it can do so quickly, accurately, and economically, using nondestructive testing techniques. As an example, if a pavement outcome is based on rutting, one might use rut depth as the basis for measuring the performance and test this with a high-speed rut bar. On the other hand, if a measurement strategy is difficult to achieve, then perhaps a method specification—rather than a performance specification—may be the best approach to achieve the project goals.

---

[42] Section 3.12.10 of AIA Document A201-2007, General Conditions for the Construction Contract, states, in general, that:

• The contractor will furnish professional design services if they are specifically required by the contract documents or the contractor needs to provide such services in order to carry out its responsibilities for construction means, methods, or techniques;

• The contractor's design services must comply with applicable licensing laws and bear appropriate signatures and seals of licensed design professionals;

• The owner and architect must specify all performance and design criteria that the contractor needs to perform its services, and are entitled to rely on the adequacy, accuracy, and completeness of the contractor's design services as long as they have specified all performance and design criteria that must be satisfied;

• The architect will review and approve contractor submittals only for the limited purpose of checking their conformity to the information given and the "design concept" expressed in the contract documents; and

• The contractor is not responsible for the adequacy of the performance or design criteria required by the contract documents.

There is substantial literature on what others in the construction industry have used to develop performance specifications. For example, the Manual of Practice developed by the Design-Build Institute of America (DBIA) has a section entitled, "Developing Performance-Based Requirements for Design-Build Projects," that provides a comprehensive approach to using and developing performance specifications on an architecturally-driven project. It identifies the key steps as 1) starting with establishing functional requirements (e.g., the project's key goals, challenges, and constraints); and 2) moving to the development of performance requirements that describe a necessary result but not the solution (e.g., a requirement for a light fixture that would express the number of foot-candles, but not the make or model of the device).[43] Importantly, it cautions specification writers to look at each performance specification and answer the following questions:[44]

- Is each requirement attainable and feasible? Is it possible to construct a facility that meets the requirement?
- Is each requirement necessary? What would/could happen if this requirement is not included?
- Is the requirement unambiguous? Will readers give the same interpretation?
- Is the requirement traceable from a higher-level functional requirement? If not, why is it included?
- Does the requirement have an objective, measurable standard and a means of substantiation?

As noted in later sections of this digest, these questions form some of the major legal issues associated with performance specifications. The reality is that these specifications frequently are ambiguous and do not contain measurable standards of substantiation.

While there are many examples from industry literature that describe approaches to developing PBS and contracts, one that FHWA recently highlighted is the Michigan Department of Transportation's (MDOT) M-115 pilot project. This $3.8-million design-bid-build project is extensively discussed in FHWA's *Performance Contracting for Construction Guide*.[45] It involved a rural 5.56-mi, two-lane highway project with pavement in poor condition and two bridges that needed reconstruction. MDOT used a series of techniques to gain stakeholder support and feedback on performance measures and outcomes, and used a best-value procurement process to select a contractor. The performance goals ultimately used were 1) date open to traffic, 2) construction and cleanup completion, 3) pavement performance, 4) worker safety during construction, 5) work zone crashes, and 6) motorist delay. Each goal had a series of incentives and disincentives, and the RFP allowed contractors to propose more aggressive goals to raise their best value scores.[46] For example, the baseline pavement warranty on the project was 5 years. Proposers who offered an additional year received 15 extra points in the scoring process; those who offered an additional 2 years received 30 points; and those proposers who offered 3 additional years received 50 points. FHWA concluded, in its "What We Have Learned" section of the *Performance Contracting for Construction Guide*, that this pilot project was highly successful and resulted in significant innovation and quantified benefits.[47]

V. THE EFFECT OF PROJECT DELIVERY AND PROCUREMENT STRATEGIES ON PERFORMANCE SPECIFICATIONS

Performance specifications are project delivery and procurement "neutral"—an owner can use some form of performance specifications on any type of project delivery approach and procurement system. For example, design-bid-build projects can use performance specifications that focus on material properties and construction practices that will have the most effect on long-term performance. Design-bid-build projects also can use incentives and disincentives and pay-factor adjustments to promote enhanced quality and "enforce" the performance specification.

However, the structure of design-bid-build limits how far an owner can go in using performance specifications. The relationship of the parties under design-bid-build (i.e., the fact that the design is being done by someone other than the construction contractor) and the associated procurement approach (i.e., the low bidder is awarded the contract and a bidder's technical concepts are not scored) constrain how much influence the contractor can have on the finished product, particularly over a period of time. Consequently, owners who are interested in expanding the breadth and effectiveness of performance specifications to optimize innovation, value engineering, and transfer of performance risk will often turn to more creative delivery and procurement approaches than those offered by design-bid-build.

A. Project Delivery Options that Optimize the Use of Performance Specifications

From a project delivery perspective, design-build is an excellent way to implement performance specifications. As noted in the 200-MW power plant discussed above, this delivery system enables an owner to get the benefit of a design and construction team's collaboration

---

[43] *Developing Performance-Based Requirements for Design-Build Projects* 13, *in* DESIGN-BUILD INSTITUTE OF AMERICA, DESIGN-BUILD MANUAL OF PRACTICE. Obtainable through subscription at http://www.dbia.org/pubs/manualofpractice/.

[44] *Id*. at 29.

[45] This was an FHWA Special Experimental Project No. 14 (SEP-14) project, and the "Final Evaluation Report of Contractor Selection Using Best Value Practices" is available at http://www.fhwa.dot.gov/programadmin/contracts/sep14mifinal2009.cfm.

[46] FHWA's Performance Contracting for Construction Guide, *supra* note 10, at 27–29.

[47] *Id.* at viii.

to identify the optimum way to meet the owner's stated objectives, while at the same time shifting the risk of performance to that design-build team. Public owners in the water and wastewater sector have increasingly turned to design-build. This method not only facilitates speedier project delivery, but also creates the single point of responsibility that enables owners to obtain performance guarantees on their facilities. In short, design-build is the best way to structure the delivery of design and construction services to obtain required results with a contractual enforcement vehicle to ensure that the results will be met. For example, design-build would allow an agency to eliminate or relax several of the lower-level material and construction requirements to give the design-builder more flexibility to meet stated performance needs.

While merging design and construction into a single contract enhances the opportunity to use effective performance specifications, the design-build system has a natural limitation. Compliance with the performance specification is evaluated at the conclusion of the construction process and does not reward or penalize longer-term performance.[48] While it is possible for an owner to require long-term warranties, this has some practical challenges, as discussed in Section VI. The biggest commercial challenge is that the design-builder does not control operations and maintenance. As a result, there will always be the potential for the design-builder to argue that supervening events outside of its control created the variance in performance, giving it an actual (or potential) contractual excuse from being responsible. Perhaps more important, many design-builders are not interested in the long-term liability that flows from performance guarantees and will either refuse to provide longer-term warranties or require limitations of liability on these obligations.

The delivery systems that give the owner the best opportunity to use performance specifications measured over the long-term are design-build-operate-maintain (DBOM) and design-build-finance-operate-maintain (DBFOM). DBOM and DBFOM, which are types of PPP projects, have become increasingly popular in the U.S. transportation industry as a result of the large number of states that have enacted PPP legislation.[49]

Performance specifications are routinely used on PPP contracts, not only from a design and construction perspective, but also from an operations and maintenance one. The private party under a PPP is generally taking on significant financial and performance risk and needs to have the flexibility to manage this risk by using approaches it believes can best accomplish its goals. By using a performance specification, the agency can specify what it wants and leave the precise solution to the private party. It can also use post-construction measurement strategies to evaluate the facility's performance, as opposed to end-result processes that are measured after construction is completed.

Likewise, FHWA's 2011 publication on PPP delivery, *Challenges and Opportunities Series: Public Private Partnerships in Transportation Delivery*, noted as follows:

> P3 agreements can create efficiencies through establishing long-term design-build-finance-operate-maintain (DBFOM) contracts that include outcome-based performance specifications. Outcome-based performance specifications focus on what a facility is intended to achieve rather than prescribing methods and materials for achieving facility goals. The goal of using outcome-based performance specifications is to make service delivery more efficient by allowing the concessionaire to decide how best to achieve the intended results. Defining, measuring, and monitoring outcome-based performance specifications can be challenging and costly, so outcome-based performance measures may be more appropriate for long-term contracts that span multiple phases of a facility's lifecycle (e.g., design, construction, operations and maintenance) or for large, complex projects where there are potential efficiencies to be gained from innovation. P3 projects typically meet both of these conditions. As a result, public agencies using P3 agreements normally employ performance-based contracts. This shifts the public agency's primary role in the project from oversight of design and construction to management of a performance-based contract. In this role, the challenge for the public agency is to find ways to monitor and manage contract performance without reclaiming transferred risks or impinging on the efficiencies gained from allowing the concessionaire to choose the best way to meet performance specifications.[50]

In short, little is to be gained when an agency places unnecessary design or construction constraints on a PPP concessionaire that is required, by virtue of a long-term PPP arrangement, to assume the risk of whole-life performance.

While a PPP is highly conducive to the use of performance specifications, an agency needs to consider some sensitive issues when it establishes its desired levels of service on such a project. While it can decide to set very high performance standards for the facility, it may have to pay more to the concessionaire to achieve these very high standards. Nothing is free, and the price for very high standards can jeopardize the financial viability of the project. Perhaps as important, setting very high performance standards on PPP projects reflects an O&M approach that is different from what is seen on non-PPP projects. Accordingly, the FHWA has noted:

---

[48] *Id.*

[49] An abundance of material addresses the diversity of PPP projects. FHWA established its Innovative Program Delivery office in Oct. 2008 to provide a comprehensive set of tools and resources to assist the transportation community in exploring and implementing innovative strategies to deliver programs and projects. Readers should refer to its Web site at http://www.fhwa.dot.gov/ipd for more information on these projects.

[50] FHWA, CHALLENGES AND OPPORTUNITIES SERIES: PUBLIC PRIVATE PARTNERSHIPS IN TRANSPORTATION DELIVERY, PERFORMANCE MANAGEMENT 68–79 (May 11, 2012), https://www.fhwa.dot.gov/ipd/pdfs/feedback_forum/challenges_and_opportunities.pdf.

In setting performance standards, public agencies may want to carefully consider the tradeoffs associated with committing to certain standards and levels of funding. In this regard, P3 agreements are less flexible than traditional methods of publicly maintaining and operating infrastructure, where the public agency retains year-to-year flexibility in the allowable performance standards. Public sector agencies sometimes relax these standards by delaying or reducing investments, or by lowering maintenance standards, in order to conform to financial realities. By specifying performance standards contractually, a P3 agreement lessens the flexibility of public agencies to make such compromises, including those that save money in the short term but are more costly from a life-cycle perspective. On the other hand, during periods when agency budgets are strained, the loss of flexibility to relax performance standards on a P3 facility will increase the pressure on public agencies to reduce spending on non-P3 facilities.[51]

Given this, it would be logical for the agency to adopt a pragmatic view in setting performance standards for O&M, and evaluate how it would behave if it was performing the O&M work.

B. Procurement Approaches that Optimize the Use of Performance Specifications

Just as some project delivery systems enhance the use of performance specifications, so, too, do some procurement approaches. Optimally, an agency would like to use the procurement approach to evaluate how a bidder proposes to meet the performance specification, and then factor that proposal into which bidder is awarded the contract. If an agency's objective in using performance specifications is to enhance quality, promote innovation, or shift performance risk to the industry, the traditional fixed-price, sealed-bid procurement process has some major limitations. This process does not readily enable an agency to consider a bidder's ideas on innovation and quality enhancements, nor does it facilitate an agency's ability to compare life-cycle costs.

Fortunately, the growth in alternative project delivery systems has given many public agencies an opportunity to use procurement approaches other than low bid. Design-builders are frequently procured through a best-value selection process. On DBOM and DBFOM projects, agencies not only use best value, but sometimes have the flexibility to select their concessionaires on a qualifications basis and negotiate with the best-qualified concessionaire to reach agreement on the technical scope and price.

The term "best-value selection" generally refers to a competitive selection process in which proposals are evaluated based upon both price and nonprice (i.e., qualitative/technical) factors. Awards can be made on a variety of bases, including using the following:

- Weighted criteria (strict formula) (e.g., 70 percent price, 30 percent nonprice), where the offeror with the highest total score is awarded the contract.
- Adjusted bid, where each offeror's bid price is divided by the technical proposal score (in essence, creating a price per quality point), and the offeror with the lowest composite price is awarded the contract.
- Pass-fail to evaluate technical proposals and, for those offerors who pass, award the contract to the offeror with the lowest price.
- A price-technical tradeoff process to determine if the value received from the technical proposal justifies paying a higher price.

Many DOTs have used best-value procurement for their design-build projects. VDOT has long used a strict formula approach to implement its best-value procurements. VDOT's design-build procurement manual notes that the RFP will identify the formula for this process, but VDOT generally has used a 70–30 split between price and technical factors.[52] The Texas Department of Transportation (TxDOT) used best value for the DFW Connector project that was procured in late 2009.[53]

There are many reasons an agency will use best value in its selection processes. The ability to use performance specifications effectively can certainly be one of them. FHWA specifically notes this in its *Performance Contracting for Construction Guide*, where it provides specific advice on how to successfully implement best-value processes.[54]

While most discussion about best value is in the context of design-build or PPP projects, best value can also be used under a design-bid-build approach. MDOT's M-115 pilot project, discussed earlier in this digest, used a best value procurement process on a performance-based contract. MDOT recently let a $71 million construction project on M-39 (Southfield Freeway), which included reconstruction and rehabilitation of a portion of the project corridor, rehabilitation of 28 bridges, freeway lighting, freeway signing, intelligent transportation system infrastructure, sanitary sewer replacement, and screen wall replacement. It applied for and was given recognition as an FHWA SEP-14 project, based on the use of best value to achieve performance-based contracting. MDOT used best value to address the results of public outreach, which revealed several "quality of life" concerns about the project, including air quality, noise, restricting construction truck traffic on neighborhood streets, maintaining utilities to homes during construction, avoiding damage to adjacent property from vibration, local contractor and workforce participation concerns, safety and mobility concerns, and schedule concerns. MDOT used an adjusted low-bid

[51] *Id*. at 70.

[52] *See* VDOT's DESIGN BUILD: ALTERNATIVE PROJECT DELIVERY OFFICE DESIGN-BUILD PROCUREMENT MANUAL (Oct. 2011), available at http://www.virginiadot.org/business/resources/ipd/DB_Manual_FinalCopy20111011.pdf.

[53] Information on this project is available at http://www.txdot.gov/government/partnerships/current-cda/dfw-connector.html.

[54] FHWA's Performance Contracting for Construction Guide, *supra* note 10, at 62–86.

process in selecting the contractor. Its SEP-14 Interim Report to FHWA expressed high praise for the use of best value, which enabled MDOT to obtain creative solutions from the offerors in not only meeting the requirements of the specifications, but in understanding the quality of life concerns and proposing additional measures to make the project a success.[55] One point from the MDOT report is particularly instructive:

> For example, for the general construction concerns of noise, both Contractor teams identified construction activities that have the highest potential for creating noise levels that may exceed the thresholds dictated in the specifications. Both teams then identified means of independent monitoring and tracking noise data, and mitigation measures to be taken should measurements exceed the thresholds. The proposed mitigation measures, and responses to measurements exceeding thresholds were developed by the Contractor teams, and in some cases, the mitigation measures exceed MDOT's expectations.[56]

The Florida Department of Transportation (FDOT) is an agency with a robust design-build program that uses best value (among other) procurement processes. FDOT's August 8, 2012, "Design-Build Guidelines" identify a number of technical factors that are to be scored, including some that relate to performance-based outcomes.[57] For example, among the criteria the guidelines suggest be considered are 1) maintainability, where credit is given for a design that minimizes periodic and routine maintenance;[58] 2) value added, where credit is given for exceeding the minimum value added requirements to enhance durability, and reduce maintenance; 3) schedule, where credit is due for a comprehensive and logical schedule that minimizes contract duration; 4) design and geotechnical services investigation, where credit is to given for the quality of, among other things, the quality and quantity of design resources and the utility relocation plan; and 5) maintenance of traffic, where credit is due for a scheme that minimizes disruption of roadway traffic, including minimization of lane closures, lane widths, visual obstructions, and drastic reductions in speed limits.

While best-value procurement can also be used on PPP projects, the current practice is that the procurement is either 1) competitive, based on a pass–fail technical, low price (e.g., lowest public subsidy, lowest toll rate, etc.) offer from shortlisted proposers; or 2) negotiated, where the proposer-concessionaire and agency work together for a period of time to arrive at a mutually agreeable commercial and technical framework. This negotiated process was used by VDOT in entering into comprehensive agreements with Transurban-Fluor for long-term concessions on the 495 Express Lanes project and the I-95 High Occupancy Vehicle/High Occupancy Toll Lanes project. Each of these comprehensive agreements contains a variety of performance-driven O&M requirements, with the design and construction specifications having enough flexibility to enable the Transurban-Fluor team to meet them.

Private sector owners using design-build, DBOM, or DBFOM have long used negotiated procurement processes. These enable contractors to advance the design, thereby creating a more robust risk transfer if there is a problem with the baseline design. They also allow the parties to discuss issues like performance specifications without having to do so in the context of a competitive environment, which can often be challenging. There are fewer opportunities to do this in the public sector, although some states (e.g., Arizona and Florida) allow "qualifications-based" selection for some construction projects and ultimately negotiate with the most-qualified proposer.

Agencies have faced a number of procurement challenges relative to alternative project delivery systems like design-build. Some of these challenges, like the ones that are discussed in the sections below, go to the heart of performance specifying.

C. The Ability of an Owner to "Let Go" of Prescriptive Specifications

One of the biggest procurement challenges results from an issue discussed earlier in this digest—the inability of an agency to "let go" of its prescriptive tendencies, while still wanting to shift the risk of performance to the design-build contractor or the concessionaire. The solicitation documents for a typical design-build or PPP project often contain technical specifications derived from the same prescriptive design and construction requirements used on traditional design-bid-build projects. If the solicitation documents also contain performance specifications, and these specifications conflict with the prescriptive requirements, the agency will face liability for the consequences of this conflict under the *Spearin* doctrine, as discussed in more detail in Section VIII.

Agencies that think about this issue attempt to draft their technical requirements for design-build and PPP in ways that allow proposers to have some discretion in how to achieve the stated results. They find the drafting difficult, as it is frequently easier to use time-tested prescriptive specifications than to create concepts that are less than fully designed to be used as a basis for performance specifications.

---

[55] Innovative Contracting Practices Special Experimental Project No. 14, Best Value—Performance Based Contracting, M-39 (Southfield Freeway), Michigan Department of Transportation, Metro Region, Interim Report, Apr. 27, 2011, http://www.fhwa.dot.gov/programadmin/contracts/sep14mi2011interim.pdf.

[56] *Id*. at 5.

[57] Available at http://www.dot.state.fl.us/construction/DesignBuild/DBRules/DesignBuildGuidelines.pdf.

[58] The Guidelines mention that the following elements should be considered: access to provide adequate inspections and maintenance, maintenance of navigational system lighting, access to structure's lighting system, and quality of construction materials. The Guidelines also indicate that credit will be assigned for exceeding minimum material requirements to enhance durability of structural components. *Id.* at 48.

D. The Ability of an Owner to Establish Supportable Best-Value Processes

Several state DOTs, like VDOT, FDOT, and TxDOT, have substantial design-build and PPP experience. As a result, they have not only well-established protocols for using design-build, but also experience asking for, evaluating, and scoring technical proposals. For agencies that do not have established protocols, using best-value procurement can be problematic.

Consider a recent case in Pennsylvania, *Brayman Construction Corp. v. Department of Transportation*.[59] It involved a contractor who mounted a successful challenge to a two-step, design-build best-value (DBBV) procurement by the Pennsylvania Department of Transportation (PennDOT). The project arose out of PennDOT's desire to rebuild two bridges whose structural integrity had been compromised by cracks, corrosion, and other defects. PennDOT sought to reduce the overall time from the start of design to completion of the project by using a relatively new internal PennDOT publication, entitled *Publication 448, Innovative Building Toolkit* (Publication 448), which established methods for innovative procurements, including design-build.

In reliance on Publication 448, PennDOT issued an advertisement seeking statements of interest from design-build teams wishing to enter into a DBBV contract for the project. The advertisement requested, among other things, each team's qualifications, resumes of key personnel, and organization charts. The advertisement notified respondents that PennDOT would shortlist three firms based on weightings for the selection criteria. The shortlisted firms would each receive an RFP and be asked to submit a technical approach with a price. Seven teams submitted timely statements of interest, including a venture between Brayman Construction and its designer, Dewberry-Goodkind. The Brayman team was not one of the shortlisted teams.

Brayman eventually sought an injunction in State court, asking that PennDOT's handling of the procurement be declared illegal and in violation of the State's procurement code. Specifically, Brayman argued that the State statute required competitive sealed bidding for this project and thus PennDOT was not authorized to utilize the DBBV method. Following a hearing at the preliminary injunction, the State court ruled that the DBBV procurement was overly subjective and PennDOT's reliance on Publication 448 was not authorized under State law. It preliminarily enjoined PennDOT from seeking and evaluating two-step DBBV "or any other 'innovative method' that does not award the bid based on sealed competitive bids" for its procurements. Despite this, however, the court ruled that, "in the interest of public safety," PennDOT was permitted to continue with its procurement of the two bridges through DBBV so as not to face delays and potential safety issues. PennDOT and Brayman both appealed to the Pennsylvania Supreme Court.

[59] 608 Pa. 584, 13 A.3d 925 (2011).

The Supreme Court rejected PennDOT's argument that its use of the DBBV method was valid because, among other things, Pennsylvania law expressly allowed a two-step process when retaining design professionals. The court concluded that the design-build contract ultimately to be awarded by PennDOT was for the design *and* construction of the bridges—not just the pure design of them. The Supreme Court also agreed with the trial court that the PennDOT DBBV method was overly subjective and should be stricken because it entailed evaluating bids based on factors not enumerated in the invitation for bid. The court specifically noted that the agency's employees at the injunction hearing "were unable to give a clear description of how its best-value analysis works." Indeed, some PennDOT employees conceded that the process is "kind of nebulous" and includes "some subjectivity" on the qualitative assessment of key personnel resumes submitted.[60]

Brayman points out how challenging it can be to implement best value in a state that historically uses low bid for the selection of construction contractors. It also highlights a pragmatic problem with evaluating technical proposals—the subjectivity involved in the process can lead to a procurement challenge.

E. The Ability of an Owner to Properly Evaluate Technical Proposals

Even DOTs with long-standing design-build programs find that the process of evaluating and scoring technical proposals is difficult. What are the true differentiators from one proposal to the next? How many points should be used to quantify the differentiators? What if there are elements of a technical proposal that will meet the performance specification and any related prescriptive specification, but the agency does not like those elements? What will be grounds for a successful protest?

Many federal and state legal decisions discuss these issues in the context of bid protests. While it is beyond the scope of this digest to review these cases, suffice it to say that the federal caselaw that addresses whether a bid protest will be successful is based on the answers to two questions: 1) did the agency's decision have a rational basis; and 2) did the agency's procurement procedure involve a violation of regulations or procedures?[61]

Courts have historically given substantial deference to an agency's decision, and disappointed bidders bear

[60] While the Pennsylvania Supreme Court affirmed the ruling of the lower court as to the DBBV procurement on future projects, it also adopted the lower court's "carve-out" with respect to PennDOT's current bridge project. The court noted that out of Pennsylvania's 25,000 state-owned bridges, the bridges in question were ranked to be in the 26th worst condition. Because these bridges carry over 40,000 vehicles per day, the Supreme Court found safety considerations to justify allowing PennDOT to use the DBBV method for these particular bridges.

[61] *See, e.g.,* Impresa Construzioni Geom. Domenico Garufi v. United States, 238 F.3d 1324 (Fed. Cir. 2001).

heavy burdens in showing that the award decision had no rational basis.[62] Courts have recognized that contracting officers are "entitled to exercise discretion on a broad range of issues confronting them in the procurement process."[63] Stated differently, it is not the province of a court to determine whether an agency's decision is correct, but only to focus on "whether the contracting agency provided a coherent and reasonable explanation of its exercise of discretion."[64] When a bid protest is based on an agency's violation of a regulation or procedure, the protestor must show that it was significantly prejudiced by a clear and prejudicial violation of applicable statutes or regulations and that there was a substantial chance that it would have received the contract award if the errors were corrected.[65]

Two Minnesota cases involving high profile design-build transportation projects help explain these principles. The first case, *Siemens Transportation Systems, Inc. v. Metropolitan Council and Bombardier Transit Corporation*,[66] involved a dispute arising out of the light rail vehicle (LRV) procurement for the Hiawatha Corridor Light Rail Transit Project in Minneapolis, Minnesota. The project's owner, Metropolitan Council (Council), requested five companies—Bombardier, Siemens, and three other unnamed companies—to submit their best and final offers (BAFOs). These BAFOs were to include 18 LRVs and related materials and services, and were to give the Council the option to purchase up to 24 more LRVs at the same price as the original 18.

The BAFO request stated that the highest-ranked bidder would be selected as the supplier. The RFP also provided that bids would be ranked based on the final score, "with the highest ranking being that with the highest score." The evaluations were to be conducted using a point scale for the technical aspects as well as the costs. The technical aspects would comprise 60 percent of the score and the price 40 percent, for a total of 100 percent. After the scoring was complete, the evaluation panel would make its recommendation based on "whose Best and Final Offer yields the highest combined score…and, when considered in its entirety, best conforms to the overall long term interests of the Council."

Although Bombardier's score was 82.23 and Siemens was 83.14, Bombardier was awarded the contract on the basis that its BAFO "provided the best value, considering score and the overall long-term interests of the Council." When Siemens lost both its administrative protest and an attempt in the federal district court to enjoin the award, it ultimately appealed to the federal court of appeals. It argued that the terms of the BAFO request required the evaluation panel to recommend the bidder with the highest score and for the Council to award the contract accordingly. Because the Council awarded to Bombardier, Siemens argued that this decision was arbitrary, capricious, and unreasonable and should be overturned. The appellate court rejected Siemens' appeal and affirmed the district court's findings.

First, the appellate court noted that the RFP did not require that the evaluation panel's recommendation be based "solely" on the highest score and ranking. The Contract Award provision of the RFP specified that award would be made to the bidder with the "highest combined score," and whose BAFO "best conforms to the overall long-term interests of the Council." The appellate court noted that the long-term interests of the Council included the possibility of the 24 additional LRVs. The evaluation panel found that Bombardier's and Siemens' technical proposals were technically equivalent; however, 24 additional LRVs would cost the Council approximately $5.2 million more using Siemens. Thus, the court agreed with the evaluation panel and the Council that Bombardier's bid conformed to the overall long-term interests better than the Siemens bid.

The court also noted that Siemens was well aware that the evaluation panel would be reviewing the scores assigned by independent committees:

> The wording of the request was sufficient to alert Siemens to the fact that the evaluation panel would be the first to look at price and quality together, and that the evaluation panel would consider whether differences in quality were worth the difference in price when determining which bid represented the best value to the council. Although the council could have set out the role of the evaluation panel more clearly in the request, the request provides notice that the evaluation panel will be evaluating the bids for "value" in light of the long-term best interests of the project.[67]

Siemens argued that it was misled by the Council's reservation to award the contract to someone other than the highest-scoring bidder. It asserted that because the "long-term interests of the council" were not clearly defined, the Council retained too much discretion and the request lacked "transparency." Siemens claimed that the ambiguity led it to bid a technically superior model, based on the 60-40 weighting criteria, even though the price of the model was somewhat higher than alternative Siemens' models.

The appellate court responded to these arguments by again noting that the bidders were "on notice from the language in the request" that the overall long-term interests would be considered in the evaluation process. The evaluation panel never gave up the right to look at the difference in the price versus technical advantages/disadvantages, regardless of the scores: "The evaluation panel did not just make an award to the lowest bidder, but rather determined that the difference

[62] Centech Group, Inc. v. United States, 554 F.3d 1029 (Fed. Cir. 2009).

[63] Precision Images, LLC v. United States, 79 Fed. Cl. 598, 614 (2007).

[64] *Id*. at 614–15.

[65] James F. Nagle & Adam K. Lasky, *Federal Bid Protests*, in FEDERAL GOVERNMENT CONSTRUCTION CONTRACTS (2d ed.), ch. 6, 157 (American Bar Association 2010).

[66] Siemens Transp. Sys., Inc. v. Metro. Council and Bombardier Transit. 2001 Minn. App. LEXIS 671 (2001).

[67] *Id*. at 11.

in technology did not justify the difference in price."[68] Given all of this, the appellate court concluded that the Council's action was not arbitrary, capricious, or unreasonable, and the award to Bombardier was allowed to stand.

The second Minnesota project involved the August 1, 2007, collapse of the I-35W bridge near Minneapolis, which set into motion an expedited procurement process by the Minnesota Department of Transportation (MnDOT) to replace the bridge. Flatiron-Manson, a joint venture (Flatiron), was awarded a design-build contract on October 8, 2007, and the new bridge opened for traffic on September 18, 2008, less than 14 months after the collapse.

While the industry widely praised MnDOT and Flatiron for this exceptional performance, the procurement of the bridge had some controversy. Shortly after the award to Flatiron, a Minnesota taxpayer filed a lawsuit seeking an injunction and declaratory relief that Flatiron's proposal should have been rejected as being nonresponsive. The taxpayer was unsuccessful at the trial court, and appealed to the Minnesota Court of Appeals. When this court rejected the taxpayer's arguments,[69] another appeal was filed to the Minnesota Supreme Court, where the case was finally resolved in 2010 in favor of MnDOT.

MnDOT had decided to use a DBBV procurement process on this project. The RFP, which was sent to a shortlist of teams, contained detailed, project-specific requirements. The instructions to proposers stated that the contract would be awarded only to a proposal that met the standards established by MnDOT, and described the weighted criteria by which the proposals would be evaluated.

A six-member technical review committee (TRC) evaluated the four proposals that were submitted. Flatiron's proposal received the highest technical score, 91.47 out of 100 possible points. The next highest score was 67.88. Although Flatiron had the highest price and tied with another company for submitting the longest delivery time, its high technical score enabled Flatiron to win under MnDOT's best-value formula.

The taxpayer argued that the TRC should have rejected Flatiron's proposal for being nonresponsive as it contained two technical components that deviated from the RFP. One component involved Flatiron's statement that it would work outside of specified ROW limits. The other was that Flatiron proposed a design that used concrete-box girders with only two webs each, contradicting the RFP's requirement that concrete-box designs use a minimum of three webs. The taxpayer argued that, under Minnesota law, MnDOT did not have discretion to determine whether a proposal responded to the specifications of the RFP, and had no choice but to reject Flatiron's proposal as being nonresponsive.

The Minnesota Supreme Court noted that in a traditional design-bid-build process, the taxpayer might be right. However, under Minnesota's 2001 design-build statute, MnDOT was authorized to use a "best value selection process" which, by its nature, allowed the consideration of factors other than cost when awarding contracts. The court noted that the design in a design-build RFP is not complete and that the proposers were to submit technical approaches based on these incomplete designs.

As to the ROW issue, the taxpayer relied upon an instruction in the RFP that stated that proposed work for the project was not to include any additional ROW. Flatiron's proposal required work outside the ROW defined in the RFP for the purpose of lowering Second Street. MnDOT countered by arguing that this instruction was added after it received a request for clarification from another contractor that was planning to take additional ROW and add traffic capacity in an area of the project that would have required more environmental review and more municipal consent. MnDOT claimed that the instruction relied upon by the taxpayer was not intended to be a "project-wide directive" to proposers on ROW limitations and that the RFP did not preclude any proposer from obtaining ROW on Second Street. The court agreed with MnDOT and rejected the taxpayer's argument that Flatiron's proposal was nonresponsive because it involved additional ROW on Second Street.

As to the concrete-box girder issue, the court found that Flatiron's proposal included eight webs, four in each direction of traffic, but only two webs per concrete-box girder. The court interpreted the RFP to require a minimum of three webs per direction of traffic, not three webs per concrete-box girder. Because Flatiron's proposal exceeded this minimum requirement, the court rejected the taxpayer's argument that the proposal was nonresponsive.

It is noteworthy that the Supreme Court focused on the design-build statute. It believed that the legislature's intent is to permit the TRC to apply its judgment and to evaluate proposals where no finished design exists. As a result, the court found that the TRC had discretion to decide whether a design-build proposal is responsive, which decision could only be reversed if there was an error of law, or if the TRC's findings were arbitrary, capricious, or unsupported by substantial evidence. The two issues raised by the taxpayer did not trigger any reason to overturn the TRC's decision.

The fact that agencies have broad discretion and are rarely overturned through bid protests should not be the take-away from these cases. Proposers spend substantial money in developing proposals, particularly when they involve formulating, during the proposal stage, solutions to performance specifications. It is incumbent upon a highway agency to have a clear process for selecting a winner, and one can see from *Siemens* that the agency on the Hiawatha project sent mixed signals (at best) about how an award would be made. It is also critical for an agency using best value to know

[68] *Id*. at 16.

[69] Sayer v. Minn. Dep't of Transp., 790 N.W.2d 151 (Minn. 2010).

that, if there are prescriptive elements contained in the RFP documents, the agency cannot disregard those prescriptive specifications without issuing an addendum—this can have a prejudicial effect on proposers who follow the rules and abide by those prescriptive specifications. While MnDOT did not disregard these requirements in *Sayer*, consider the case that is discussed in the next section.

F. Procurement Challenges Involving "Brand Name or Equal Clauses" and Performance Specifications

Much has been written about the legal issues associated with "brand name or equal" clauses and performance specifications, and Section VIII discusses some caselaw around these concepts. The preferred practice of the Federal Government is to require agencies to use performance specifications rather than a "brand name or equal" clause. If an agency believes that it is beneficial to use "brand name or equal" descriptions, the Federal Government requires that the specification describe, in addition to the brand name, the main physical, functional, or performance characteristic of the brand-name item that an "or equal" item must contain.[70]

In 23 C.F.R. § 635.411, "Material or Product Selection," the expenditure of federal-aid funds on proprietary products is prohibited unless specific conditions are met, with the expectation that there will be full competition in the selection of materials, equipment, and processes. As noted in Section II above, while FHWA allows the use of proprietary products (i.e., a "sole source" or "brand name with no equal"), such use is severely constrained to meet the requirements of 23 C.F.R. § 635.411. The highway agency is generally required to demonstrate that there is no suitable alternative to the specified product. Relative to "brand name or equal" clauses, FHWA also makes the following point:

> The use of trade names in specifications can sometimes be avoided by writing requirements in terms of desired results. A generic, end-result specification is preferable to specifying a proprietary product because it can promote competition. However, simply deleting the name of the product while retaining all of the salient characteristics from the manufacturer's literature or cut sheets would not necessarily create a non-restrictive specification. Without providing some range of quality or performance, it may still be possible that only one manufacturer or vendor could meet the specification. Adding the phrase "or equal" next to a brand name similarly does not make a proprietary specification competitive if the technical requirements can only be met by the named brand. To ensure a specification is competitive, a reasonable number (as determined by the division office) of manufacturers or vendors should be able to provide or achieve the specified results.[71]

This highlights one of the major practical issues that confront an agency in drafting a performance specification. Frequently, the drafters are writing a "brand name or equal" clause around a particular product, creating the "salient characteristics" discussed in federal policy to give an appearance of the equals. However, this can create some procurement challenges on design-build projects using best-value procurement approaches, as evidenced by *Strand Hunt Construction, Inc*.[72]

Strand Hunt involved a design-builder's protest of the termination of its contract with the United States Army Corps of Engineers (Corps) when the Corps determined, after awarding the contract to the design-builder, Strand Hunt Construction (Strand), that it had improperly relaxed certain RFP technical requirements. The General Accounting Office (GAO) denied the protest, finding that the Corps had broad discretion to take corrective action when it had reasonable concerns that there were errors in the procurement.

The RFP sought proposals for the design and construction of the central heat and power plant facility upgrades at the Clear Air Force Station in Alaska. The design-build project included the construction of a facility to house three baghouse collection systems, which were designed to remove particulates from the three existing coal-burning boilers. Award was to be made on a best-value basis, with price and nonprice factors considered equally important.

The RFP specified that the work must conform to detailed performance and prescriptive-based drawings and specifications, including certain baghouse specifications. The design criteria for the baghouse specifications required that 1) the maximum net pressure differential between manifolds of the baghouse should be 6 in., and 2) the minimum spacing between individual bags within the baghouse (bag-to-bag clearance) must be 2.5 in. While the RFP did not specify a brand name, the baghouse specifications, including those set forth above, were written around a specific manufacturer.

Strand offered a baghouse system that was not produced by the manufacturer contemplated in the RFP specifications, and its system had a maximum net pressure differential of 7 in. and bag-to-bag clearance of 2 in. While the Corps noted these deviations during technical discussions, Strand's proposal was ultimately accepted. Another bidder protested, arguing that the Corps improperly accepted Strand's deviations from the RFP and gave Strand an advantage over the other bidders. The Corps agreed and admitted that it made a mistake in accepting Strand's nonconforming proposal. It also believed that its original baghouse specification,

---

[70] *See* Ralph C. Nash & John Cibinic, *Procurement Management* ¶ 10, NASH & CIBINIC REPORT, Feb. 2008 (*citing* Off. of Fed. Procurement Policy Memorandum, Dec. 17, 2008, available at http://www.whitehouse.gov/omb/procurement/memo/2008_brand_name.pdf).

[71] More information is available at http://www.fhwa.dot.gov/construction/specrevattach2.cfm.

[72] Strand Hunt Constr., Inc., Comp. Gen. No. B-292415, 2003 CPD ¶ 167 (Sept. 9, 2003), http://www.wifcon.com/cgen/292415.pdf.

which favored a single manufacturer, was proprietary and did not give potential proposers an accurate statement of the agency's minimum requirements. Consequently, the Corps decided to terminate Strand's contract, amend the RFP to permit the use of other baghouse manufacturers, and resolicit proposals.

Strand's appeal to the GAO conceded that its baghouse system did not meet specification requirements. Strand argued, however, that the differences between the RFP specifications and what Strand proposed were immaterial because the two systems were identical in functionality. Strand also claimed that even if the Corps did make a mistake in awarding to Strand, the Corps was unwarranted in taking the corrective action of terminating the contract, since there was no showing of competitive prejudice.

The GAO disagreed with Strand and found that the Corps' corrective action was appropriate, stating that "a proposal that fails to conform to one or more material requirements of the RFP is technically unacceptable and may not form the basis for award." The GAO decision held that:

> Here, the RFP set forth discrete minimum specification requirements for the baghouse system, which were material terms of the solicitation. The RFP informed offerors that all proposed baghouses must meet the specified design criteria and that the "baghouse arrangement and installation shall be as shown on the drawings and specified."
>
> ****
>
> The agency's acceptance of Strand's noncompliant proposal meant that the agency waived these design criteria for Strand, which resulted in an unfair and unequal evaluation. It is a fundamental principle of federal procurement that competition must be conducted on an equal basis; that is, offerors must be treated equally and be provided with a common basis for the preparation of their proposals.[73]

Because the Corps concluded that several baghouse models could meet the revised RFP requirements, "acceptance of Strand's non-conforming proposal prejudiced offerors who could have proposed other solutions, potentially at a lower cost, if the competition had not been improperly restricted."

An agency confronted with this situation during the procurement process has several choices to make, none of which are optimal. The first is to recognize that it likely made a mistake in identifying "maximum" and "minimum" requirements that were not, in reality, required. The better practice would have been to use a performance specification that described the expected outcomes, rather than trying to make an educated guess as to what was truly a mandatory criterion. However, by noticing this during the evaluation process, the agency could not waive these requirements without facing a protest—as occurred in *Strand*. Its choices were to reject Strand's proposal as being nonresponsive, or to issue an addendum (even at the late stage of the procurement) and give all proposers the opportunity to change their proposals.

One of the ways to avoid this situation from the outset is to have a procurement process that uses Alternative Technical Concepts (ATCs). ATCs are most commonly used with design-build project delivery. They are intended to address the situation where an RFP contains basic, but prescriptive, project configurations, design, and construction criteria, and the design-build teams have what they believe to be a better idea. Proposers can submit ATCs, on a confidential basis, which are reviewed by the agency either before or concurrent with the submission of technical proposals. FHWA has recognized that ATCs foster a best-value solution that allows design-builders to submit innovative, cost-effective solutions equal to or better than the agency's design or construction criteria.[74] If the *Strand* procurement had contained an ATC process, it is highly likely that this issue would have been determined well in advance of the evaluation process, and, one way or the other, the agency could have avoided a bid protest.

G. Determining Whether to Incorporate the Technical Proposal into the Contract

Private sector owners who use design-build and EPC contracting for performance-based contracts know how important it is to ensure that the technical proposals they receive during the procurement process are properly reflected in the final contract with the successful proposer. Before signing the contract, they will often do a "scope scrub" where teams from both the owner and the proposer meet to merge the contractor's proposal into the RFP's technical requirements and attempt to minimize gaps or misunderstandings. Rarely will the entire proposal from the proposer be attached as a contract document.

Public sector owners do not have the same discipline. They will generally either make the entire proposal a contract document or not include the proposal at all, and rely upon the proposer to meet the owner's technical requirements. Some owners will incorporate relevant parts of the contractor's proposal, and some will use order of precedence clauses to put the contractor's proposal at a lower level than other contract documents. While these approaches may be expedient, they create significant risks to the owner, particularly on performance-based contracts.

The primary risk comes from the reality that few owners have the time or resources to fully vet and verify the contractor's approach during the proposal process. If a contractor proposes something that requires less work than the RFP documents, and that proposal is a contract document, can the owner require the contractor to provide what is in the RFP documents? Is the question resolved by an order of precedence clause that places the RFP documents at a higher order than the proposal? What if the contractor's overall technical ap-

[73] *Id.* at 4.

[74] Information can be found at http://www.fhwa.dot.gov/everydaycounts/edctwo/2012/atc.cfm.

proach was far different than what was included in the RFP documents and must be substantially changed to meet the RFP documents? What if the contractor's proposed approach to meet the performance guarantee does not work? Will the owner's acceptance of the proposal and incorporation of it in the contract create liability exposure? These questions are not rhetorical. Depending on the trier of fact, it is possible that either party could win its argument.

The other problem is the way that contractors phrase their commitments in the proposals. They often express their "intentions" to perform a certain way, as opposed to a "commitment" or "promise" to perform a certain way. When these "intentions" are incorporated into the contract documents, do they have any contractual significance if the contractor decides to do something differently?[75]

Two cases show the potential problems in this area. In *Omni Corp. v. United States*,[76] the government lost a dispute over the question of whether the manpower proposed by the contractor was a contract requirement because the contract language on this issue was not clear. In *Northrop Grumman Corp. v. United States*,[77] the court concluded that the baseline for the contractor's performance was established by the performance specification and not the contractor's technical proposal. The primary reason for the court's ruling was that the contractor's technical proposal was not a contract document. If it had been, the court noted that this would have clouded the issue.

While there is no single right answer as to how to handle this issue, owners should recognize the risks and think carefully about what they are trying to accomplish from the procurement process. If the owner intends to use a low-price procurement process with pass–fail technical submissions, it should assess whether there are any benefits in having the technical proposal incorporated into the contract. If it is a best value that is heavily weighted to technical approaches, then the owner should think about what aspects of the proposal really matter and incorporate those into the contract. Above all, the owner should be well staffed with qualified procurement personnel who can evaluate the proposals and then ensure that those responsible for administering the contract post-award understand the significance of the technical proposals submitted by the contractor in relation to other elements of the contract.

VI. PROJECT MANAGEMENT RISKS

A number of risks are inherent in the drafting and execution of performance specifications. While other sections of this digest discuss some of these risks, five specific risks warrant discussion here.

A. Drafting Clear and Enforceable Performance Standards

Successful performance contracting requires that the owner be able to articulate what it is asking for and have definable ways of measuring what it is getting. One of the challenges owners face is in using aspirational words to convey performance standards, which are inherently difficult to interpret and enforce. Consider, for example, requiring the contractor to "conduct work in a manner that ensures minimal interference with traffic." Precisely what should the contractor do to meet this subjective requirement?

As another example, consider a specification requiring that the site be delivered "free and clear of Hazardous Materials." Does this cover only non-naturally-occurring hazardous materials (e.g., naturally-occurring asbestos is not to be remediated)? Does it mean that that any Hazardous Material has to be removed to zero parts per billion? What if the testing measurements had a tolerance of +/-10 parts per billion? If the owner and contractor have different views of these answers, there could be a major dispute over this relatively simple specification.

Some performance specifications related to design and construction processes are relatively easy to specify. Flatness in concrete building slabs can be defined and assessed by using American Concrete Institute standards to identify both the flatness level as well as how to measure it. Likewise, for concrete pavement on highway projects, the typical construction performance requirements (e.g., strength, slab thickness, smoothness levels) can be defined and measured. However, performance standards around certain areas, such as bridge approaches or other pavement transitions, may require further thought and elaboration in the specification to avoid ambiguity.

B. Defining Testing Methodology

A major area of risk, related somewhat to drafting clear standards, is when and how to define testing methodology and testing frequency for the relevant performance specification. The process industry, which routinely uses performance-based contracting, often establishes general acceptance testing parameters in the RFP/contract documents and leaves the precise acceptance testing protocols as a post-award deliverable, where the parties can work together to develop the details of something that works. Therefore, one might see, for a 200-MW power plant, a contract requirement that will 1) condition substantial completion on the contractor passing a 72-hour performance test, where the facility achieves all of its guaranteed levels without interruption; and 2) condition final acceptance on the completion of a reliability test where the facility runs at 93 percent of electrical capacity for 30 days, in compliance with all other guarantee levels (e.g., noise and

---

[75] *See* Ralph C. Nash & John Cibinic, *Performance-Based Contracting: Incorporating the Proposal in the Contract*, 14 No. 9, NASH & CIBINIC REPORT ¶ 47 (Sept. 2000); Ralph C. Nash & John Cibinic, *Proposals and Promises: Vive La Difference*, 14 No. 11, NASH & CIBINIC REPORT ¶ 61 (Nov. 2000).

[76] 41 Fed. Cl. 585 (1998).

[77] 47 Fed. Cl. 20 (2000).

emissions). These are major commercial terms that can affect the contractor's price, which is why they are included in the contract. However, one can also expect to see these broad requirements supplemented by a testing protocol, developed by the contractor during contract performance and subject to the owner's approval, that will define ambient temperatures, adjustments for degradation, testing points, and a host of other areas that will define the success of each of these tests.

In the highway sector, one major question an owner needs to answer is whether to have the contractor's quality management program submitted as a condition to award (where it can be evaluated as part of a best-value process), or submitted after award. Each approach has benefits and risks. Doing it before contract award commits the contractor to provide something that is definable, but is potentially done at the expense of the owner, who may have limited time during the procurement process to thoroughly assess the program. Doing it after award may allow the owner and contractor to have cooperative dialogue in developing the plan, but at the potential risk that the contractor will not commit to provide what the owner wants.

A related question pertains to the frequency of testing. In the highway sector, testing is dependent on a variety of factors, and it is critical for the parties to reach alignment on how this will be done. For example, data related to travel time through a work zone could be collected continuously for the entire duration of the traffic restriction, continuously for peak travel times only, or on some other periodic basis determined to be practical and cost-effective for a given project's conditions and goals. On the other hand, parameters such as pavement smoothness would typically be measured at the end of construction as an acceptance point. If there is ambiguity in the contract as to how this will be done, the contractor could claim owner interference. Likewise, if the owner intends to have the right to conduct unscheduled or random tests, or to conduct more robust verification testing, the contractor should be on notice of this in the contract to avoid any arguments that it is being impacted.

C. Assessing Gaps in the Performance Specification

One of the risks in the use of performance specifications is the likelihood of their successful measurement in the field. It is possible for a performance measure to be technically sound, but difficult to implement due to a need for specialized or costly equipment, an inability to yield timely results, or some other impracticality. These gaps in the performance measurement strategy could have significant impact on the commercial relationship between the parties. Stated simply, gaps create the potential for unfulfilled expectations, and unfulfilled expectations create the potential for claims and disputes.

VII. COMMERCIAL RISKS AND CONSIDERATIONS

In addition to procurement challenges and project management risks that can be associated with performance specifying, a number of commercial risks should be considered when using performance specifications. Agencies sometimes fail to adequately evaluate these commercial considerations, assuming that the private sector's appetite for revenue will generally outweigh its concerns over the risk of the deal. This is an erroneous assumption. Sophisticated contractors and designers think about risk before doing any major project, and their assessment heavily influences whether they will consider pursuing a project, not to mention how they will ultimately price the projects they do pursue. Given the type of risks inherent in meeting a performance specification, it is important for an agency to have a clear understanding of these risks, as well as a strategy for dealing with them in the procurement and contracting of the project.

A. Payment Mechanisms and Incentives/Disincentives for Construction

The literature on performance-based contracting in the transportation sector is replete with examples of how payment mechanisms tie into the execution of performance specifications for construction quality. The general thesis is that performance specifications allow the parties to acknowledge a range of acceptable work quality and to use a price adjustment formula that reflects the value of the work—either in terms of a negative or positive price adjustment. Generally, negative pay adjustments (i.e., disincentives) for construction are intended to cover the cost of future maintenance and rehabilitation caused by a lower level of quality; positive adjustments (i.e., incentives) would reflect lower costs of future maintenance and rehabilitation.[78] Ideally, these pay adjustments for construction quality should be tied to life-cycle costing analysis.

As noted in FHWA's *Performance Contracting for Construction Guide*: 1) incentives and disincentives should be reasonable and meaningful; 2) the incentives should be achievable, or they will not have an impact; and 3) disincentives create risk, and come at a cost.[79] Simply put, when payment mechanisms are established to force a contractor to consider life-cycle costs and provide high-quality construction, they need to effectively motivate the contractor to do this, but not in a punitive manner.

The preceding paragraphs are consistent with FHWA's view on incentives and disincentives. FHWA has published detailed guidance on the use of quality-

[78] AASHTO 2003 Guidelines, *supra* note 5, at 33.

[79] FHWA's Performance Contracting for Construction Guide, *supra* note 10, at 36–37. This document provides extensive suggestions on measurement methods for various performance goals, as well as a sample RFP exhibit on Performance Incentives and Disincentives that explains how to implement this payment adjustment process (*id*. at 51– 54).

price adjustment clauses.[80] Observing that, "Price adjustment clauses and schedules are an important and effective component of QA specifications," FHWA states:

> In the past there was some sentiment that price adjustments were punitive in nature. However, negative price adjustments can provide a basis for accepting and paying for work that does not fully meet specifications and removal and replacement is not justified. They are not to penalize a contractor, but rather to pay an equitable amount for the value of the product delivered. Both incentives and disincentives should rationally relate to the gain or loss in service life or performance of the product.

FHWA's publication identifies one of the key commercial risks associated with disincentives—the fact that they are "liquidated damages" and have important legal connotations:

> Legal opinions have upheld the use of liquidated damages provisions regardless of the label placed on them provided they are reasonable and based on a rational cost analysis. A legal opinion should be sought in each State when considering the application of price adjustment clauses because some States have had legal restrictions which did not allow such provisions in State construction contracts.

Substantial caselaw from around the country explains the central premise behind the FHWA's admonition—liquidated damages that are neither reasonable nor rationally-based will be considered a penalty and will be deemed unenforceable if the contractor contests such damages.[81]

Relative to incentives, the key commercial issue, as discussed above, is to have such incentives be achievable and worthwhile to the contractor. The FHWA publication states that the agency has traditionally endorsed the use of incentive provisions up to 5 percent of the unit bid price for improved quality, provided they are based on readily measured physical properties that reflect improved performance, and that incentives greater than 5 percent can be considered on a case-by-case basis following an analysis of performance data. An agency needs to ask itself: 1) how much it is willing to pay to achieve a higher level of performance; 2) which performance parameters should be incentivized; and 3) whether there are alternatives to monetary incentives (such as an extension of a maintenance term).

Given the legal consequences, FHWA suggests that agencies ask the following questions when developing their price adjustment provisions:

- What physical properties are considered to be critical?
- How are these physical properties tested/measured?
- To what degree does each physical property influence performance?
- What price adjustment, if any, should be applied to these physical properties?

The FHWA publication also provides some sample physical properties that can be used to measure construction quality for performance specifications and determine how a price adjustment can work on the basis of either a continuous pay schedule (i.e., an equation to measure precise value), or a stepped pay schedule (i.e., a table in the specifications that provides ranges of defects and a corresponding pay factor). An agency concerned with a legal challenge for having an unenforceable disincentive scheme should consider the continuous pay schedule, which has the benefit of avoiding large differences in pay for minor changes in quality that might occur at the break points on a stepped pay schedule.

B. The Use of Performance Points on PPP Projects

PPP agreements frequently measure a concessionaire's performance, particularly on O&M services, through the use of a formal point system that assigns compliance and noncompliance points associated with performance standards. As noted in FHWA's *Challenges and Opportunities Series: Public Private Partnerships in Transportation Delivery,*[82] most of these agreements address the concessionaire's noncompliance, as opposed to better performance than the benchmarks: "Most P3 agreements prescribe processes for penalizing noncompliance, but rewards for superior performance are rarely used. The government is responsible for tracking concessionaire performance and penalizing the concessionaire when contractual obligations are not met."[83] These performance point provisions typically identify a series of actions that must be taken when an issue arises, including giving the concessionaire notice of the issue and an opportunity to cure the problem. Penalties typically consist of payment reductions, retentions, noncompliance, or default points. Once noncompliance or default points reach a specified level, they can result in increased oversight, work by the owner at the contractor's expense, suspension of work, or termination of the contract.[84]

A variety of recent PPP projects have used performance points to measure a concessionaire's effectiveness in meeting O&M performance standards. FHWA's *Key Performance Indicators in Public-Private Partnerships: A State-of-the-Practice Report*[85] specifically discusses the details of these on several major domestic projects, including FDOT's I-595 Corridor Improvements project and VDOT's 495 Express Lanes. On the I-595 project,

[80] Section 9 of FHWA's Contract Administration Core Curriculum Participant's Manual and Reference Guide 2006, available at http://www.fhwa.dot.gov/programadmin/contracts/core03.cfm#s3A09.

[81] RESTATEMENT (SECOND) OF CONTRACTS, § 356(1); *see generally* ROBERT F. CUSHMAN & JAMES J. MYERS, 2 CONSTRUCTION LAW HANDBOOK, ch. 32, Guy Randles, *Liquidated Damages* (Aspen Law Publishers 1999).

[82] CHALLENGES AND OPPORTUNITIES SERIES: PUBLIC PRIVATE PARTNERSHIPS, *supra* note 50, at 68–79.

[83] *See id.* § 4, Performance Management.

[84] *Id*.

[85] FHWA-PL-10-029 (Mar. 2011), http://international.fhwa.dot.gov/pubs/pl10029/pl10029.pdf.

"noncompliance" points are used to measure the concessionaire's O&M services. For example, relative to incident responses (i.e., crashes, emergencies, or life-threatening conditions), the concessionaire was given a 15-minute cure period to respond to the issue. If the concessionaire compiles 100 points in a 1-year period or 200 points in a 3-year period, FDOT has the ability to suspend, in whole or part, the concessionaire's O&M work. During this suspension, the concessionaire will have no right to extra work costs, delay costs, time extensions, or other relief costs. FDOT can also increase its levels of oversight and has the right to reduce payments or step in to fix the problem itself at the concessionaire's expense.

On the 495 Express Lanes contract, there were three categories of performance points, each of which had different cure periods before the compilation of points would be assessed. The areas of performance measurement included both O&M as well as other contract obligations, such as engaging in discriminatory employment practices or failing to provide notice of a refinancing.[86] While the specific number of points that trigger remedies differs from FDOT's I-595 project, the overall approach taken by VDOT is essentially the same.

A performance point approach has the benefit of establishing objective factors and specific consequences for failing to meet performance requirements. This approach goes to the heart of what has been a problem in construction contracts. The primary contractual remedy to an owner for contractor nonperformance is to either step in, perform the contractor's work, and backcharge the contractor for the resultant cost, or terminate the contractor for default. Because termination for default is such an extreme remedy, it is difficult to do unless the owner can prove that the contractor has committed a material, substantial breach of contract. These types of breaches are hard to objectively identify when it comes to quality, responsiveness, and other areas of interest/concern to an owner. Performance points are, in effect, a form of liquidated damages that enable the owner to quantify the impact of specific performance breaches and create consequences when these points accumulate over time.

As noted in FHWA's PPP report, contractors fear that the public agency will abuse a performance point system that extracts financial penalties simply to meet the agency's short-term financial objectives.[87] FHWA notes that this can create unintended consequences on compliance, because if the cause of underperformance is lack of finances, fines may inhibit the concessionaire's ability to correct the problem. FHWA notes that default points "incentivize performance without money changing hands by raising the risk of default," which may create lender pressure on the concessionaire to correct the issue.

A host of legal and commercial issues are associated with performance points on PPP projects. First, these are relatively new creations, and domestic projects using them have not yet extensively moved to an O&M period. Consequently, while there are examples of performance point provisions in contracts, there are no examples of how they have actually been applied and whether they have had their intended effect of improving performance. Second, no case law has been identified to elaborate on how disputes over the application of these provisions will be handled. When push comes to shove, will courts view these as penalties and reject them?

What is clear is that parties to the concession team have great concern about the potential liability flowing from this process. The risk of default, even if remote, can be disastrous to the concessionaire, as it could lose its equity contribution and the entire project. The risk that an agency will be unreasonable in evaluating performance—simply to "add up the points" and trigger a remedy—is very real in the eyes of a contractor. Consequently, concessionaires will negotiate vigorously to lengthen cure periods, increase the number of points required to trigger a financial penalty or declaration of default, and reduce the number of areas where performance will be measured. From the agency's perspective, if there are few disincentives in the performance point provision (e.g., the financial penalties are set too low), it may find that the concessionaire lacks sufficient incentive to take corrective action or may perceive fines are simply part of the cost of doing business.[88]

C. Long-Term Warranties

As discussed in Section II and other areas of this digest, warranty specifications are a common form of performance specifications used in the highway sector.[89]

Prior to 1991, FHWA had a policy restricting the use of warranties on federal-aid projects, believing that this would effectively result in the use of such funds for maintenance costs.[90] This changed under FHWA's SEP-14 program, which allowed states to try warranty clauses as well as cost-plus-time bidding, lane rental,

[86] The major areas are 1) tolling, including subfactors of transactions, cross-reads, signage, and privacy; 2) communications; 3) project management; 4) miscellaneous obligations, such as discrimination, subcontracting and updating the financial model; 5) operations, such as incident management and work zone management; 6) inspections; 7) maintenance; and 8) level of service.

[87] FHWA, *supra* note 50.

[88] *Id.*

[89] The topic of warranties has been comprehensively discussed in GUIDELINES FOR THE USE OF HIGHWAY PAVEMENT WARRANTIES (National Cooperative Highway Research Program Report 699, 2011), http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_699.pdf.

[90] The Intermodal Surface Transportation Efficiency Act of 1991, Pub. L. No. 102-240, 105 Stat. 1914 (Dec. 18, 1991), offered more independence by enabling the FHWA to delegate many of the project decisions to the states, allowing them to use their own policies and procedures for federal-aid projects located off the National Highway System. This provision allowed state DOTs to use warranty clauses.

and design-build contracting. FHWA decided that warranty clauses were suitable for operational use through an interim final rule on August 25, 1995, adopted as a final rule on April 19, 1996, as 23 C.F.R. 635.413.[91] The final rule provides, among other things, that 1) all warranty requirements need to be approved in advance by FHWA's applicable Division Administrator; and 2) "no warranty requirement shall be approved which, in the judgment of the Division Administrator, may place an undue obligation on the contractor for items over which the contractor has no control."[92]

It is widely recognized that warranty clauses are a typical component of any construction contract. The typical warranty clause is for a short term (e.g., 1 to 2 years after substantial completion), and the risks of complying with them are well understood by contractors, trade subcontractors, suppliers, and bonding companies. The warranties are generally tied into defective work of the contractor and require the contractor to correct such work or face financial consequences.

The application of warranty clauses in performance specifications is much different, and creates some major consternation in the contracting community. In addition to the fact that many of these warranties are for long durations, which creates some unique challenges, contractors are concerned about many of the same risks and challenges previously discussed in this digest, including the following:

- *Measurement technology and sampling*. The inability to ensure that the contractor's performance can be precisely tested, measured, and sampled, either because technology does not allow it or because the agency has yet to implement available technology, means that the contractor and its guarantors face the uncertainty of meeting the agency's expectations. As noted earlier in this digest with respect to asphalt, contractors can be particularly concerned relative to whether samples are consistent and representative of overall performance.
- *Performance of the work based on actual conditions (e.g., traffic loads)*. The inability of the contractor to predict or control with certainty how the facility will be maintained or used can have a significant impact on long-term guarantees. For example, if the specifications are not clear about how to deal with changes in traffic conditions, then this poses a major uncertainty over how performance will ultimately be measured.
- *Combination of performance and prescriptive specifications*. When this occurs, contractors are in effect being expected to provide guarantees that the constructed facility will perform as expected when they have not fully controlled the design. This lack of control impacts the private sector's appetite for risk assumption.
- *Risk associated with the lack of consistent, industry-wide definition or understanding of performance measures*. This can be a major challenge, as it goes to the heart of contractor concerns over whether their performance can be objectively evaluated, measured, and validated, particularly when the time period of the warranty becomes protracted.
- *Inability to predict performance*. The relationship between engineering properties and performance can be tenuous. The major risk for a contractor is that the predictions do not remain valid over the life of a warranty, particularly if the warranty is expected to approach a design life of multiple decades.

There are certainly ways for contractors to mitigate some of these performance-based risks and their warranty exposure. They can begin by feeling comfortable with the design process and operating assumptions. When a team is working in a design-build or PPP relationship, designers, contractors, and (if applicable) the O&M team can collaborate to consider all of the issues that could affect the efficacy of the design. In addition, the team can decide to put performance contingency into its proposal to provide protection for potential exposure. A number of contractual measures also can be taken to protect the contractor, such as providing exclusions to the warranty, limitations on the breadth of the warranty relative to designated usage, and overall limitations of liability.

The commercial aspects of most design-build and PPP projects are embedded into the deal structure. How the warranty is priced may not always be transparent. One notable exception is the warranties that were offered by Koch Industries, Inc. (Koch), which in 1995 created Koch Performance Roads, Inc., to market higher-cost, longer-lasting roads made of a new polymer-modified asphalt.[93] The Koch model was to team with a major contractor and designer, with Koch providing, among other things, a pavement design for its asphalt. To offset the higher initial construction costs, Koch offered extended warranties of 15 to 20 years to its customers, explaining:

> The Performance Road objective is to provide a road with lower life cycle costs. Agencies currently spend less on initial construction and then incur greater maintenance and reconstruction expense. A Performance Road would spend more on initial construction but would incur far less maintenance and reconstruction expense leading to lower life cycle costs. It is typical to find that the breakeven point between these alternatives will occur around year 12. Therefore, in order to provide value to the customer, the warranty period typically needs to exceed 14 years.[94]

Koch Performance Roads did several major projects, including Virginia State Route 288 (a $236 million design-build-warranty project that had, among other things, a 20-year pavement warranty) and New Mexico

[91] http://www.gpo.gov/fdsys/pkg/CFR-2011-title23-vol1/pdf/CFR-2011-title23-vol1-part635.pdf.

[92] *Id*. § 635.413(d).

[93] *See* Koch Ind., Inc. v. United States, 603 F.3d 816 (10th Cir. 2010). This case involved a tax refund action brought by Koch Industries against the United States as a result of New Mexico SH44, which is also discussed in depth herein.

[94] *Id*. at 818.

State Highway 44 (SH44).[95] SH44 consisted of a 118-mi reconstruction and widening project and was delivered under a $314 million design-bid-construction-management-maintain contract awarded in 1998 by the State of New Mexico Highway and Transportation Department to Mesa PDC, LLC, a division of Materials Company. The SH44 project had a 20-year pavement warranty and was secured by a $114 million bond.[96]

The commercial details behind the SH44 project were set forth in a recent court decision, and provide some interesting perspectives on how the Koch organization created its business plan for this project. The pavement warranty stated:

> [Koch] warrants that during the term of this Warranty the Pavement shall meet the Pavement Performance Criteria. If at any time during the term of this Warranty any portion of the Pavement described in the Pavement Performance Criteria shall fail to meet the applicable Pavement Performance Criteria, [Koch] shall Repair or Replace the Pavement to the extent necessary to cause such portion of the Pavement to meet the Pavement Performance Criteria.[97]

Koch's obligations under the warranty were triggered by detailed performance criteria that the pavement was required to meet. The court noted that "although it was virtually certain that some work would have to be done at some point in time under the warranty agreements, Koch had no obligation to perform any work on the highway unless and until the [highway] failed to meet the performance standards included in the warranty agreements."[98] A number of the performance criteria (e.g., rut depth, delamination, and potholes) remained constant over the entire warranty term. Other performance criteria, pertaining to smoothness, cracking, and depressions, became less stringent with the passage of time, indicating that the parties did not intend the road to remain in the same condition over the warranty period.[99]

Koch received $62 million for both the pavement and structural warranties, and, according to testimony in the case, forecasted it would spend between $17,493,180 and $94,010,183 to fulfill its obligations under the warranties. Koch's liability under the warranties depended on "the ultimate pavement design, the ultimate quality of construction, the ultimate quality of the materials used, the traffic and loading of that traffic and the weather conditions."[100]

The pavement warranty for the Virginia Route 288 project was part of the December 18, 2000, design-build agreement between VDOT and APAC Virginia, Inc., the project's design-builder. The Pavement Warranty obligated Koch Performance Roads to meet specified Pavement Performance Criteria for smoothness, rutting/shoving, cracks/joints, bleeding, raveling/weathering, and potholes, with the severity of each of these criteria being measured over five periods (Years 1–2, Years 3–5, Years 6–10, Years 11–15, and Years 16–20). It is instructive to note some of the commercial terms of this warranty, including:

- The stated price of the warranty was 34 consecutive monthly payments of $294,117.65 (i.e., $10 million), which monies were paid to Koch Performance Roads through the design-builder.
- Koch Performance Roads' total liability under the warranty was capped at $15 million.
- The term of the warranty applied to each of the project's three segments and ran from substantial completion of each segment until the earlier of 20 years or 12.5 million cumulative equivalent single-axle loads for the segment.

Unlike the SH44 project, the Virginia Route 288 warranty did not address structural performance. The Virginia Route 288 pavement warranty contained a number of exclusions related to O&M, including damages to the pavement from accidents, spills, and fires; heavy equipment, trucks, and machinery operating without approved permits and in violation of legal weight restrictions; and damage caused by snowplows and cuts for utility crossings.

The Koch experience helps explain some of the things considered by a private party taking long-term pavement warranty risk while not assuming O&M responsibility. It is logical that Koch would structure its warranty around a specific set of O&M assumptions, as it would otherwise be at risk for damage caused by events beyond its reasonable control. However, the natural question for an agency is whether the price it pays for the warranty is worth the protection it gets. Contrast this with the warranties that are associated with a PPP concession, where the concessionaire controls the design, construction, and O&M. Because it has

---

[95] The author understands that Koch Industries, Inc., abandoned promoting the pavement warranty market several years ago and is no longer pursuing new projects.

[96] Performance-Based Contracting for the Highway Construction Industry, *supra* note 10, at 31–32. Note that Koch also provided a 10-year structural warranty on the project.

[97] *Koch*, 603 F.3d at 819.

[98] *Id*.

[99] *Id*. at 820.

[100] Koch used the percentage-of-completion method of accounting to report the $62 million it received for providing the two warranties, which would have allowed it to defer payment of tax on the income for a substantial number of years. The Internal Revenue Service determined Koch was not entitled to use the percentage-of-completion method and thus had to pay the resulting deficiency. Koch filed a refund suit and won at the federal district court, which concluded the warranties were long-term construction contracts to which the percentage-of-completion method could apply. The district court concluded neither of the agreements was a true warranty and that Koch had the right to defer claiming the $62 million as income. The 10th Circuit Court of Appeals overturned this decision, finding that the $62 million was for a warranty, and that "the percentage-of-completion method cannot be used to defer tax on income received under a guaranty, warranty, or maintenance agreement." *Id*. at 819.

this type of control, the concession contractor can assume greater risk if something goes awry.

In short, agencies interested in using warranty clauses for performance specifications need to think through the associated commercial ramifications. Will contractors feel comfortable in taking the risk? Will this have a chilling effect on bidder interest? Is the performance standard clear enough that a reasonable contractor can achieve it without major contingencies in its price? Is the long-term performance of the warranted item really dependent upon what the contractor will be designing and/or constructing? Will the agency be paying for a warranty that is giving more of an illusion of protection than real, practical protection?

D. Bonding Long-Term Warranties

The other question that needs to be considered by the agency is one of performance security. Even if a contractor is willing to provide a long-term warranty, how will it stand behind this warranty? Koch Industries, Inc., is widely recognized as having a strong balance sheet, and backstops its warranties. On typical PPP concession contracts, there are either letters of credit to backstop performance, or a deal structure that creates great risk to the concessionaire for failing to maintain the warranted performance (e.g., the risk of default and losing the project completely).

However, these are not the typical scenarios for backstopping financial obligations on design-bid-build or design-build projects. On these projects, the U.S. public sector construction industry has long relied upon performance bonds to secure the faithful performance of a contractor's obligations. Performance bonds (as well as warranty bonds) are three-party agreements in which the surety guarantees to the owner (called the "obligee") that the contractor (the "principal") is capable of performing the contract and protecting the obligee from financial loss if the principal does not perform. Bonds are credit instruments and are underwritten in a manner similar to bank loans. Underwriters generally consider three factors:

• *Capacity*. This is a factor that considers the ability of the contractor to perform the obligations of the contract. Evaluation criteria include the contractor's technical skill, management, qualifications of personnel, employee retention, and exposure and progress on other contracts.

• *Capital*. This is a factor that considers the financial strength of the contractor as it relates to its ability to fulfill the terms of the contract. Evaluation criteria include the contractor's financial condition, working capital, debt structure, liquidity, and leverage.

• *Character.* This factor considers the historical performance of the contractor. Evaluation criteria include experience and reputation, industry niche, length in business, and relationships with subcontractors.

The key challenge vis-à-vis long-term warranties is that the surety market has consistently had major concerns about providing bonds when the overall duration of its principal's performance obligation is extended beyond the normal construction periods. This is evident from a white paper issued by the Surety & Fidelity Association of America (SFAA) in 2006, entitled "Statement Concerning Bonding Long-Term Warranties." In this paper, SFAA framed the issue as follows:

> Some public owners have proposed special warranty requirements in excess of the standard one-year warranty of the entire work. Under these warranties, the contractor is responsible for correcting defects in its work that are due to faulty materials and workmanship (materials and workmanship warranty) or correcting any shortfall from established specifications (performance warranties). It is often difficult to determine where the line is between faulty workmanship and materials versus inadequate design, use beyond expectations or maintenance issues.

While noting that the surety industry understood the desire for QA, SFAA's white paper concluded that bonded long-term warranty requirements limited "bond availability, thereby limiting competition for construction contracts, and ultimately increasing costs."

SFAA highlighted the pragmatic issues associated with a surety's underwriting process and how it did not align with long-term bonds. "As the duration of the bonded obligation becomes longer, and the surety must assess the contractor's operation for periods of time well into the future, the certainty of the judgment will be lessened." Examining the risks above, as well as the factors for assessing capacity, capital, and character, the overall uncertainty of the contractor's financial situation is of major concern to the surety industry at large.

SFAA has noted that the time periods within which bonds are underwritten create major underwriting challenges, irrespective of the amount of coverage applied over and above the "normal" 1-year warranty and bond period. Surety commitments (and hence underwriting decisions) are made at the time of bid, and on a reasonably large project, that can mean that the overall commitment (with only a 1-year warranty) may be 2 to 3 years. The surety takes the risk of the financial condition of the contractor during that procurement and contract execution time period. If an agency adds on an additional warranty obligation (assume 5 years), then the surety is potentially at risk for the contractor's financial condition for potentially 7 to 8 years, which sureties find difficult in underwriting and assessing.

In addition to the underwriting uncertainties, the SFAA white paper expressed surety concerns over the method of payment for the work under long-term performance-based warranties. The paper noted that under most contracts, the contractor is paid fully upon final completion, leaving no contract balances to fund any warranty work. As a result, if a surety became obligated to step in and complete the warranty work, it would not be able to avail itself of contract funds to mitigate its losses, as it would have if the default had taken place during contract performance and before final payment.

The SFAA white paper noted that to compensate for the increased risk due to the diminished certainty of underwriting and the method of payment, sureties typically raised their underwriting standards and provided long-term bonds only to the largest and most financially sound contractors—sometimes shutting out smaller contractors who were otherwise qualified to do the work from bidding on these projects. To mitigate these issues, the SFAA white paper recommended that:

- Warranties be limited to 1 year.
- Any warranty of more than 1 year should be only from the supplier of the equipment or material and explicitly excluded from the prime contractor's bond.
- Warranties in excess of 1 year from the prime contractor should not be backstopped by a performance bond, but instead should come from a specific warranty bond that would be required at final acceptance of the construction project—enabling the bonding company to underwrite the financial condition of the contractor at the time the warranty bond was being placed and not years earlier.
- Warranty bonds would be for an amount commensurate with the long-term warranties and not the entire project.

Sureties can have major issues with warranty bonds, given the relatively small amount of the bond and the underwriting associated with it. Stated simply, there is not enough money to be made in the premium for the level of effort required. Experience has shown that sureties are generally willing to provide warranty bonds as a service to their good, existing clients, but they do not view it as a separate market focus.

A survey performed among several bonding companies confirmed the reluctance of sureties to provide long-term warranty bonds because of the detailed underwriting reviews needed, and also when the length of the warranty was extended.[101] Interviewees noted a concern that warranty work was funded by contractors out of working capital, and that this could jeopardize the contractor's financial status. They cited reasons for providing warranty bonds as not being tied to sound underwriting practices, but instead to "responses to competition," "holding on to market share," and "fear of losing large premium producers." The survey also noted that there was a very likely probability that small companies would be eliminated from warranty projects because of risk and underwriting concerns. The recommendations from this survey included:

- Decreasing the warranty period to a maximum of 3 years.
- Having a renewable annual warranty bond after 3 years.
- Treating warranty requirements as a separate line item on the project, which would help fund the warranty expense and be an additional incentive to the contractor.

While these surveys were conducted several years ago, there is nothing to suggest that the surety industry looks at this any differently today. As a result, agencies will need to consider how to factor the pragmatics of the surety industry into their performance warranty regimen, or to use other instruments, such as letters of credit, to pay for performance and retainage.[102]

E. Standard of Care for Achieving Performance Specifications

When an owner has used performance specifications, it expects its contracting team to achieve the required results. If these results can be attained through the exercise of "ordinary" standards of care for designers and contractors, then there is little controversy. However, what happens if a higher standard of care is needed? While this issue is discussed in more detail in Section VIII, suffice it to say that it can create a major contractual and liability challenge for the parties.

From a design standard of care perspective, design professionals who directly contract with an owner (e.g., under a design-bid-build or construction management at-risk project delivery structure) generally have standard of care provisions that are based on an "ordinary negligence" standard, like the following: "The standard of care for all professional engineering and related services performed or furnished by Engineer under this Agreement will be the care and skill ordinarily used by members of the subject profession practicing under similar circumstances at the same time and in the same locality." This type of clause does not make the designer responsible for achieving a mistake-free design or for achieving any specified performance. It merely requires that the designer do its design services in accordance with industry standards.

Contrast the previous clause with the type of standard of care clauses that one might see in a design-build contract that uses performance specifications:

> Contractor shall perform the Work: (a) in accordance with all engineering, architectural, and construction principles, practices and methods generally accepted as standards of the industry for projects similar in nature, size, and complexity to this Project; (b) in accordance with applicable industry standards for performance, service life, deterioration, and wear; (c) in a good and workmanlike manner, and in accordance with manufacturer's recommendations and requirements; (d) in compliance with Regulatory Approvals and applicable Laws, Regulations, and Ordinances; and (e) in accordance with the Contract Documents.

---

[101] Mehmet Emre Bayraktar, Qingbin Cui, Makarand Hastak & Issam Minkarah, *Warranty Bonds from the Perspective of Surety Companies*, 132 J. CONSTR. ENG. MGMT. 333–37 (Apr. 2006).

[102] These are discussed in NCHRP Report 699, *supra* note 89. For example, North Dakota has, for some of its projects, held a 1 percent retainage for the duration of the warranty in lieu of any bonds or other security.

By integrating design and construction, and specifying that the entire work will be in accordance with the contract documents (i.e., achieving performance specifications contained in the contract documents), this clause creates a responsibility for both the design and construction teams to do the work necessary to achieve those results. That the design services were performed in accordance with industry standards is not an excuse. The standard clause from the DBIA states this very directly:

> The standard of care for all design professional services performed to execute the Work shall be the care and skill ordinarily used by members of the design profession practicing under similar conditions at the same time and locality of the Project. Notwithstanding the above, if the parties agree upon specific performance standards in the Basis of Design Documents, the design professional services shall be performed to achieve such standards.[103]

From the perspective of designers working for contractors or concessionaires under design-build, PPP, or other arrangements, the need to meet performance specifications can create a major challenge. The designer could insist that its subcontract contain a clause like the first one in this section, where its liability will be based on an “ordinary” standard of care. While this may create a “standard of care gap” for the design-builder or PPP concessionaire, it may be a commercial risk that the design-builder/concessionaire has to assume given the realities of the arrangement (i.e., the risk-to-reward ratio). Even if the designer was willing to agree to a more severe standard of care and to create a design to achieve the performance specification, there is a potential gap for the design-builder/concessionaire. Professional liability policies do not cover losses incurred by designs that do not meet guarantees of performance—they just cover “ordinary” negligence. Therefore, unless the designer has deep financial pockets, the design-builder/concessionaire will ultimately have the financial risk of the design deficiency.

While design-build and design professional contracts routinely address standard of care, this is not a term used in a general construction contract. The construction contractor under a design-bid-build or construction management at-risk contract is obligated to perform the work required by the contract documents—including any performance standards. However, a recent case provides some insight into how courts view standard of care among the contracting parties relative to a performance specification that was not met for terrazzo floors on a school building project.[104]

The project’s general contractor subcontracted the floor installation to a trade contractor that specialized in the installation of epoxy terrazzo floors. After the floor was installed, an oily substance began oozing to the surface through tiny pores in the terrazzo. When the problem could not be remedied, the flooring was replaced with a cement-based terrazzo floor. This resulted in a lawsuit involving the question of whom, among the architect, general contractor, terrazzo subcontractor, and resin supplier, should have liability for the losses suffered by the school.

The trial court concluded that the oily substance came to the surface of the floor as a result of water vapor intrusion from below the concrete slab. As might be expected, each party argued that someone else was the one who should have known how to meet the performance specification for the terrazzo installation and avoid the water vapor problem. The trial court held that each party should have done more to learn the standards of care for correctly installing the terrazzo and consequently found each of them liable.

The court found that the architect was liable because it was the first time it had ever specified the use of terrazzo flooring, and that in specifying only that terrazzo be installed in conformity with national standards, it failed to investigate what those standards were or whether they were obtainable in Louisiana where the project was being built. The general contractor, who relied upon its subcontractor to ascertain installation standards to eliminate water vapor transmission, was liable because it should have directly learned the standards of terrazzo flooring and what was needed to meet the needs of this project. The subcontractor was liable because it knew or should have known the applicable industry standards, but it relied upon its resin supplier to select the method for testing the water vapor transmission through the concrete slab, and that supplier used a method that was not trustworthy.

In assigning percentage responsibility for the damages, the trial court concluded that, as between the general contractor and flooring subcontractor, the subcontractor had greater performance responsibility for the floor and the knowledge to inform and advise the contractor about what the requirements were for the proper installation of the floor. The court assigned 80 percent of the responsibility to the subcontractor (to be shared equally with the resin manufacturer) and 20 percent to the contractor and architect to be shared equally.

The appellate court agreed with the decision, with one important exception. It concluded that the general contractor had no liability for the floor because it was entitled to rely upon the architect and on its specialty subcontractor that actually installed the floor. There was nothing at the trial that indicated that the general contractor did not meet the architect’s plans and specifications. The architect himself testified that the concrete slab had been poured in conformity with his plans and specifications, and an expert witness on high-performance flooring testified that he knew of nothing the contractor could have done prior to installing the floor to prevent its failure.

The appellate court concluded that the terrazzo subcontractor had not met the standard of care because it failed to perform a manufacturer’s recommended cal-

[103] DBIA Document 535, General Conditions of Contract Between Owner and Design-Builder (2010).

[104] Calcasieu Parish Sch. Bd. v. Lewing Constr. Co., Inc., 931 So. 2d 492 (La. App. 3d. Cir. 2006).

cium chloride test to determine the vapor transmission rate. The court was persuaded by testimony that the "terrazzo installer should have known more about the specifications than anyone else on the job, that the installer should have been aware of the tests, and that the installer should have done more tests and made further inquiries."[105] The court also confirmed that the architect's 20-percent liability was appropriate, as it used performance specifications without further investigating the requirements of an epoxy terrazzo floor before writing the specifications.

The above case seems at odds with the stated purpose of performance specifications—to minimize prescriptive details and give the contractor the opportunity to determine how to meet the required performance. Since the architect wrote a performance specification that did not set forth any design details, the normal assumption would be that the contractor takes on all responsibility for determining the appropriate design details to satisfy the performance standard. Given this, one might have thought that the architect could rely upon the contractor's "supply chain" to meet the performance specifications. However, it certainly points out the risk of what can happen if a performance specification is not achieved on a design-bid-build project, where there is no pre-contract collaboration among the parties.

There are some pragmatic points to consider relative to articulating the standard of care in a contract. If the premise of the project is built around a clear contractual performance guarantee (e.g., a 200-MW power plant or pavement performance guarantees), then the design, construction, and, if applicable, O&M teams need to collaborate about whether these guarantees are achievable based on current state-of-the-industry practices. If these guarantees are achievable, then the standard of care language in the contract should not be a major issue. The parties simply need to agree upon who will do what to meet the guarantees. If these guarantees are based on an industry standard of care that has not yet been established, particularly for a new technology, the use of that technology should not be undertaken without careful consideration of the available technical information and the risks and benefits associated with its use.[106] Once this is done, the parties can decide whether they will pursue the project and, if they do, how the associated commercial risks will be allocated. Appropriate compensation and contractual limits of liability can address all of these issues.

[105] *Id*. at 500.

[106] A Preliminary Look at Best Practices in the Specification of Proprietary Products: A Response to the Ceiling Collapse in the Interstate 90 Connector Tunnel in Boston by the American Society of Civil Engineers, available at http://www.asce.org/uploadedFiles/Communications-TO_BE_DELETED/Disaster/Post-Disaster_Teams//Big%20Dig%20Final%20White%20Paper.pdf.

F. Limitations of Liability

One of the biggest challenges to the use of performance specifications is that suppliers of technology or products are not willing to take major commercial risks that could result in liability far in excess of their contract price. Suppliers will commonly condition their willingness to furnish goods or technology on a particular project to an agreement by the prime contractor that the supplier will have a contractual limitation of liability (frequently capped at 100 percent of their contract price) for any deficiency attributable to the supplier. This was evident in the Virginia Route 288 project discussed above, as Koch Performance Roads limited its overall warranty obligations to $15 million. Contractual limitation of liability is also a routine practice for information technology suppliers in all industry sectors, including transportation projects. As discussed below, these conditions can create potential gaps in liability to the prime contractor, and can create major problems in obtaining recourse for a performance failure.

On industrial projects such as power and petrochemical plants, limitations of liability are an accepted part of the contracting landscape between owners and contractors. However, the public sector has not widely adopted limitations of liability for prime contractors—other than on a handful of megaprojects where limitations of liability were required to obtain adequate price competition. Therefore, a prime contractor on something other than a megaproject will likely be required to assume the risk of the financial gap between the limitation of liability it gives to a supplier and the liability that is incurred if the supplier fails to meet the performance guarantee. This "gap risk" is exacerbated because of the large difference in the contract price of a purchase order vis-à-vis a prime construction contract.

In theory, there is justification for designers and specialty subcontractors to require an overall contractual limitation of liability. To date, however, most designers and specialty trade subcontractors have not made overall liability caps part of their contracting philosophies. One might expect this to change in the future, particularly based on the risk–reward ratio prevalent in major contracts with major performance specifications.

G. Creative Commercial Approaches from Other Industry Sectors

While the highway sector has historically used incentives/disincentives with performance specifications, capital projects in other industries have highly creative commercial contracts. Power projects, for example, regularly provide EPC contractors with bonuses for exceeding net electrical power and having lower heat rates than guaranteed levels. Outsourcing contracts will provide major incentives for better performances. Certain federal agencies routinely use contract award fees, where major bonuses can be earned for exceeding performance levels.

The building sector is currently using performance specifications in a major way to measure energy usage.

One project that has received much national attention is the Federal Center South project currently being built by the U.S. General Services Administration (GSA) in Seattle.[107] The original design-build contract, valued at $66 million, included a 0.5 percent "holdback" that will only be paid if the building makes good on its proposal promise to deliver a 209,000-ft^2 building that uses 30 percent less energy than the American Society of Heating, Refrigeration, and Air Conditioning (ASHRAE) 90.1-2007 standard (i.e., 27,600 Btu/ft^2/year). Consistent with some of the points covered previously, the parties are working through the specifics for measurement, validation, and fine tuning, and how energy-use data are to be assessed. One of the particular areas of concern is the comparison of the energy model's assumptions versus actual operating conditions. For example, the model assumed certain weather conditions, and that there would be no electrical-plug loads from individual space heaters or refrigerators. Changes in these assumptions could impact the ability of the design-builder to meet its guarantees. Note that GSA did not use any incentives in this contract to reward enhanced performance.[108]

VIII. AN EXAMINATION OF THE CASELAW ASSOCIATED WITH PERFORMANCE SPECIFICATIONS

As discussed in previous sections of this digest, many factors can drive an owner to choose performance specifications rather than design specifications. One of the key factors is liability exposure. Under the *Spearin* doctrine, owners who use design specifications face liability to contractors for defects in those specifications, while owners using performance specifications do not.

In theory, the legal distinction between design and performance specifications seems clear and easy to apply. In reality, it is anything but clear and easy. As evident from the caselaw on these subjects, application of this general principle to real-life situations raises a number of questions, such as 1) how does one determine if the specification at issue is a "design" or a "performance" specification; 2) what happens if the specification at issue is a composite of both design and performance specifications; 3) what if the contractor helps draft the performance specification; and 4) what if the performance specification cannot be achieved? If there is anything that is clear about this subject, it is that the winners and losers in litigation over performance specifications issues are decided by the specific facts of the case, where a trier-of-fact can assess what the specification required and who should bear responsibility for the problem.

Readers should note that there are literally hundreds of cases around the country that have discussed defective specifications and the application of the *Spearin* doctrine. The purpose of this section of the digest is to provide a comprehensive review of how the legal issues associated with performance specifications have been decided.[109] While many of the cases arise out of construction projects, there are also examples from other industries, including research and development, product sales, and technology. Readers should also note that most of the caselaw in this area arises from Federal Government contracts, as is evident by the citations included in this section.

A. *Spearin* and the Creation of Implied Warranties for Defective Specifications

United States v. Spearin[110] is generally considered the most important construction law case in the United States. This case essentially established what has become commonly known as the doctrine of implied warranties, which imposes on an owner an implied promise that certain specifications contained in a contract are free of material defects.[111] While the *Spearin* doctrine has been stated in many different ways, it essentially means that an owner cannot hold a contractor responsible for the consequences of following an owner's specifications.

The facts in *Spearin* arose out a contract that called for the contractor to build a dry dock. The contract required the contractor to relocate a 6-ft sewer. Unfortunately, the plans inaccurately reflected subsurface conditions through which the sewer system would be built, as there was an existing dam not shown on the plans. The contractor relied upon the plans and specifications and completed the sewer relocations. One year after completion, a heavy rainstorm backed up water into the sewer, breaking it and flooding the surrounding dry-dock area. The nondisclosed existing dam contributed to the flooding and failure.

When the contractor refused to clean the area and complete performance on the contract, it was terminated for default. This resulted in a lawsuit over who was responsible for the problem. In finding for the contractor, the United States Supreme Court established the fundamental liability differences between owners and contractors for constructability risk:

[107] Post, *supra* note 36, at 10.

[108] As of May 2012, the building was 80 percent complete. Interestingly, the energy modeling at the time of the ENR publication indicated that the building was to use 40 percent less than ASHRAE standards, and that the team was attempting to obtain a LEED Gold standard versus the LEED Silver rating that was contractually specified.

[109] There are many nuances associated with defective specifications that do not directly relate to performance specifications, such as the duty of the contractor to provide what is reasonably inferable from the contract documents and to raise patent ambiguities in the bidding process. These nuances are not discussed in this digest.

[110] 248 U.S. 132, 39 S. Ct. 59, 63 L. Ed. 166 (1918).

[111] Kevin C. Golden & James W. Thomas, *The Spearin Doctrine: The False Dichotomy Between Design and Performance Specifications*, 25 PUB. CONT. L. J. 47 (1995).

> The general rules of law applicable to these facts are well-settled. Where one agrees to do, for a fixed sum, a thing possible to be performed, he will not be excused or become entitled to additional compensation, because unforeseen difficulties are encountered. …But if the contractor is bound to build according to plans and specifications prepared by the owner, the contractor will not be responsible for the consequences of defects in the plans and specifications. [citations omitted] …This responsibility of the owner is not overcome by the usual clauses requiring builders to visit the site, to check the plans, and to inform themselves of the requirements of the work…if he was misled by erroneous statements in the specifications.[112]

The Supreme Court, in reaching this conclusion, created the owner's implied warranty by the following language:

> The risk of the existing system proving adequate might have rested upon Spearin, if the contract for the dry dock had not contained the provision for relocation of the 6-foot sewer. *But the insertion of the articles prescribing the character, dimensions and location of the sewer imported a warranty that if the specifications were complied with, the sewer would be adequate. This implied warranty is not overcome by the general clauses requiring the contractor to examine the site, to check up the plans, and to assume responsibility for the work until completion and acceptance.* The obligation to examine the site did not impose upon him the duty of making a diligent inquiry into the history of the locality with a view to determining, at his peril, whether the sewer specifically prescribed by the government would prove adequate. The duty to check plans did not impose the obligation to pass upon their adequacy to accomplish the purpose in view [emphasis added].[113]

The holding in *Spearin* is somewhat narrow, as it only relates to the accuracy of existing conditions on the site—essentially creating what the industry now thinks of as a "differing site conditions" remedy. However, the cases that followed *Spearin* considerably broadened the holding. One of the most important post-*Spearin* cases was *Helene Curtis Industries, Inc. v. United States*,[114] which involved a contract to produce disinfectant chlorine powder to be used by U.S. troops in Korea to disinfect mess gear and fresh fruits and vegetables.

The Army prepared a specification for the new disinfectant product that contained the active ingredients and directions for its production. The contractor followed these specifications, but the production batches failed to meet the contract's prescribed solubility requirements. To meet these solubility requirements, the contractor had to use a complicated and expensive grinding process to mix the specified chemicals. It argued the government should pay for this extra work. The court agreed with the contractor. Citing *Spearin* as precedent, the court stated:

> We hold the specification for the disinfectant to have been misleading with respect to grinding. This was not merely a specification for an end-product, without any implications at all as to method of manufacture. To reasonable bidders it erroneously implied, in its context, that grinding would not be necessary to make the desired item; and in the circumstances defendant should have known that this would be the inference. Specifications so susceptible of a misleading reading (or implication) subject the defendant to answer to a contractor who has actually been misled to his injury.[115]

As indicated by the above excerpt, *Helene Curtis* clearly articulated what the industry has come to know as the *Spearin* doctrine. It also gave rise to what has become known as the Helene Curtis, or "superior knowledge," doctrine.[116] This doctrine holds that an owner violates its contractual obligations if it fails to disclose during the bidding process special knowledge that is central to the performance of the bidder, and which the bidder cannot reasonably be expected to know from any other accessible source.[117]

Countless cases around the country have considered claims raised by contractors that defective specifications led them to do something to their detriment. Typical of this is *Chantilly Construction Corporation v. Commonwealth of Virginia Department of Highways*,[118] where the court found that a highway contractor was not liable for defective concrete where it followed the owner's design specifications. The contractor was unable to obtain the specified concrete strength. It was able to prove this was because VDOT specified the use of Type III modified cement as opposed to Type III cement, which was substantially stronger than the Type III modified cement. Citing *Spearin*, the court stated that:

> The Department supplied Chantilly with specifications prescribing the types and amounts of components for the concrete mixture, the temperature ranges during pouring of the cement, and the methods by which the concrete was to be made. In so doing the Department impliedly warranted that those specifications, if complied with, would produce concrete that would meet strength requirements.[119]

Myriad other courts and triers of fact have reached similar conclusions on projects involving both building and civil works contracts. They do this by reviewing the specifications themselves, determining whether the design specification was defective, and then considering

[112] *Spearin*, 248 U.S. at 136.

[113] *Id*. at 137.

[114] 160 Ct. Cl. 437, 312 F.2d 774 (1963).

[115] *Id*. at 778.

[116] The *Helene Curtis* decision noted that the Army knew that a more costly process of grinding would be necessary to meet the requirements of the specification, and also knew that the contractor was planning to use a simple mixing process that would not work. The court concluded that bidders would not have had the time during the bidding process to learn this and would conclude that a simple mixing process would be adequate. The court held that "The Government, possessing vital information which it was aware the bidders needed but would not have, could not properly let them flounder on their own." *Id*. at 778.

[117] *See, e.g.*, H.N. Bailey & Assoc. v. United States, 196 Ct. Cl. 166, 449 F.2d 376 (1971).

[118] 6 Va. App. 282, 369 S.E.2d 438 (Va. App. 1988).

[119] *Id*. at 447.

the cause and effect of any problems. Importantly, courts have not generally been swayed by an owner's argument that it can completely design a project and then, by requiring the contractor to pass a test, shift the risk of performance to the contractor.[120]

Spearin and *Helene Curtis* make it clear that an owner has liability for defective design specifications. However, the caselaw and legal commentators have made it equally clear that the *Spearin* doctrine does not apply to the accuracy or adequacy of performance specifications.[121] One legal commentator stated the proposition as follows:

> [The implied] warranty's creation turns on whether the disputed specification falls within one of two mutually exclusive categories. Thus, if the court classifies the specification as a "performance" specification, the warranty does not attach. If, on the other hand, the court places the specification in the "design" category, the specification carries an implied warranty that the contractor will achieve a satisfactory result if the provision is followed.[122]

One of the seminal cases in this area, *J.L. Simmons Co. v. United States*,[123] stated the general proposition as follows: "[T]ypical 'performance' type specifications set forth an objective or standard to be achieved, and the successful bidder is expected to exercise his ingenuity in achieving that objective or standard of performance, selecting the means and assuming a corresponding responsibility for that selection."[124] Several cases have cited to *J.L. Simmons*, including *PCL Construction Services, Inc. v. United States*,[125] which expressed the principle as follows:

> The *Spearin* doctrine has been discussed and clarified over the years, often with the words "design" and "performance" specifications used to differentiate between contracts for which the specifications warranty does and does not apply. [citations omitted]. The warranty applies only to "design specifications" because only by utilizing specifications in that category does the government deny the contractor's discretion and require that work be done in a certain way. When the government imposes such a requirement and the contractor complies, the government is bound to accept what its requirements produce.[126]

Other courts have used similar wording to describe this general philosophy, such as the two following quotes from reported decisions:

> A claim based on defective specifications can only be maintained if the contract incorporates design rather than performance specifications.[127]
>
> ****
>
> Even though a contract may contain some design specifications, when a crucial element of the contract requires the contractor to use its own expertise and ingenuity, a Spearin warranty does not arise as to that element of the contract.[128]

In short, the proposition is so well-established that virtually every writing on the subject of *Spearin* and performance specifications will contain language that reminds readers that the owner's warranty under *Spearin* does not apply to work that is defined by performance specifications.[129]

B. Distinguishing Between Design and Performance Specifications

Given the above, one might expect that a "bright line" test exists to determine whether a specification at issue is a design or a performance specification. Unfortunately, there is no such test. The caselaw demonstrates that the answer to the question involves a mixture of legal and factual considerations.[130] This was well-stated in *Fru-Con Construction Corp. v. United States*,[131] where the court, citing earlier precedent, held: "[T]he distinction between design specifications and performance specifications is not absolute and that courts should understand that it is the obligation imposed by the specification which determines the extent to which it is a 'performance' or 'design,' not the other way around."[132] Even a specification that says, in effect, "this is a performance specification," will not be dispositive on the issue. The *Fru-Con* court held that the labels of "performance" and "design" specifications do not independently create, limit, or relieve contractors' obliga-

[120] An example of this is W.H. Lyman Constr. Co. v. Village of Gurnee, 84 Ill. App. 3d 28, 403 N.E.2d 1325 (1980), where the contract documents for a sewage treatment plant contained detailed plans and specifications, as well as requiring the contractor to pass an infiltration test on the completed sewer. The court cited to *Spearin* and held that because the contractor performed in accordance with the contract documents, and had no input into the design, the contractor could not be held responsible for failing to pass this test.

[121] The genesis of this principle comes from the language in the *Spearin* decision that says, "Where one agrees to do, for a fixed sum, a thing possible to be performed, he will not be excused or become entitled to additional compensation, because unforeseen difficulties are encountered." *Spearin,* 248 U.S. at 136. While the above wording may seem a bit vague, courts have regularly cited *Spearin* as the controlling authority for the basic principle that performance specifications are not covered by the same implied warranty associated with design specifications.

[122] Golden & Thomas, *supra* note 111, at 47, 51.

[123] 188 Ct. Cl. 684, 412 F.2d 1360, 1362 (1969).

[124] *Id.* at 1361.

[125] 47 Fed. Cl. 745 (2000).

[126] *Id*. at 748.

[127] Connor Bros. Constr. Co. v. United States, 65 Fed. Cl. 657, 685 (2005), *citing* Haehn Mgmt. Co. v. United States, 15 Cl. Ct. 50, 56 (1988).

[128] Aleutian Constructors v. United States, 24 Ct. Cl. 372 (1991).

[129] *See, e.g.*, Laura A. Hauser & William J. Tinsley, Jr., *Eyes Wide Open: Contractors Must Learn to Identify and React to Design Risks Assumed Under Performance Specifications*, 27 CONSTR. L. 32 (2007); 19 No. 12, NASH & CIBINIC REPORT ¶ 56 (Dec. 2005).

[130] Caddell Constr. Co., Inc. v. United States, 78 Fed. Cl. 406 (2007).

[131] 42 Fed. Cl. 94 (1998).

[132] *Id.* at 96.

tions, particularly because contract language does not always fall squarely within either category and because contracts may exhibit both design and performance characteristics.

While there are no "bright line" tests, there are a number of "rules of thumb" that courts use to determine how to label a specification. One approach courts frequently use is to assess how much discretion the specification gives the contractor to perform the work. As stated in *Fru-Con*: "[C]ourts have directed their attention to the level of discretion inhering within a given specification; discretion serves as the touchstone for assessing the extent of implied warranty and attendant liability."[133] If the specification serves as a "road map," then it is generally considered a design specification. If the specification gives the contractor wide discretion in meeting the end result, then it is generally considered to be a performance specification.

J.L. Simmons Co. v. United States.,[134] which was cited above and is considered a leading case for distinguishing between design and performance specifications, stated:

> [In a design specification]…the defendant set[s] forth in precise detail the materials to be employed and the manner in which the work was to be performed, and plaintiff was not privileged to deviate therefrom, but was required to follow them as one would a road map. In contrast, typical "performance" type specifications set forth an objective or standard to be achieved, and the successful bidder is expected to exercise his ingenuity in achieving that objective or standard of performance, selecting the means and assuming a corresponding responsibility for that selection.[135]

This case involved a dispute over whether the contractor should remediate a defective foundation on a hospital. The court applied the above-referenced test to find that the specifications were design specifications. These specifications contained 1) specific requirements for the type of piles to be used and depicted the design loads for these piles; 2) limitations on preexcavating and coring; and 3) "complete specificity" on the pile driving equipment to be used, as well as the procedures for its use, including when bearing capacity would be determined and the tolerances for completed piles. The contractor followed the specifications. After installing virtually all (almost 2,000) of the piles, it was discovered that the piles were showing movement, requiring a major remediation plan. The court rejected the government's argument that these problems were the contractor's responsibility, concluding that under *Spearin* the government had impliedly warranted that if the contractor followed its detailed specifications, the end result would have been acceptable.

A variety of cases have used the "road map" analogy to find that the owner had furnished design specifications. The rationale in these cases typically involves a review of the general principle to determine whether there is a design or performance specification. If the court concludes that the issue involves a design specification, it then examines whether the specification was defective and caused the problems claimed by the contractor, thereby creating liability to the owner under the *Spearin* doctrine.

One of the cases using this approach is *Caddell Construction Co. v. United States*,[136] which involved the construction of seismic upgrades to an existing Veterans Administration (VA) hospital. A steel subcontractor claimed that it was entitled to money and time relief because of defective specifications. The government admitted that the contract documents were detailed, but claimed that 1) because these details were not instructions on how to construct the building, the contract was not a design specification; and 2) because the contract did not provide the "means and methods" for the construction, the contract was a performance specification. The court rejected this argument, and found that the subcontractor had been furnished a design specification:

> The court agrees with plaintiff that, at the very least, the structural steel portion of the contract was a design specification. Although the government did not dictate every aspect of the construction of the building and left certain key aspects of the construction, such as sequencing and scheduling, up to Caddell, the details and specifications for the structural steel were design specifications. Nine pages of the contract are devoted to specifications for the structural steel with specific instructions on what type of bolts, washers, nuts, welds, finishes, and connections, among other things could be used for the construction. This was clearly a "road map" for the structural steel fabricator to follow…. In addition, the building itself was designed to meet specific earthquake proofing guidelines and the contractor had to strictly follow that design.[137]

The court also noted that neither the general contractor nor its subcontractor had the expertise necessary to make any changes while ensuring that the building served its purpose and was still earthquake resistant. All engineering for the project was the responsibility of the government and its design professionals, and the contractors had no authority to deviate from the structure's prescribed design.[138]

Another case using the "road map" approach is *Fruin-Colnon Corp. v. Niagara Frontier Transportation Authority*,[139] where a tunnel contractor claimed extra costs for grouting that was required to achieve the watertightness of the twin subway tunnels it built. The owner argued that the specification requiring the constructed tunnels to be "watertight" was a performance specification and that, therefore, the contractor's addi-

[133] *Id*.

[134] 412 F.2d 1360 (1969).

[135] *Id*. at 1362.

[136] 78 Fed. Cl. 406 (2007).

[137] *Id*. at 412.

[138] Note that although this court found that the government furnished a design specification, it ultimately concluded that the contractor did not prove that errors in the specification led it to suffer damages, and rejected the claim.

[139] 180 A.D.2d 222, 585 N.Y.S.2d 248 (1992).

tional costs in achieving that standard were not compensable. The watertightness clause in the contract specified the end objective (e.g., watertightness) and the standards for measuring compliance with that objective; it did not specify the methods of achieving watertightness.

The court stated that, on first blush, the watertightness clause looked like a performance specification. However, in reading the contract as a whole, and evaluating how much control the contractor had to achieve watertightness, the court concluded that the contract established "complex and exacting standards for design and construction of the tunnel" that made it a design specification. These standards included requirements that the contractor construct an unreinforced, cast-in-place, concrete liner of precise dimension and use prescribed concrete types and mix; and the standards specified how the concrete was to be placed, cured, protected, and finished. The contractor was given no discretion to deviate from those specifications, whether for the purpose of waterproofing or otherwise. The decision observed that, for example, the contractor had no discretion to install an impermeable outer liner to resist the hydrostatic pressure that was expected to exist following completion of construction. The contract also specified that waterproofing would be accomplished by means of fissure grouting, with detailed specifications governing how to do this.

Interestingly, the court looked to the payment and warranty provisions of the contract to support its conclusion that, as a whole, this was a design specification. The contract explicitly provided that all measures necessary for achieving the degree of watertightness, including remedial treatments, would be paid for at the contract unit prices. The court concluded that it was unlikely that the owner would have agreed to pay the contractor on a unit-price basis if the contractor had actually assumed a performance responsibility to achieve watertightness. Even the warranty clause did not provide that the contractor would remedy water leaks at its own expense.

Just as there are a large number of cases that have used the "discretion" and "road map" rules of thumb to identify design specifications, there are many that have used the same standards to conclude that the specifications were actually performance specifications, thereby defeating a contractor's claim for relief. An example is *Fru-Con*, cited above, which involved an overblasting claim on a concrete removal project that arose out of problems with the contractor's detailed blasting plan. The contractor argued that its blasting plan "constituted nothing more than a reflection of the detailed specifications prescribed by the [Corps of Engineers]."[140] It included such items as saw cutting; the amount of concrete to be removed; the height, width, and depth of removal; and the length, size, and depth of embedment of all anchor and reinforcing steel associated with permanent installation. The government countered by stating that while it had specified the elements of a successful blasting plan, it did not take away the contractor's opportunity for ingenuity.

The court agreed with the government and rejected the contractor's claims, finding that the contractor retained complete discretion in the development of the blasting plan, subject only to the review and approval of the Corps of Engineers. The contractor had determined the size, depth, and diameter of the holes; the size and location of the charges; and the blasting sequence; and had selected the explosives and related equipment. There was no evidence that the Corps of Engineers had input into the preparation of the plan, mandated the use of certain explosives or equipment, or imposed any obligations during its review and approval of the plan.

Another example is *PCL Construction Services*,[141] cited earlier for the general proposition of how one is to evaluate the differences between design and performance specifications. This case involved a claim by PCL Construction (PCL) against the U.S. Bureau of Reclamation on a fixed-price contract for the construction of the Hoover Dam's visitor center and parking garage. The solicitation documents informed bidders that certain aspects of the design were based on estimates of rock location and to expect some omissions, discrepancies, and conflicts in the design. PCL encountered numerous problems during construction that were largely caused by inaccuracies in the estimated rock line. Once the Bureau took possession of the facilities, PCL refused to fix certain items. This led the Bureau to terminate PCL for default and withhold the final payment. PCL filed suit to convert the default termination to a convenience termination and to recover $32 million.

One of the major issues in the case was whether the Bureau had *Spearin* liability arising from defective design specifications.[142] After examining the contract, the court concluded that the specifications were not exclusively design specifications, but either performance specifications or a mix of design and performance specifications. It concluded that many areas of the specifications did not have the "road map" necessary to take away the contractor's discretion in performing the work, and cited 22 specific examples where PCL was contractually responsible for the design and/or engineering of significant portions and elements of the work, including concrete formwork and falsework, concrete reinforcement, precast structural concrete units, metal floor and roof decks, prefabricated steel stairs, skylights, and glass and glazing. Reflecting on all of the facts, the court stated:

[140] *Fru-Con*, 42 Fed. Cl. at 97.

[141] 47 Fed. Cl. 745 (2000).

[142] Another major issue in the case raised by the contractor was that, by using a fixed-price contract, the Bureau had represented that the plans and specifications were prepared in accordance with industry standards and that *Spearin* applied. It argued that a cost-reimbursement contract should have been used if the Bureau truly believed that the plans and specifications were so inaccurate.

> It is apparent to the court from the contract requirements outlined above that the contract never contemplated that PCL's performance could be accomplished using only the contract documents. The contract required that PCL also use numerous types of drawings and data prepared by its own forces, including coordination layout drawings, concrete placement drawings, concrete reinforcement drawings, various types of submittals including its own designs, shop drawings and layout drawings of all crafts.
>
> ***
>
> In fact the contract expressly provided that the design package conveyed only the "design and engineering intent" for the project, and that the design drawings would be supplemented and detailed as necessary to construct the final product. Thus, the contract allocated a substantial amount of discretion and responsibility to PCL to participate in resolving design problems. The contract also stated performance goals that PCL was to meet, and did not tell PCL the methods or processes to use to achieve the specified end result. Indeed, it is evident that the drawings do not contain the level of detail necessary to actually construct the project in the field. It was up to PCL to provide the precise details of how the structures were to be built (including, but not limited to, the precise routing of electrical and mechanical systems, the number and locations of individual concrete pours, the sequence of construction activities, and details of all concrete reinforcement.)[143]

Based on these findings, the court concluded that the Bureau of Reclamation was entitled to terminate PCL for default and withhold an amount necessary to complete the defective work.

Another case, *P.R. Burke Corp. v. United States*,[144] involved the repair and improvement of a sewage treatment plant at the U.S. Marine Corps Base at Camp Pendleton, California. The contract documents depicted certain areas of the plant that the contractor had to repair, showing both the existing location of various structures and the planned location of the new structures. One drawing showed the location of the two new trickling filters (i.e., filters that provide secondary treatment of waste in sewage treatment by converting organic materials into sludge). These drawings showed the new trickling filters, as well as several other new facilities, in the same area as the existing trickling filter.

The contract required that "the plant remain in operation during the entire construction period and the Contractor shall conduct his operations so as to cause the least possible interference with the normal operations of the activity."[145] The contractor's initial demolition plan was rejected by the government because it showed the removal of the existing trickling filter and some additional tanks at the beginning of the project, essentially resulting in the plant being nonoperational.

After discussions between the parties, the government ultimately suggested a sequence of work where the contractor would first construct one new trickling filter, and make it operational before demolishing the existing trickling filter and constructing the second new filter. While the contractor adopted this sequence, it argued that this cost it more money and delayed its performance. The court rejected the contractor's claim, finding the specifications to be performance specifications and giving the contractor the right to "plan and schedule the manpower, materials and methods of construction necessary to complete the Project as specified." It specifically noted that the contractor had control over its demolition sequence and schedule, and had the obligation to design the trickling filter to meet specific performance requirements:[146]

> [This] simply shows that the government was telling Burke how the trickling filter needed to perform after Burke had completed it, not how Burke itself should go about constructing the filter. Indeed, under the contract, Burke had to submit drawings that "show the complete assembly of equipment, components, and parts" for the trickling filter. Accordingly, all the contract did was "set forth an objective or standard to be achieved," the definition of a performance contract.[147]

Central to the court's decision was the fact that it was possible to meet the government's definition of "normal operation." The court also concluded that the contractor had a duty during the bidding period to raise a question with the government if it truly believed that the existing trickling filter had to be decommissioned to make its plan work.[148]

Some contractors have tried to argue that incomplete specifications are a basis to make a claim under the *Spearin* doctrine. For example, in *Connor Brothers Construction Company v. United States*,[149] the contractor claimed that it was entitled to additional compensation for having to connect new diffusers and grilles to an existing hospital heating, ventilation, and air-conditioning (HVAC) system. The plans and specifications showed the new equipment and systems to be installed but did not specifically call out details of the connection work as to the existing HVAC system. The court rejected the contractor's claims on a number of grounds, one of which was the contractor's defective specification argument, stating:

> [S]imply because the contract documents did not specify exactly how Conner was to make an operational system, that fact does not render the contract drawings and speci-

---

[143] *PCL Construction*, 47 Fed. Cl. at 798.

[144] 277 F.3d 1346 (Fed. Cir. 2002).

[145] *Id*. at 1350.

[146] The performance requirements were stated as requiring "a flow range from a minimum 1980 gallons per minute (gpm) to maximum of 3450 gpm and average design loading of 2620 gpm of sewage having a maximum 24-hour biochemical oxygen demand (BOD) of 195 milligrams per liter (mg/L)."

[147] *P. R. Burke*, 277 F.3d at 1360.

[148] The contractor argued that it should have been able to decommission the trickling filters and bypass them by sending the wastewater through the treatment plant without secondary treatment. This would have continued to make the plant "operational." The court ultimately rejected this as an unreasonable interpretation of the word "operational." *Id*. at 1357.

[149] 65 Fed. Cl. 657 (2005).

> fications defective. An omission regarding the methodology of the reconnection of the diffusers and grilles to the ductwork does not invite a claim of defective drawings, as plaintiff would like the court to decree.[150]

Examining the specification at hand, and applying the tests described above, the court concluded that the contractor had the obligation to comply with a performance specification relative to the connections of the diffusers and grilles:

> In this instance, the aspect of the contract involving the replacement of diffusers and grilles clearly reflects performance specifications and Conner has failed to demonstrate that it lacked discretion in performing the contract in order to warrant a finding of defective specifications. The contract drawings showed the layout of the ductwork and the sites of the old diffusers and grilles and where the new diffusers and grilles were to be placed along with a requirement that the system was to be made operable. This lack of detail indicates a performance specification because the contract drawings were silent as to how the new diffusers and grilles were to be re-attached to the HVAC system. The successful bidder in this case was given a significant amount of discretion in making the system operational. Conner was expected to use its own judgment and experience in deciding how to successfully perform the contract requirements.[151]

Note that many other cases have considered similar issues relative to the design versus performance specification argument, and have concluded that contractors cannot simply find an omission in a specification and claim that it is defective.[152] However, it is important to remember, as noted earlier, that there is no "bright line" standard on specification disputes, and the cases are decided on their own facts. For example, in *M.A. Mortenson Co.*,[153] a contractor successfully argued that the omission of a firestopping design for penetrations placed in structural steel beams was the duty of the owner. The specifications appeared to be performance-based, although they also required a UL-listed, classified, and numbered product specifically designed to close the penetrations. The Board of Contract Appeals concluded that as a result of this, it was the duty of the owner to have designed what was needed to meet that UL-listed product.[154]

Looking at the other side of the issue, owners cannot argue that an omission in a design specification converts a clear design specification into a performance specification. This situation arose in *Travelers Casualty and Surety Company of America v. United States*,[155] a case that involved the construction of turning lanes into a new laboratory facility. The specification did not show any specific slope for the turning lanes, and the contractor built it along the contours of the grade. The government believed that it should have been a 2-percent slope in accordance with South Carolina DOT's design manual, and it argued that the absence of any designated slope on the drawings required that the contractor bear responsibility for determining what the required slope was and achieving it. The court rejected this argument, finding that the specification was a detailed design specification, not a performance specification, and that the contractor's interpretation of using the existing contours was reasonable.

C. Composite/Mixed Specifications

Parties involved in a specification dispute typically argue for or against the design/performance specification label. However, as most in the industry know, it is rare for a performance specification not to have some prescriptive requirements associated with it. This was noted in *Utility Contractors, Inc. v. United States*,[156] where the court stated:

> The court has difficulty in believing that every government contract entered into can so neatly be placed in such black and white terms as design specification or performance contract. The court does not necessarily find that these terms have to be so mutually exclusive. Certainly one can find numerous government contracts exhibiting both performance and design specifications characteristics.[157]

As stated in *Costello Industries, Inc*., "Specification problems become more complex when a specification is

---

[150] *Id.* at 685.

[151] *Id.* at 686.

[152] One of the frequently-cited performance specification cases, Zinger Constr. Co. v. United States, 807 F.2d 979 (1986), falls into this category. The contractor in this case had a contract to install electric duct heaters in a dehumidifier system. This work included moving existing fan units and steam coils in the dehumidifier ducts approximately 3 ft forward and installing new electric heaters downstream from the relocated steam coils and fans. After installing the electric heaters and relocating the existing fan units and steam coils, the contractor argued that it was not obligated to reconnect the steam coils and fans to the electric control box. Because the existing wires would not reach the relocated equipment, a new junction box and connecting wires had to be installed and the contractor filed a claim for the costs under the *Spearin* doctrine. It argued that it was entitled to rely exclusively on the drawings and detailed specifications, and the disputed wiring and reconnection was not depicted on either.

Finding the contractor's argument that this was a design specification "misguided," the court looked at the contract as a whole and concluded that the contract required, and a reasonable contractor would have understood, that the completed system needed to be fully reconnected and operational. The court also suggested, without specifically stating it, that the contractor had signed up for performance obligation through a clause stating that the contractor would install and electrically connect the duct heaters "in such a manner that…existing automatic control is functionally and operationally assured." *Id.* at 981.

[153] ASBCA No. 53394, 04-2 BCA ¶ 32,777.

[154] The Board concluded that the contractor would only be entitled to recover the labor and material costs that exceeded what it would have reasonably anticipated when bidding the job, and the specifications did require that the contractor install a firestopping system of some sort.

[155] 74 Fed. Cl. 75 (2006).

[156] 8 Cl. Ct. 42 (1985).

[157] *Id*. at 51 n.7.

a composite of these two types of specifications. When there is such a composite, it is necessary to test each portion of the specification, insofar as responsibility is concerned." [158]

Given the above, cases dealing with these "composite" or "mixed" specifications tend to look carefully at how much discretion the contractor ultimately had in performing the work and whether flawed design specifications actually created the contractor's alleged problems. This was noted in the example provided in Section II above, where the issue in dispute was whether the bridge contractor truly had discretion to drive the concrete piles to meet the performance requirements, or whether the owner's design requirements took away that discretion and caused the contractor to suffer damages.

Utility Contractors is often cited as the precedent for how to deal with composite specifications. This case involved the construction of channel and drainage excavation in conjunction with a flood prevention program. During construction, a series of major rainstorms caused normal stream flows to flood over the contractor's temporary cofferdams, which damaged permanent concrete work, permanent and temporary excavation, and fine-grade filter material then in place. The contractor argued that this was a responsibility of the government, as it had overall design responsibilities for the project and had provided design specifications to ensure that the project functioned as planned. The government argued that while it had responsibilities for the completed project's functionality, it did not have responsibility for damage caused before completion, and cited to specifications that required "the contractor to design and construct protective works of a sufficient size and design to prevent damage to the work during construction," and "if the protective works are inadequate the contractor shall, at its expense, make the necessary corrections."[159]

The court cited to the general principles associated with design specifications, and stated that "design specifications are explicit, unquestionable specifications which tell the contractor exactly how the contract is to be performed and no deviation therefrom is permissible."[160] Noting that the contract was replete with examples of design specifications, the court cited to the concrete specifications, which provided detailed requirements affecting how the concrete was to be mixed, comprised, proportioned, and produced. However, because the contractor had responsibility for the means and methods of construction and for preventing damage to its work, the contract was "more like a performance contract," with no implied warranties being given by the government that following its design would preclude precompletion damages.[161] Stated differently, while the efficacy of the permanent works may have been prescribed and subject to a *Spearin* warranty, the temporary works were fully left to the discretion of the contractor.

A similar result was reached in *Martin Construction, Inc. v. United States*,[162] which involved a Corps of Engineers project for the construction of a marina at a state park in North Dakota. The contractor was defaulted as a result of substantial delays in completing the marina. It argued that this was caused by the Corps' defective cofferdam design specification, which stated:

> The underwater fill for the cofferdam shall consist of materials classified as GW, GP, SW, SP, ASTM D 2487. The material shall consist of a clean granular soil such as a pit run sand or sand with gravel. The material shall be State of North Dakota Type 7 Aggregate or equivalent. The contractor may utilize alternative materials, including recycled concrete, as long as the material is stable and free draining, and approved by the Contracting Officer prior to use.[163]

The contractor used the North Dakota Type 7 (N.D. 7) aggregate, and it was soon learned that it was too permeable to lower the groundwater. After a number of changes were made to the design, the cofferdam was constructed, but the project was so late that the Corps of Engineers terminated the contractor for default.

The Corps of Engineers defended on the basis that this was a performance specification, as it gave the contractor the ability to use N.D. 7 or its equivalent to construct the underwater fill, and any "alternative materials" as well. The court flatly rejected this, determining that the "language, detail, and specificity of the pertinent provision indicate that the specification to use N.D. 7 for the underwater fill was a design specification. By directing the use of N.D. 7 or its equivalent, the Government set forth in precise detail the material to be used; it did not merely set forth an objective for the contractor to achieve through its own ingenuity."[164] Because N.D. 7 created the contractor's problems, the default termination was lifted.

Some owners have argued that the contractor has the burden of finding discrepancies within composite specifications during the bidding process. A good example is *J.E. Dunn Construction Co. v. General Services Administration*,[165] which involved a curtainwall dispute on a new federal courthouse in Kansas City, Missouri. This project contained a number of creative architectural design elements, including an innovative, complex curtainwall that rested on columns four stories high, extended another three stories to the penthouse, and was semicircular in shape.

The curtainwall specifications contained a mixture of design and performance requirements. For example, the solicitation stated that the drawings and specifications are "an outline of the criteria and performance re-

[158] ASBCA No. 28731, 89-3 BCA ¶ 22,090, citing *Monitor Plastics Co.*, ASBCA No. 14447, 72–2 BCA ¶ 9,626.

[159] *Utility Contractors*, 8 Cl. Ct. at 45, n.2.

[160] *Id*. at 51.

[161] *Id*.

[162] 102 Fed. Cl. 562 (2011).

[163] *Id*. at 576.

[164] *Id*.

[165] GSBCA No. 14477, 00-1 BCA ¶ 30,806.

quirements" of the work and "within these parameters the contractor is responsible for the design and engineering of the window system." The specifications also stated that the curtainwall was to be designed to accommodate, among other things, "27 mm maximum long term depiction (creep) at edge of structure at the midpoint between columns."

As it was developing shop drawings, the curtainwall subcontractor determined that the curtainwall would not accommodate the long-term creep limitation. It argued that the costs to overcome this problem should be borne by the government, since the design, shapes, and profiles of the curtainwall's aluminum members were prescribed in the contract and one could reasonably assume that the government had evaluated concrete deflection in conjunction with this design. The government countered by claiming that the contractor had responsibility to determine the means and methods of accommodating deflection in its design of the curtainwall system. It cited to contract language that the solicitation's drawings were merely "diagrammatic" and further claimed that "the drawings were only the starting point, to be modified at the discretion of the contractor to meet the deflection criteria."

The Board of Contract Appeals rejected the government's position on the basis that the *Spearin* doctrine governed, notwithstanding that there was a combination of both design and performance specifications. It noted that the contractor's discretion was confined by the requirements shown on the drawing details, and that any modifications to the curtainwall design had to conform to these details:

> We thus cannot agree with the Government's argument that the drawing details were merely schematic, or that the written specifications subordinated the drawing details to the performance requirements. The argument may be an example of the wish being father to the thought, but it was simply not the way the contract was written. …The mullions for the north and south curtain walls were dimensioned and considerably detailed in the drawings, leaving little discretion to the contractor as to how to fabricate the mullions.[166]

The Board ultimately concluded that the curtainwall contractor could not produce curtainwall mullions that met the design specifications while at the same time meeting the deflection criteria's performance specification.

The Board also rejected the government's argument that this defect had to be discovered during the bidding process and that the contractor had a duty to seek clarification before submission of a bid. It noted that six curtainwall subcontractors submitted bids and none noticed the defect, and that even the government's architect did not discover the defect during its initial review of the curtainwall's sketches before shop drawing submission. The decision stated that it took the curtainwall subcontractor's engineering expert 20 hours of engineering study to discover the defect, and then additional structural engineering to determine what design and shape of mullion would accommodate the deflection criteria: "A reasonably prudent construction contractor is not expected to become an amateur structural engineer and hunt down defects in Government design drawings upon which the contractor has been told to rely, especially given the relatively short—one month—time to prepare bids."[167] Based on this, the Board concluded that the design defect was "latent" (hidden) and that the government bore the liability for overcoming this defect.

A similar result was reached in *Trataros Construction, Inc.*,[168] which involved conflicts between design and performance specifications on the renovation of the U.S. Post Office and Courthouse in Old San Juan, Puerto Rico. The performance specification was established through the shop drawing requirements, which directed the contractor to develop shop drawings that were sealed by a professional engineer. By submitting sealed shop drawings, the contractor was certifying that its design complied with building code requirements and other performance criteria.

The contractor's scope of work included a performance specification for the fabrication and installation of fiberglass panels replicating the building's wood roof cornices. Engineered shop drawings were to include any necessary design changes to the support structures and the attachment points for the cornices. In addition to the performance specification, the contract also contained myriad design specifications associated with this cornice work, including specific directions for design of the stainless steel support structure and location of the attachment points.

Before the contractor started the cornice work, it discovered that this work could not be performed as specified in the contract documents. Its structural engineer determined that several parts of the structure needed modification to carry the required loads, particularly the weight of the fiberglass. The engineer also concluded that the number of attachment points shown on the contract drawings was inadequate to prevent the fiberglass from sagging. Because this engineer would not approve the design without making necessary changes, the shop drawings submitted to the government were different in many material respects from the original contract requirements. While the government eventually approved these shop drawings, it denied the contractor's claim for the additional money associated with the revisions to the contract requirements, relying upon the contractor's contractual obligation to meet the performance specification.

The Board of Contract Appeals rejected the government's performance specification defense. The Board was favorably impressed by the fact that the contract documents gave the contractor specifics on what was expected in key areas:

[166] *Id*.

[167] *Id*.

[168] GSBCA No. 14875, 2001-1 BCA ¶ 31,306.

> The drawings told Trataros to construct the support structure using stainless steel angles of a certain size, configured a particular way, connected in a particular way, and running in specified directions. The drawings said that the structure was to be attached to the building using stainless steel bolts of a specified diameter, and showed the configuration of that attachment. The drawings showed Trataros where to use clip angles and where to install bolts to hold the support structure's angles and clip angles together.[169]

These and other detailed specifications led the Board to conclude that the contract documents and specifications, read together, did not leave the design and location of the fiberglass system to the contractor's discretion:

> Although the contract required Trataros to supply shop drawings, this did not provide Trataros with any flexibility concerning either the design of the support structure or the location of the attachment points for the fiberglass panels. …Trataros's obligation was to provide a support structure and to attach the fiberglass panels as shown on the drawings. Trataros was not obligated by the contract, however, to correct any design problems contained in the drawings.[170]

Similar to the conclusion reached in *Dunn*, the Board also rejected the government's argument that the contractor should have assessed the risks associated with this cornice work before committing to a price. There was no evidence that the extent of the engineering problems was known by the contractor or its team in advance of pricing the work. The Board stated, "Trataros did not have any contractual obligation to provide engineering services in order to determine the adequacy of the design shown in the drawings before it proposed a price for performing the cornice work."[171] Given these factors, the Board awarded the contractor an equitable adjustment for the consequences of dealing with the defective design specifications.

There is also a series of composite specification cases involving government specifications for jet-fuel-resistant joint sealant that is used in repairing military airfields. Each of the cases involves a common theme, where the sealant did not produce the required results and the government and contractor argued over who had financial responsibility for repairing the problem. The government generally claimed that the joint-sealant specification was a performance specification because it set forth the operational characteristics of the desired joint sealant, without stating specific details concerning the material composition or formula for acceptable joint sealant, nor the manufacturing process. The contractor would counter this by pointing to specific and detailed testing procedures in the specification that established the test procedures and performance standards for all of the performance requirements. The courts and boards of contract appeals considering these cases uniformly concluded that the specifications are neither purely performance nor design specifications, but instead composite/mixed specifications. As a result, they examined the facts behind the manufacture of the sealant and its application in the field to assess who had liability.

In *Haehn Management Company v. United States,*[172] the sealant began to bubble and have other problems after the work was completed. The court found for the contractor, ruling that although it was a mixed design and performance specification (the design "included both a compositional requirement and standards by which the joint sealant must perform"), it was predominantly a design specification. The contract specified 11 tests that the sealant had to pass, and the sealant passed each of them. The Navy stated that the samples had passed and that the contractor could begin using the sealing product. The specification also provided detailed measurements and tolerances of materials. Further, it prescribed in detail both the type of equipment to be used and the methodology for performing the sealant work. Citing to prior cases involving the same specification, the court held:

> History repeats itself, or at least it has in this case. The SS–S–200 series of joint sealant which was held to be a design specification in its earlier developmental version by another forum is before this court in its more refined and even more detailed form. This Specification now provides even more detailed testing requirements. Proper samples were submitted by the contractor for testing and this tested sealant product was approved by the Government. [The contractor and manufacturer] proved at trial that this approved material was properly tested and applied, and any placement defects were corrected under the purview of government inspectors.[173]

Contrast this with *Costello Industries, Inc.*,[174] a Board of Contract Appeals case decided a year after *Haehn* that found against the contractor. The Armed Services Board of Contract Appeals (ASBCA) distinguished *Haehn* on the basis that the sealant on that project was tested by the government in its testing laboratories, had passed all testing, and that the government authorized the contractor to use it in the field. Unlike on the *Haehn* project, the government on the *Costello* project had not directly tested the sealant, but instead required that the contractor furnish a certificate that the sealant met specifications. Moreover, the contractor had not provided the government any information concerning the sealant, including its composition or formula, and failed to submit to any samples. While there was no proof that the contractor or manufacturer had done anything wrong, the ASBCA concluded that the burden was on the contractor to prove that the government's specification was defective. Because it could not do this, the ASBCA held that the contactor assumed the risk that its joint sealant would meet the performance standards of the contract, and

[169] *Id*.

[170] *Id.*

[171] *Id*.

[172] 15 Cl. Ct. 50 (1988).

[173] *Id*. at 61.

[174] ASBCA No. 28731, 89-3 BCA ¶ 22,090.

that it was liable under warranty and guarantee clauses of the contract.

Costello demonstrates that the contractor faces the burden of proving that the design component of a composite specification is defective and created its problems. This was also demonstrated in *George Sollitt Construction Co. v. United States*,[175] which involved a series of claims on a Navy building project. After installing a new chiller, the contractor discovered that the 600-amp electrical service its electricians had wired pursuant to the contract drawings was not sufficient to power the chiller it had installed. The contractor argued that it used the 600-amp service because the Navy's detailed electrical service contract drawing showed the 600-amp service going to the chiller.

The court agreed with the contractor that the electrical drawings were design specifications. However, the chiller specification was a typical performance specification, where the contractor had discretion to install whatever chiller would meet the required cooling capacity. While it was undisputed that the 600-amp service shown on the contract drawings was not adequate to power the chiller installed by the contractor, the contactor did not prove that another chiller using 600-amp service could not have met the performance specifications. Consequently, because the contractor had a duty to provide a functioning chiller, it had liability for failing to provide sufficient power to the chiller it chose.[176]

While the contractor is typically arguing that the composite specification is more of a "design" than "performance" specification (i.e., to take advantage of the *Spearin* warranty), there are times when contractors argue that a specification is a performance specification—which gives them the discretion to ignore the prescriptive elements of the relevant specification. As discussed below, this is a frequent topic in design-build litigation. However, it also arises under design-bid-build disputes, as evidenced by one of the leading cases in the area of composite specifications, *Blake Construction Co. v. United States*.[177]

Blake involved the construction of medical facilities for the Navy, including a 1,000-ft corridor that ran along the ground floors of the new buildings. The contract drawings for the electrical conduits within and between the buildings showed the installed conduits on one side of the corridor, hanging either exposed from utility racks or hidden from view by a dropped ceiling. These drawings also included the following notes: 1) the drawings are "diagrammatic"; 2) "All feeder details & sections are diagrammatic. Contractor shall relocate any/all conduits as per existing conditions to coordinate with all other trades"; and 3) "All feeder locations are diagrammatic. Contractor shall relocate feeders as per existing conditions and shall coordinate with other trades."[178]

Before the building work started, the contractor's electrical subcontractor began installation of the electrical feeder system in an underground concrete duct bank along the planned path of the corridor. When the Navy challenged this installation method, the subcontractor stated that the contract's "diagrammatic" notes permitted the contractor to relocate the electrical conduits so as to avoid conflict with other trades, such as mechanical and plumbing, which were to be installed in the corridor. The Navy issued a stop-work order and directed that the conduits be installed overhead, as depicted in the drawings.

In filing a claim, the contractor argued that the drawings, by characterizing the location of electrical feeder lines as "diagrammatic," were performance specifications that described the requirement "that the electrical feeder system be installed in a manner which avoids conflict with the other trades."[179] It cited as support the above-referenced drawing notes, as well as the fact that the drawings did not detail the exact manner in which the conduit was to be installed. The contractor argued that it had discretion to do whatever was necessary to best achieve this goal, including underground installation. It also argued that because the electrical feeder system could not be installed exactly as depicted by the Navy's drawings, and because some alterations were needed to avoid conflict with other trades, the specifications did not provide the "road map" characteristically associated with design specifications.

The court rejected both arguments. As to the second argument, the court concluded that just because a specification cannot be followed precisely does not make it a performance specification:

> Were this true, any specification intended to be a design specification would be transformed into a performance specification if it were faulty. This is nonsensical; common sense dictates that the contractor does not acquire unfettered discretion to complete the contract in any manner it sees fit, just because one aspect of the specification might be defective. …The fact that the electrical conduits could not be installed overhead in the precise manner depicted by the drawings, and at some points had to be installed outside the corridor itself, did not automatically relieve Blake of the obligation to install them overhead.[180]

As to the question of whether the performance specifications gave the contractor discretion over the location of the conduits, the court also flatly rejected the con-

[175] 64 Fed. Cl. 229 (2005).

[176] Note that the court ultimately required the Navy to pay for one-half of the cost of ripping out the 600-amp service and replacing it with an 800-amp service. The evidence demonstrated that the contractor had chosen a standard chiller model to meet cooling tonnage requirements and submitted this model for approval. The Navy approved the chiller and never notified the contractor that its choice of chiller could not be powered by the 600-amp service that was called for on the Navy's electrical drawings. As a result, the court did not think it would be equitable for the Navy to be unscathed and leave all of the cost for this problem to the contractor.

[177] 987 F.2d 743 (Fed. Cir. 1993).

[178] *Id*. at 744.

[179] *Id*. at 745.

[180] *Id*. at 746.

tractor's arguments. Regardless of the label of "design" or "performance," the court stated that a specification is to be construed reasonably and consistent with the entire contract:

> There is no question that the diagrammatic notes gave the electrical contractor some discretion to work around the other trades…[however], we believe that a reasonable contractor would understand that the contract required more than mere avoidance of conflict with the other trades. The specifications, viewed as a whole, additionally required installation of the conduits overhead within the confines of the corridor. This is the only conclusion that gives meaning to the drawings. …All the drawings depicted overhead installation of the electrical conduits and, more specifically, showed either an exposed or concealed installation depending on their position along the length of the corridor. An interpretation permitting underground installation renders these drawings meaningless.[181]

The *Blake* decision reinforces several issues about performance specifications that are addressed in earlier precedent. First, the primary issue to be considered is how much discretion the contractor has to do its work. Second, if the contractor's discretion has been limited by prescriptive elements of the specifications (i.e., essentially making the specification a composite specification), then the contractor is obligated to meet those prescriptive elements.

D. Brand Name or Equal Specifications

When a contract contains "brand name or equal" specifications, bidders can often obtain a competitive edge by basing a bid on an equal product that is less expensive than the brand-named product specified. As a result, these specifications can create liability challenges. The identification of a brand name (without an equal) is a classic example of a design specification, as the contractor has no choice but to use the brand name. However, the use of a "brand name or equal" specification creates the equivalent of a composite/mixed specification. Consequently, courts considering this issue often fall back on the analysis set forth above on composite/mixed specifications, and determine exactly how much discretion the contractor has in selecting the equal.

Much of the litigation in this area revolves around what happens when there are challenges in finding an "equal," and who bears the consequences of that problem. For example, in *Aerodex, Inc. v. United States*,[182] the contract named a particular brand of thermal resistors "or approved substantial equal." The only brand name product was not available, and the government could not provide the contractor with the detailed material specifications of that named product so that the contractor could readily find the "substantial equal." The contractor eventually located a manufacturer that would manufacture an equal, but there was no available test procedure or equipment that could perform tests to demonstrate compliance with the performance requirements. While the government and contractor eventually created an acceptable test procedure, the contractor incurred delay costs in doing so and, in essence, proved that the product was "equal."

Even though the court implicitly accepted that it was a performance specification, it ruled in favor of the contractor. In doing so, it balanced the contractor's pre-award duty of inquiring about applicable test procedures against the government's duty to inform bidders of the lack of availability of the originally specified brand name part, material specifications against which to measure the "or equal" requirement, and testing procedures to establish the acceptance of the "or equal" product.

Eslin Co.[183] involved a dispute over windows. The specification called for "Pella Clad TD Double-Hung and Pella LD units" or equal. The specification did not list salient characteristics of the window, but did provide a series of performance criteria for the windows, including manufacturing standards, water tightness, and air leakage. The government refused the contractor's requested "equal" because it was not aluminum clad on the exterior sides of the glazing bars and the sash was 1 3/8 in. instead of 1 3/4 in. These were standard features for Pella, but all other manufacturers would have to specially manufacture the windows to meet these requirements. None of these were identified in the performance criteria. The contractor filed a claim based on the additional costs of furnishing the Pella windows.

The Board of Contract Appeals rejected the government's position, and concluded that the list of performance criteria was the list of "salient" characteristics to meet the government's minimum needs. Citing to *Aerodex*, the Board stated:

> When a brand name or equal purchase description is used, the specification becomes, in reality, a performance specification. The standard of performance applicable to the "or equal" is that it must be functionally equivalent to the brand name product, but not necessarily the same in every detail. The Court of Claims has specifically rejected the Government defense that it is entitled to get exactly what it specifies. The substitute does not have to comply with every detail of the specification, but only function as well as the specified product.[184]

It specifically rejected the government's argument that the sash requirement was necessary to provide strength and the lack of aluminum cladding made the windows less cost-effective and detracted from their useful life. There was nothing that notified the bidders of these concerns or indicated that they were "critical or salient."

While an abundance of caselaw at the federal level supports the above principles, there are fewer cases at the state level. One that provides a different twist on the issue is *Florida Board of Regents v. Mycon Corpora-*

[181] *Id.* at 746–47.

[182] 189 Ct. Cl. 344, 417 F.2d 1361 (1969).

[183] AGBCA No. 90-222-1, 93-1 BCA ¶ 25,321.

[184] *Id.*

tion,[185] where the specifications required the contractor to "provide a skin plate with a smooth, non-corded 'true radius' forming surface, equal to that manufactured by Symons." The contractor used the entire Symons forming system, and encountered difficulty in installing the architectural concrete within the specified contract tolerances. The contractor contended that the specification was a proprietary, design specification and that the owner bore responsibility for the failure of the Symons system to meet expectations. The jury agreed with the contractor, and the case was appealed.

The appellate court overturned the decision, finding that the specification did not require the contractor to use a proprietary product. The court stated that, "a contract provision calling for quality of the product to be the equivalent of a specific manufactured product is a performance specification, involving no implied warranty, unlike a design specification."[186] In so ruling, the court found that the specification referred to the concrete surface produced by Symons, and not to the forming system. The court stated that the contract did not give the contractor elaborate, detailed instructions on how to perform the contract, and that "oblique references" in the contract and drawings to the specified manufacturer's forming system did not transform the specification into a proprietary or design specification that would give rise to an implied warranty by the owner.[187]

E. The Relation Between Claims for Differing Site Conditions and Defective Specifications

Geotechnical conditions are one of the biggest risks on a construction project. As a result, it is not unusual for a contractor that encounters a problematic site condition to argue that the owner owes it contractual relief under both a defective specification and a differing site condition (DSC) theory. Several cases explain this in the context of performance specifications.

One of the leading cases in this area is *Kiewit Construction Company v. United States*.[188] The contractor was to build and implement a dewatering system to control groundwater in conjunction with the completion of a cofferdam, with the groundwater to be within 5 ft of the bottom of the work area. The contract documents included extensive specifications providing mandatory minimum performance and design information regarding the dewatering system, as well as design assumptions for the minimum dewatering system. The contractor followed the specifications and was only able to lower the groundwater to an elevation within 13.5 ft of the excavation's floor. This prompted a claim to be filed on both DSC and defective specification theories.

The court first noted that while the two theories had similarities, justification of a claim was based on different operative facts. Under a DSC theory, the contractor must show that 1) the conditions indicated in the contract differed materially from conditions encountered by the contractor during performance of the contract; 2) the conditions actually encountered were not reasonably foreseeable; and 3) the contractor reasonably relied upon its interpretation of the contract, and was thus damaged from the material variation between expected and encountered conditions. In the context of this case, the court concluded that the operative facts to prove a DSC claim would focus on the contract's description of the work site, particularly with respect to subsurface conditions, and the contractor's reliance on that description. In contrast, a defective specifications claim requires a showing that the contractor was misled by design specification errors, and the focus is on the viability of design requirements. In the context of this case, the court concluded that the operative facts to prove a DSC claim would concern the functioning of the contract's dewatering system specifications.

The contractor argued that the dewatering system was comprised of design specifications, citing detailed instructions on construction and installation of the system that significantly limited its discretion. It also argued that following the minimum dewatering system should have resulted in the site being adequately dewatered. The court acknowledged that the minimum required dewatering system was a design specification, because it provided mandatory detailed instructions and construction drawings in the building and operation of such system. However, the court rejected the notion that the alleged failure of the minimum system to achieve the overall dewatering goals of the contract meant that these specifications were defective. The contract warned the contractor that the minimum prescribed system was not warranted to satisfactorily dewater the work site. It also warned that it was the contractor's responsibility to augment the minimum prescribed system, if necessary, to control water seepage in accordance with guidelines provided by the contract. In ruling against the contractor, the court cited to many performance specifications in the contract pertaining to the design, construction, and implementation of the dewatering system. These specifications gave the contractor ample discretion to augment the contract's specifications and encouraged the contractor to supplement the minimum prescribed dewatering system to meet its dewatering obligations under the contract.[189]

An often-cited example is *Stuyvesant Dredging Co. v. United States*,[190] where a contractor was to restore a channel by dredging it to its original shape and size. This particular channel had been impacted by several storm events and prior dredging efforts by the Corps of Engineers. The Corps' specifications identified, among other things, average density readings at certain loca-

[185] 651 So. 2d 149 (1995).

[186] *Id*. at 153.

[187] *Id*. at 154.

[188] 56 Fed. Cl. 414 (2003).

[189] The differing site conditions claim was also rejected, on the grounds that the contractor failed to demonstrate that there were any indications in the contract upon which the contractor could reasonably rely to support its position.

[190] 834 F.2d 1576 (Fed. Cir. 1987).

tions in the channel. The contractor developed its production rates and equipment plans based on this information. When the actual material to be removed had densities much higher and more difficult to remove than the contractor expected, the contractor filed a claim against the Corps based on both differing site conditions and defective specifications.

The court rejected the differing site conditions argument on several grounds, including the fact that the specifications only provided average densities, and warned that the average values should not be used as representatives of minimum or maximum densities. The court noted that density of material is only one of several factors that determine the difficulty of dredging. The court was particularly swayed by the contractor's failure to investigate the Corps' records of previous dredging for the channel, which would have shown that harder densities were likely to be encountered and that the type of material the contractor encountered was similar to what the Corps experienced during its previous dredging programs.

The contractor's defective specification argument focused both on the alleged inaccuracies of the average densities and the following specification:

> The material to be removed…is that composing [sic] of shoaling that has occurred since the channel was last dredged, however, some virgin material [earth never before dredged in that particular channel] may be encountered in the prescribed prism, and/or side slope dredging. Bidders are expected to examine the site of the work and the records of previous dredging…and after investigation decide for themselves the character of the materials.[191]

The contractor argued that this was a design specification, and that the term "shoaling" inaccurately described the material to be removed.

The court concluded that the above specification was a performance specification and rejected the contractor's argument. This provision

> did not instruct Stuyvesant how it should perform the dredging of the channel. It merely stated the result to be achieved, namely, that the channel was to be dredged to its acceptable prism. Stuyvesant had complete discretion to determine how it would perform that work. Its only obligation was to accomplish the designated result.[192]

Another case, *Tri-State Consultants, Inc.*,[193] involved a contract to repair a breach in a sand dune in New Jersey using sand dredged from a designated borrow area. The contractor encountered subsurface currents that caused sand movement and scouring, some of which damaged its dredging equipment and ultimately caused it to dredge a significantly larger amount of material and use different equipment. Arguing that it experienced both a differing site condition and a defective specification, the contractor relied upon bidding documents indicating that the contractor should dredge to a particular depth and discharge the dredged material within a particularly sized embankment—neither of which were possible given the actual water currents.

The Board of Contract Appeals rejected the differing site condition claim on the basis that the contract made no representations of any type about the water current that would be experienced by the contractor. It declined to find that the specified dredging depth limit and initial embankment width would lead a contractor to conclude anything about the water current. Finding that the contract left it to the discretion and expertise of the contractor to select the type and size of dredge to be used to perform the dredging work, the Board concluded that these were performance specifications and also rejected the defective specification argument.

F. Design-Build and Its Implications on Performance Specifications

As discussed earlier in this digest, performance specifications are an important part of the design-build process. They not only give the design-builder discretion to determine the right solution for the owner's stated goals, but can also serve as a way to help shift the risk of performance away from the owner and to the design-build team.

Several cases have evaluated the issues arising from performance specifications on design-build projects. Although these decisions generally reaffirm the principles set forth above, it is instructive to consider how courts and boards of contract appeals have expressed these principles relative to 1) the application of the *Spearin* doctrine to design-build; 2) the duty to meet the prescriptive elements of a performance specification; and 3) the failure to meet performance guarantees on a design-build contract.

1. The Application of the Spearin *Doctrine to Design-Build*

Many agencies have the view that the use of design-build makes them immune from liability under the *Spearin* doctrine. Caselaw (as well as logic) dictates otherwise. The principles behind the *Spearin* doctrine apply to any situation where an owner provides a detailed specification that has been reasonably relied upon by a bidder to its detriment. The fact that a design-builder will ultimately be the designer-of-record does not alter this principle.

The seminal case in this area is *M.A. Mortenson Co.*[194] This case involved a design-build contract awarded by the Corps of Engineers to Mortenson for a medical clinic replacement facility at Kirkland Air Force Base, New Mexico. The solicitation contained design documents that were approximately 35 percent complete, with the solicitation informing proposers that such documents expressed the minimum requirements for the project. The Corps' design criteria informed all proposers that, "[these] requirements may be used to prepare the proposals." The design documents furnished by the Corps contained a number of options for

[191] *Id*. at 1578.

[192] *Id*. at 1582.

[193] ASBCA No. 55251, 08-1 BCA ¶ 33,800.

[194] ASBCA No. 39978, 93-3 BCA ¶ 26,189.

structural systems, including calculations for these systems.

Mortenson's estimators, in originally pricing the work, did a take-off of the structural concrete and rebar quantities indicated in the solicitation design documents. The final design was similar to that shown in the solicitation documents and was approved by the owner. Mortenson ultimately submitted a request for equitable adjustment based on the increased quantities of concrete and rebar associated with building to the final design. The Corps rejected the claim, believing that Mortenson assumed the risk of any cost growth due to these quantities because of the fixed-price nature of the design-build contract.

The ASBCA agreed with Mortenson, finding that, while the solicitation did not require that the proposers use the information in the drawings, it also did not indicate that the information was to be used at the proposer's risk. The Board held that Mortenson had acted reasonably in relying on the technical information provided by the Corps, and rejected the notion that Mortenson was obligated to place a contingency in its bid or have an engineer involved in the proposal process:

> The Government suggests that "some sort of review by a structural engineer would have been prudent"…It also suggests that [Mortenson] should have included a contingency in its proposal to cover any increase in quantities. This interpretation is not reasonable. It was not established as a factual matter that an interpretation of the solicitation requiring preproposal engineering or a contingency for the quantities in question in this appeal would be reasonable and prudent from a contractor's point of view. The contract required [Mortenson] to verify and validate the design as part of the design work, not the proposal effort.[195]

In so ruling, the Board concluded that the government had warranted the adequacy of information on the solicitation design documents.

Because the solicitation documents in *Mortenson* specifically stated that the design could be used for pricing purposes, the precedential value of the case could have been quite narrow. However, later cases that have examined allegedly defective design specifications on design-build projects have cited *Mortenson* as the authority that determined that the owner impliedly warrants these specifications. They also have used *Mortenson* as the controlling caselaw to confirm that a proposer does not have to go through an engineering effort during the proposal stage to determine that the design in the solicitation documents is flawed. Note that this is similar to the logic that was used by the *Dunn*[196] court in determining liability for composite curtainwall specifications and in *Trataros Construction*[197] relative to the fiberglass panels.

Another significant case is *White v. Edsall Construction Company, Inc.*,[198] which involved the construction of an aviation support facility for the Army. The issue in dispute was the design of the storage hanger tilt-up canopy doors. The drawings showed a three-point pick system to lift the doors. The design-builder eventually concluded that the three-point system was deficient and made a claim for its costs in modifying the lifting system. Arguing that it was a performance specification, the government claimed that responsibility for the deficient three-point pick system was to be borne by the design-builder because a note on the canopy door drawings required the design-builder to verify details and loading prior to bidding.

The court found the three-pick design system to be a defective design specification because of the level of detail in the design:

> If the three-pick-point design had been merely a performance specification (i.e., it did not specify an actual method of performance), Edsall could have chosen any method of building a workable tilt-up canopy door, including a four-pick-point design. Because the Army made the three-pick-point door design, including the weight distribution to points on the truss, a design requirement, it warranted the adequacy of the design. The Army is thus responsible for the consequences of design defects absent an express and specific disclaimer shifting the design risk to Edsall.[199]

Citing *Spearin*, the court concluded that the design-builder was entitled to recover its costs in remedying this defect.

The board of contract appeals in another well-recognized design-build case, *Donahue Electric, Inc.*,[200] relied upon both *Mortenson* and *Spearin* to find in favor of the design-builder under a composite specification dispute. The dispute revolved around the requirements for a steam boiler to power a sterilizer on a VA ambulatory care center. The 50 percent design documents specified that the design-builder was to install a government-furnished sterilizer unit manufactured by Steris. The HVAC equipment schedule in the contract listed a Parker B-3 steam boiler to power this sterilizer. The Parker B-3 is a 7-HP boiler. During design development, the design-builder concluded that the 7-HP boiler would not meet the instantaneous burst requirements of the Steris equipment. After it was agreed that a 25-HP boiler would be supplied, the design-builder argued that it should be entitled to the additional costs associated with the change from a 7-HP to 25-HP boiler.

The government rejected the claim, believing that the design-builder had no right to rely on the VA's 50 percent drawings because the "information only" note on the drawings effectively prevented bidders from using or relying on the drawings in any way. It concluded that the design-builder should have obtained the Steris sterilizer specifications, developed its own design, and

---

[195] *Id*.

[196] GSBCA No. 14477, 00-1 BCA ¶ 30,806.

[197] GSBCA No. 14875, 2001-1 BCA ¶ 31,306.

[198] 296 F.3d 1081 (Fed. Cir. 2002).

[199] *Id*. at 1085–86.

[200] VABCA No. 6618, 2003-1 BCA ¶ 32,129.

purchased whatever was necessary for the installation of the VA-furnished sterilizer.

The Board of Contract Appeals disagreed with the government, holding it liable for the additional cost of upsizing the boiler, stating:

> Specifications included in a design-build contract, however, to the extent specific requirements, quantities, and sizes are set forth in those specifications, place the risk of design deficiencies on the owner. Thus the VA reassumed the risk and warranted the accuracy of the specifications with regard to the 196 LB/hr boiler output.[201]

Using logic similar to the board in *Edsall*, the *Donahue* board acknowledged that the government could have transferred the risk of design defects to the contractor with a properly written contract. More specifically, the Board noted that the government could have avoided liability by drafting the boiler requirement as a pure performance specification rather than by including a prescriptive design requirement:

> The VA could simply have stated, "install the Steris 3400 GFP sterilizer and a boiler to operate it." Such a specification would have made [the design-builder] responsible for choosing a boiler that would properly operate the sterilizer. When, as here, the VA specifies a 196 LB/hr boiler, absent actual knowledge to the contrary a bidder may rely on that information.[202]

While design-builders can use the *Spearin* doctrine in support of their claims, the facts of the specific case will determine whether this theory will be successful. Stated differently, just as in design-bid-build cases, the contractor cannot always demonstrate that the composite specification restricted its discretion enough to justify holding the owner liable for the problems experienced on the project.

Consider *Strand Hunt Construction, Inc.*,[203] which involved the installation of windows at a Corps of Engineers complex in Alaska. The specifications called for windows that met certain thermal and blast-resistance performance requirements. There were delays in procuring and installing contract-compliant windows. Strand Hunt Construction (SHC), the design-builder, sought extra costs for the delays, claiming that the specification was defective because the windows meeting the specified criteria were not available "off the shelf" from manufacturers at the time of the contract award. Interestingly, the design-builder's architect created design specifications directly from the RFP, and these documents were submitted, reviewed, and approved by the government. It was only after these specifications were sent to subcontractors for bidding purposes that it was discovered that they could not be met by an off-the-shelf product.

The Board rejected this claim, finding that there was a performance specification that the contractor was bound to meet. Specifically, the Board found that while there were several specific design characteristics that the windows had to meet, the specifications gave the contractor discretion over their location, size, manufacturer, and installation. The fact that windows meeting these specifications were not available "off the shelf" and had to be custom-made did not shift this risk to the owner:

> SHC apparently assumed, even though the RFP made no such representation, that a ready-made window existed or that a compliant custom made window could be acquired within its budget that met the RFP requirements. It (as well as its designer and its window subcontractor) did little investigation prior to submitting its proposal or even before substantially completing its design during the performance period. …The RFP does not require nor promise the availability of ready-made windows. There is evidence that windows meeting all RFP performance requirements could be manufactured given enough time. The evidence shows only that SHC could not find an off-the-shelf ready-made window meeting the requirement of CRF 67 and which was within its proposed budget. Had SHC, its architect of record and its window subcontractor investigated window availability in the proposal phase they would have discovered that it was unlikely they would find windows meeting all the RFP requirements without having them custom manufactured with attendant cost and long lead times. However, SHC and its subcontractors did not fully investigate window availability until late in the design process. SHC must now bear the burden of its failure to investigate the availability of the required windows (citations to findings omitted).[204]

The Board also responded to the design-builder's argument that it had no choice but to make sure its proposal and design specifications mirrored the RFP requirements:

> [If] SHC indicated in its proposal and design specification submissions that it would meet the RFP performance requirements without adequate investigation, it did so at its own risk. SHC was obligated to not just say that it would meet requirements, but also to be sure it could actually do so.[205]

Underlying the Board's decision was evidence presented during the hearing that the contract-compliant windows could be designed and manufactured given enough time and appropriate planning.

A recent case discussing performance specifications in the context of design-build delivery is *Fluor Intercontinental, Inc. v. Department of State.*[206] The project involved the design and construction of a United States embassy complex in Astana, the capital of Kazakhstan. Among the many issues involved in this case were claims by the design-builder, Fluor Intercontinental (Fluor), that it had the right, under the *Spearin* doctrine and *Mortenson* decision, to rely upon information in the bidding documents that was faulty and that had to be changed during the development of its design.

The RFP documents provided a set of standard Department of State (DOS) drawings and specifications that depicted the DOS's design intent, and which were

[201] *Id*. at 34.

[202] *Id*. at 35.

[203] ASBCA No. 55671, 08-2 BCA ¶ 33,868.

[204] *Id*.

[205] *Id.*

[206] CBCA 490, 492, 716, 1555, 1763, 12-1 BCA ¶ 34,989.

to be "site adapted" for specific projects, including the Astana project. The design-builder was specifically charged with conducting its own geotechnical investigation and advised not to rely upon any geotechnical information provided by DOS.

During bidding, Fluor relied upon the DOS's geotechnical information in the RFP. The RFP provided general information about the standard construction practices in Astana, and noted that reinforced concrete is the most common material for piles. The record in the case shows that Fluor planned to use precast concrete piles, reinforced with rebar, and that its geotechnical engineer (hired by the design-builder after contract award) confirmed that the majority of buildings in Astana were supported by reinforced concrete piles. The geotechnical report noted that Fluor's ultimate pile capacities were 80 to 120 metric tons, whereas the local practice was 60 to 70 metric tons. As a result, the geotechnical report cautioned that such high capacities could make driving difficult, and that the local contactors might not have equipment to do so.

Fluor issued a solicitation for subcontractors that could manufacture and drive precast concrete piles. It specified that the manufacturer had to use portland cement, which was a concrete mix not readily available in Astana. The record indicates that Fluor had no bidders, and eventually shifted to the use of steel H piles. After a period of time, Fluor filed a claim against the DOS, arguing, among other things, that DOS had warranted that precast concrete piles would be available from a local source.

The Board of Contract Appeals flatly rejected this argument. It distinguished *Mortenson*, where the government had advised the design-build bidders that they could rely upon the 35-percent documents for pricing purposes, and provided significant details in the RFP documents about the design. Here, Fluor was required to fully design the project, and was given only basic information that was not to be relied upon:

> This contract placed all of the responsibility for design and construction (and, as a consequence, all of the risk) on Fluor. While the Government provided Fluor with standard design documents and basic technical specifications developed for use for all embassy construction, the contract made plain that Fluor would be responsible for adapting the design to the specific location in producing the project construction documents. Bidders were expressly told in many different sections of the RFP not to rely on the drawings, as illustrated by the following: "drawings are for the sole purpose of illustrating the design intent of the owner"; "the Contractor remains solely responsible and liable for design sufficiency and should not depend on the reports provided by the [Government] as part of the contract documents"; and noting that the contractor would be responsible for adapting the design "according to the unique conditions of the site and other local and regional factors."[207]

The Board concluded that nothing about the RFP documents could be construed as a warranty that precast concrete piles would be available from a local source. The RFP provided only general information about the standard construction practices in Astana and, while noting that reinforced concrete was the most common material for piles, it did not make any recommendations concerning how to build the project. "Presumably, this is why the solicitation required bidders to use their own geotechnical engineers for advice in this area."[208] Likewise, the RFP documents did not confirm that the locally available precast concrete piles would be available for use by the successful bidder or that, if piles were available, they would meet contract performance requirements:

> Fluor needed to make that determination after it created the detailed drawings and specifications required performing the contract. Likewise, Fluor had the responsibility to "investigate and select sources of supply prior to bidding and obtain assurances that the materials needed to perform the contract in accordance with the contract terms will be available." …Fluor failed to do this.[209]

The Board concluded that under the design-build contract, "the risk of developing a design, and the consequences of miscalculating the resources available for constructing to the design, fell solely upon the contractor."[210] Fluor assumed the risk that its plan for construction would work. The fact that it had to change its design based upon site conditions was Fluor's problem.[211]

The preceding cases are examples of how the issue of composite specifications on design-build projects has been interpreted, and the ultimate responsibility that flows to a design-builder. Readers should note that many design-build cases are resolved in alternative dispute proceedings that do not result in a reported decision. Consequently, the industry does not get the benefit of using these cases as precedent.[212] However, at

[207] *Id.*

[208] *Id.*

[209] *Id.*

[210] *Id.*

[211] Note that Fluor raised another claim on the same theory, related to the use of a deep foundation instead of the shallow foundation that it envisioned at the time of bid. Although the RFP documents had some prescriptive components, such as the requirement that Fluor comply with the 2003 International Building Code and local law, Fluor had the ultimate discretion and obligation to determine the type of foundation that would support the perimeter walls of the facility.

[212] An excellent example of this is Acquest Gov't Holdings U.S. Geological, LLC v. Gen. Servs. Admin., CBCA 439, 07-1 BCA ¶ 33,576, http://www.cbca.gsa.gov/2007app/A439.pdf. This case involved a 20-year lease for an office and laboratory facilities that contained detailed performance and design HVAC specifications. Because the lessor (i.e., the design-builder) was unable to achieve the temperature requirements in some animal holding rooms, the government withheld rent on that portion of the facility. The ultimate issue was whether the government had warranted that the initial design documents were sufficient to achieve the requirement temperature. The government had approved all of the HVAC design documents, which were consistent with the RFP documents, and the lessor had attempted to add HVAC equipment to address the prob-

this point in time, given the general principles behind *Spearin* and performance specification responsibility, it is clear that *Spearin* theories of recovery are available to the design-builder when the owner has been prescriptive in the design (i.e., has created a roadmap or has given the design-build proposers RFP documents that are detailed) and has taken discretion away from the design-builder in terms of what is to be ultimately designed.

2. The Duty to Meet the Prescriptive Elements of a Performance Specification

Some design-builders have argued that because of the "design-build" nature of the project, they are free to ignore prescriptive elements of a specification, as long as they are ultimately successful in achieving the performance specification. Just as in non-design-build cases, this argument has not been successful.

One of the first cases addressing this was *Dillingham Constr., N.A. v. United States*.[213] Dillingham, the design-builder, sued the VA on behalf of its electrical subcontractor for costs arising from the VA's enforcement of more stringent electrical specifications than the electrical subcontractor contended were required by the contract.

The electrical specifications in the solicitation required the use of raceways to run conduit through the facility. They also described the conduit size and characteristics, and supports for the raceways. The subcontractor proposed to use metal-clad cable in lieu of the raceways.[214] The VA rejected this proposal. It also rejected the conduit supports installed by the subcontractor, claiming they were nonconforming to the specifications. The total cost of complying with these VA requirements, which was over $600,000, was the subject of the claim.

The subcontractor argued that the electrical specifications were performance specifications and that, as a result, were merely "general guidelines" that gave the subcontractor "wide latitude" in interpreting them. Its primary argument was based upon the cover page of the solicitation, which stated, "Contractor shall provide complete construction drawings and specifications for the [Project] based on the preliminary drawings and performance specifications included with this solicitation." The court rejected this out-of-hand, stating that the cover page did not say that the contractor was excused from complying with design specifications in the contract. In fact, the court noted that the contract specifically required that the design comply with the design-build criteria and the electrical specifications contained in the contract. Citing to the general rule and the *Blake* decision discussed above, the court stated that "design specifications" and "performance specifications" are just labels which "do not independently create, limit or remove a contractor's obligations."[215]

The electrical specifications specifically required the use of raceways and gave the design-builder no flexibility to instead use metal-clad cable. With respect to the support clips, the court concluded that the types of allowable supports were also specifically identified in the specifications and consisted of ceiling trapeze, strap hangers, and wall brackets. The fact that the support clips offered by the electrical subcontractor performed the same function as those identified in the specifications was irrelevant, as the specifications did not state that "an equivalent" could be used.[216]

A similar result was reached in *FSEC, Inc.*[217] This case involved a dispute arising out the installation of a ventilation system during construction of a new abrasive-blast-and-spray facility for the Navy. The plans and specifications called for two exhaust fans and two dust collectors for each room and also specified, among other things, a cross-draft ventilation rate of air flow. The design-builder assumed that because this was a design-build project, it had the flexibility to design a ventilation system that would meet the performance specifications. Therefore, it concluded that each room needed only one exhaust fan and dust collector to meet the air handling requirements. When the Navy rejected the design-builder's proposed design and required it to supply all four exhaust fans and dust collectors, the design-builder filed a claim for the additional costs.

The Board of Contract Appeals rejected the notion that the design-builder could change the specified design as long as it met the performance requirements. It noted that the contract very clearly contained both design and performance specifications, and that the design-builder had to comply with both. The Board was also persuaded by testimony from the Navy that it wanted the ventilation system design to be prescriptive to "insure that the end result would meet applicable air pollution standards…and not leave it to chance for the design-build contractors to design it."[218]

This logic was also used in *United Excel Corporation*,[219] which involved the construction of a Federal Government healthcare facility for the VA. The RFP

lem, to no avail. The lessor argued under *Dunn* and *Spearin* that it was entitled to be paid its rent and the costs of trying to make the facility meet the performance specifications (even though its efforts were fruitless). The Board declined to decide the case on summary judgment, concluding that this issue was dependent upon the facts of whether the lessor had discretion to change the initial design criteria provided by the government, and whether it should have discovered this during the bidding process. The case was ultimately settled in an alternative dispute resolution (ADR) proceeding (*see* Acquest Gov't Holdings U.S. Geological, LLC v. Gen. Servs. Admin., CBCA 404, 413, 08-1-BCA ¶ 33,720.

[213] 33 Fed. Cl. 495 (1995).

[214] Metal-clad cable is a factory assembly of conductors, each individually insulated and enclosed in a metallic sheath of interlocking tape or tubes.

[215] *Dillingham*, 33 Fed. Cl., at 501; see *Blake*, 987 F.2d, at 746.

[216] *Id*. at 502.

[217] ASBCA No. 49509, 99-2 BCA ¶ 30,512.

[218] *Id*.

[219] VABCA No. 6937, 04-1 BCA ¶ 32,485.

contained detailed specifications, including requirements for components of the HVAC system. During the 90-percent design review, a dispute arose between the design-builder and the VA over whether the registers, grilles, and diffusers in the operating rooms were required to be aluminum or stainless steel.

The numerous specification sections that addressed these requirements were in conflict. Some required that the components be stainless steel, others required that they be extruded aluminum, and yet others gave a choice of stainless steel or aluminum. The design-builder's mechanical subcontractor had identified these conflicting provisions prior to submitting its bid and priced aluminum diffusers to provide "best value." However, when the design was developed, the VA insisted that stainless steel be used in the operating rooms.

The VA conceded that the specifications for the operating room HVAC materials were ambiguous, but contended that the conflicts were so "obvious" and "glaring" that they should be considered "patent ambiguities" and that the design-builder was obligated, pre-award, to inquire about what materials were required. The design-builder argued that the ambiguity was not patent, since the specifications reasonably led one to believe that aluminum was an acceptable material. The design-builder also argued that, because this was a design-build contract and the RFP drawings and specifications only established "design parameters," it was entitled to choose aluminum diffusers as the most economical way to achieve the design intent.

The Board of Contract Appeals concluded that the design-builder had the obligation to meet the design requirements of the specifications, notwithstanding that this was a design-build project: "The Contract is clear that, in executing the final Construction documents, [the design-builder] was constrained to follow the requirements of the RFP specifications and drawings and this constraint required [the design-builder] to design a diffuser configuration, using stainless steel diffusers, which would meet the sterile air curtain requirements."[220] The Board found it unnecessary to decide whether the conflicts in the specifications were patent or hidden. In holding against the design-builder, the Board concluded that since the mechanical subcontractor had actual knowledge of the ambiguity, its failure to raise this ambiguity prior to bid was fatal to the claim. It specifically rejected the notion that because the contract was design-build these duties to inquire before bid were no longer relevant:

> We also see nothing in the case law, and [the design-builder] has provided none, for the proposition that the well-settled law relating to the contract interpretation is suspended or abrogated in a design-build contract. To the contrary, the case law indicates that a design-build contract shifts risk to a contractor that a final design will be more costly than the bid price to build and that the traditional rules of fixed-price contract interpretation still obtain. [The design-builder] was not relieved of its obligation to inquire about the aluminum stainless steel diffuser discrepancy because the Contract was design-build.[221]

3. Failure to Meet Performance Guarantees on Design-Build Contracts

As noted previously in this digest, some industries use design-build with performance guarantees because the owner is able to rely upon the design-builder meeting specific requirements that are needed to make the project viable (e.g., electrical capacity and heat rates in a power plant). Despite the widespread use of these contracts in the power, petrochemical, and process industries, relatively few cases address the obligation to meet the performance guarantee directly. Instead, the cases generally discuss this obligation in the context of responsibility for delays, liquidated damages for performance, and excuses by the design-builder as to why it should not be held to the guarantee.[222]

Despite this, a number of cases directly explain the proposition. For example, in *Fort Howard Paper Co. v. Standard Havens, Inc.*,[223] a paper company brought suit against a firm that designed, built, and installed a pollution control device in the company's plant. The device was designed to remove fly ash from the flue gases of the plant prior to their emission into the atmosphere. Buildup of fly ash on the filters of such devices can lead to higher operating costs, due to the greater power required to move the flue gases through the filter system. Consequently, the filter manufacturer warranted the device against filter cloggage, as measured by the pressure drop of the flue gases across the surface of the device. Under this warranty, the maximum allowable pressure drop was not to exceed 6 in. of water. The paper company successfully sued when the pressure drop consistently exceeded this level.

Aiken County v. BSP Div. of Envirotech Corp.[224] involved the design and supply of a thermal sludge conditioning system on a wastewater treatment plant that failed to meet its performance guarantees. The guarantees required that the system operate continuously on a 24-hour basis with not more than 15 percent of total time required for maintenance. The maintenance time for the first 3 months after startup was 42 percent, 36 percent, and 42 percent. Upon learning that the supplier had, despite its representations to the contrary, provided a new process that had never been successfully used or tested in a wastewater application, the

[220] *Id.*

[221] *Id.*

[222] Readers should also remember that many of these types of contracts have their disputes resolved in ADR, as noted earlier.

[223] 901 F.2d 1373 (7th Cir. 1990). *See* Michael C. Loulakis, ch. 1, *The Current State of the Design-Build Industry*, *in* DESIGN-BUILD CONTRACTING HANDBOOK (Robert F. Cushman & Michael C. Loulakis eds., Aspen Law & Business, 2d ed. 2001) ("Design-Build Industry" hereinafter).

[224] 657 F. Supp. 1339 (D.S.C. 1986).

owner sued for breach of warranty and fraud. The owner prevailed on both theories.

Gurney Industries, Inc. v. St. Paul Fire & Marine Ins. Co.[225] involved a design-build contract for a yarn manufacturing plant that had specific production requirements in terms of output and quality standards. When the design-builder did not achieve these, the owner terminated the contract and successfully pursued a claim against the surety. The surety argued that the only recourse for the failure of its principal to meet these requirements was that it would not receive its 10-percent retainage. The Fourth Circuit Court of Appeals found that the design-builder's agreement to meet the stated production objectives constituted warranties, not simply conditions to receiving retainage, and held the surety liable for the owner's operating losses resulting from the deficient performance output.

Another example is *CIT Group/Equipment Financing v. ACEC Maine*,[226] where the design-builder of a power facility was required to meet two sets of performance tests as a condition to acceptance. One set of performance tests established substantial completion and the start of commercial operation. The second set, which would determine the plant's efficiency and reliability, was to be undertaken on the 1-year anniversary of substantial completion (with a 30-day grace period). Shortfalls in electrical capacity or heat rate were to be handled through liquidated damages.

The plant achieved substantial completion and was in commercial operation when, 9 months after substantial completion, one of the turbine generators failed. The turbine was not finally repaired until 1 year and 56 days after the original substantial completion date and, as a result, the second set of performance tests could not be undertaken on the date scheduled in the contract. The owner alleged that this was a breach of contract and triggered $32,276,440 in liquidated damages. The design-builder attempted to defend on the basis that the liquidated damages were not contemplated for this type of defect and were unenforceable as a penalty. The court found for the owner, describing the allocation of risk in the following manner:

> The parties agreed that if the Facility performed at the Guaranteed Performance Level the Contractor would be relieved of its liability under the Construction Contract for the plant's failure to perform at the specified levels over the plant's lifetime, including incidental and consequential damages. On the other hand, if the Facility was unable to meet the performance standards, as it was unable to do in this case, the Owner would be compensated by a one-time payment according to a formula.[227]

The court rejected the notion that the liquidated damages were a penalty, stating, among other things, that it was difficult to put a price on the lack of reliability of the plant given that a turbine failed in its first year of operation.

G. Liability of Design Professionals for Performance Guarantee Failures

The liability issues that have arisen on performance specifications generally relate to the contractual relationship between the owner and contractor/design-builder. However, the question that has been frequently posed is the nature of the risk a design professional takes on if it is involved in a project where a performance guarantee is established.

While it is beyond the scope of this digest to conduct an in-depth review of design professional liability, suffice it to say that the general theory of design professional liability is based on "professional negligence." This means that a plaintiff suing a design professional has to demonstrate that the design professional failed to meet its duty to exercise the ordinary skill and competence of similarly situated members of its profession.[228] Stated differently, absent a specific express warranty in a contract, a designer does not guarantee that its design will meet a given result.

One case where such a guarantee was found to have been given by the designer is *Arkansas Rice Growers v. Alchemy Industries, Inc.*[229] It involved the construction of a pollution-free rice hull combustion plant capable of generating steam and marketable ash from the rice hull fuel, with the rice hulls being the only fuel for the plant's furnace. The plant's owner executed a contract with the process technology owner (Alchemy), whereby Alchemy agreed to hire the engineering firm that had developed the process technology (Pitt), and each committed to provide:

> [The] necessary engineering plant layout and equipment design and the onsite engineering supervision and start-up engineering services necessary for the construction of a hull by-product facility capable of reducing a minimum of 7½ tons of rice hulls per hour to an ash and producing a minimum of 48 million BTU's per hour of steam at 200 pounds pressure.[230]

The plant's owner acted as its own general contractor to build the plant to Pitt's design, including procuring and installing pollution control equipment. The completed plant was to be operated in accordance with the instructions and procedures provided by Alchemy, and Alchemy was to receive all of the ash produced from the plant.

The plant, which was designed to operate daily on a 24-hour basis, never performed as anticipated. It was repeatedly shut down because of a buildup of hulls in

---

[225] 467 F.2d 588 (4th Cir. 1972).

[226] 782 F. Supp. 159 (D. Me. 1992). *See* Design-Build Industry, *supra* note 223.

[227] *Id*. at 163.

[228] *See* John R. Heisse, *The Measure of Malpractice: A Rebuttal to the "Threshold Approach" to Evaluating Errors in Design*, 5. J. AM. C. CONSTR. LAW. (2011), http://www.pillsburylaw.com/siteFiles/Publications/BylinedArticleTheMeasureofMalpracticeJournaloftheAmericanCollegeofConstructionLawyersSummer2011.pdf.

[229] 797 F.2d 565 (8th Cir. 1986).

[230] *Id*. at 566.

the furnace and an inability to comply with state air pollution control standards. The primary reason for this was that the furnace system designed by Pitt could not support combustion at a temperature low enough to produce quality ash without the aid of fuel oil when the outside temperature fell below a certain level. For 3 years, Alchemy and Pitt tried unsuccessfully to get the plant to operate per the specifications. The plant was eventually closed.

The plant's owner successfully sued Alchemy and Pitt for breach of contract and negligence on the basis that these parties failed to design a plant capable of meeting the performance requirements. Citing to *Spearin*, the 8th Circuit Court of Appeals upheld this verdict. It found that Alchemy and Pitt had provided a warranty that Pitt's design would achieve the performance criteria and that they should be liable for the consequences of failing to do so.[231] Significantly, the court never looked at Pitt's liability from a standard-of-care perspective. Finding that the plant's owner was a third-party beneficiary of the Alchemy–Pitt contract, the court only focused on Pitt's contractual obligation (i.e., warranty) to deliver a design that met the performance criteria.

A similar problem occurred in the construction of a plant to make blocked iron through a new and recently patented process. In *Day and Zimmerman, Inc. v. Blocked Iron Corporation of America*,[232] Day and Zimmerman (D&Z) signed what appeared to be a standard EPC contract that committed to make the blocked iron with specific performance requirements, including a specific capacity. For more than a year after start-up, the plant failed to operate profitably. The parties argued about whether D&Z had guaranteed the production rates and the maximum cost of the project. The court ultimately concluded that D&Z had not warranted the plant's performance and held it to a "professional negligence" standard. The court did nevertheless conclude that D&Z was negligent, as it purchased equipment that was "wholly incapable of furnishing the necessary heat required by the duty specification."[233]

A recent case that has considered an engineer's liability under a performance specification/guarantee is *Evergreen Engineering, Inc. v. Green Energy Team LLC*.[234] The project involved a biomass-to-energy plant, on the Island of Kauai, which would be fueled by locally produced wood waste products.

The plant's owner hired an engineering firm to do front-end engineering and conceptual design of the plant. Based on the engineers' recommendations, the owner contracted with an equipment vendor for the gasification/boiler system that guaranteed that the plant would not have to use more than 201 tons per day of wood feedstock. This system ultimately proved faulty, and it was learned that 240 tons of fuel per day were needed to operate the gasifier system at the required efficiency level. The owner claimed that this affected the pro forma financials and economic viability of the project, not only because of the added cost of the feedstock, but also because compliance with its air permit would require the plant to operate fewer hours or at a lower output than intended under its power purchase agreement.

As a result of the miscalculation in tonnage, the parties became involved in litigation over a number of issues. Central to the case was the interpretation of the following clause in the owner-engineer contract, which came from the engineer's proposal and was incorporated into the contract:

> Overall plant performance guarantee will be achieved via guarantees by suppliers of individual equipment and the undertakings of the Contractor and certain project investors as well as by the undertaking of Evergreen in this Agreement. Equipment performance guarantees will be written into the specifications for each piece of major equipment with financial penalties for performance shortfalls. Factory performance tests combined with onsite performance testing will verify that equipment is achieving desired performance. A highly qualified design team is being proposed for this project with the necessary experience to design and support your project during construction. The design will be performed in our Eugene, OR office. Evergreen will work together with your Construction Manager, Contractor and Owner's Representative to ensure that your project is designed and built to the high standards you require in order to achieve your continual goals.[235]

The owner claimed this created a performance guarantee of performance of the plant, and made the engineer liable for the performance of the equipment vendor. The engineer argued that this was not a design-build or EPC contract where the risk of performance was shifted to the designer, but was in fact a modified design-bid-build delivery system, and that no guarantees of performance were provided. The engineer moved for summary judgment on the owner's breach of warranty count, alleging that its only duty was a professional negligence standard and that it had not given a guarantee.

The court ultimately declined to grant summary judgment, concluding that the above provision was ambiguous and that what was intended by its terms would

[231] *Id.* at 569. Alchemy and Pitt never contested that Pitt's design did not meet the performance criteria and that fuel oil was needed. However, they argued that the air pollution control equipment selected by the plant's owner contributed to the problems. Both the district court and the appellate court found that the problems attributable to the faulty air pollution control system, as well as some other problems caused by owner-furnished equipment, did not manifest themselves until several years after it was evident that the plant was incapable of achieving the performance criteria on a sustained basis. More importantly, these courts found that even if this other equipment had worked properly, the entire plant would not have been able to perform in accordance with the terms of the contract because of deficiencies in Pitt's design. *Id*. at 570.

[232] 200 F. Supp. 117 (E.D. Pa. 1960).

[233] *Id*. at 122.

[234] 2012 U.S. Dist. LEXIS (D. Haw. 2012).

[235] *Id*. at 4–5.

have to be decided in a trial. However, the court did note that by including the term "overall plant performance guarantee," the agreement memorialized the engineer's "assurance" regarding overall plant performance. What was unclear was the scope of the guarantee or assurance or the specific contours of "overall plant performance." It indicated a concern about using this language to create the same obligation as would arise under a turnkey contract, and distinguished the result in *Arkansas Rice Growers*, where the guarantee was much more clearly stated. However, it also indicated a concern about the significance of this being a modified design-bid-build contract, as argued by the engineer, since this type of delivery could also give rise to performance guarantees and liability to the engineers.

The above three cases provide some interesting perspectives. While the designers in *Arkansas Rice Growers* and *Day & Zimmerman* each had liability for ultimately failing to meet performance guarantees, the different ways the courts reached these results is significant, and demonstrates the importance of a contract's working. *Arkansas Rice Growers* used a "black and white" liability assessment, finding the designer liable simply because the plant did not meet the guarantees. *Day & Zimmerman* looked at this from the lens of what a "reasonable engineer" would have done to meet the standard of care. *Evergreen* is a classic example of the need to understand what the contract meant before assessing liability.

H. Defenses to Meeting a Performance Specification

Despite the general principle that makes parties responsible for meeting performance specifications, there are questions as to how far this obligation will actually extend when the contractor is confronted with factors beyond its reasonable control. Although there are few cases on this subject, two lines of defense have surfaced—impossibility/impracticability of performance and owner interference.

1. Impossibility and Impracticability of Performance

If an owner creates a specification that is, for technological or financial reasons, impossible or impracticable to perform, courts may excuse the contractor's nonperformance. This is an equitable (i.e., fairness) doctrine that is intended to void contracts that are impossible or commercially senseless to enforce. The general principle behind the doctrine applies to performance specifications.[236]

Among the factors courts consider in evaluating an impossibility defense are 1) whether any other contractor was able to comply with the specifications; 2) whether the specifications require performance beyond the state of the art; 3) the extent of the contractor's efforts in meeting the specifications; and 4) whether the contractor assumed the risk that the specifications might be defective.[237] Commercial impracticability is a subset of the legal doctrine of impossibility. It excuses a party's delay or nonperformance when the "attendant costs become excessive and unreasonable by an unforeseen supervening event not within the contemplation of the parties at the time the contract was formed."[238]

While there are discrete standards for proving the theories of impossibility and commercial impracticability, cases often meld the theories together. Consider *Guy F. Atkinson, Co*.,[239] where the general rule was stated as follows:

> Performance may be so difficult, so expensive, or so time-consuming, even though not literally impossible, that performance is practically impossible or commercially senseless within the original reasonable anticipation of the contracting parties. Legal impossibility may be established without showing actual or literal impossibility. Thus, a finding of legal impossibility may be based on "commercial impracticability." [citations omitted] The principle of practical impossibility consists of the theory that the object of the contract could not be accomplished without commercially unacceptable costs and time input far beyond that contemplated in the contract. [citations omitted] Absolute impossibility is not required, if the specifications are so time consuming as to be outside the basic objectives contemplated by the parties.[240]

The Board of Contract Appeals in this case agreed that the contractor had proven performance impossible when it could not meet the contractually required moisture content in aggregate and the government refused to relax the requirement.[241] Another case used a similar analysis to find that a foundation contractor that encountered a Type 2 differing site condition was excused from performing the contract on the basis that it was commercially impracticable to do so.[242]

A handful of other construction disputes have recognized these doctrines when an owner-furnished design specification created the hardship.[243] The issue of im-

[236] *See, e.g.*, Concrete Placing Co. v. United States, 25 Cl. Ct. 369, 374 (1992), which noted: "Only in the relatively rare case where the specifications call for a performance which is impossible to achieve can a contractor obtain an equitable adjustment for defective performance specifications."

[237] Hauser & Tinsley, Jr., *supra* note 129, at 36; Oak Adec, Inc. v. United States, 24 Cl. Ct. 502 (1991).

[238] L. W. Matteson, Inc. v. United States, 61 Fed. Cl. 296 (2004). *See also* RESTATEMENT (SECOND) of CONTRACTS § 266(1), which states,

> Where, at the time a contract is made, a party's performance under it is impracticable without his fault because of a fact of which he has no reason to know and the non-existence of which is a basic assumption on which the contract is made, no duty to render that performance arises, unless the language or circumstances indicate to the contrary.

[239] *Guy F. Atkinson Co*., ENGBCA 4171, 88-2 BCA ¶ 20,714.

[240] *Id.*

[241] *Id*.

[242] Soletanche Rodio Nicholson (JV), ENGBCA Nos. 5891 and 5796, 94-1 BCA ¶ 26,472.

[243] *See*, *e.g.*, *S & M—Traylor Bros*., ENGBA No. 3852, 78–2 BCA ¶ 13,495 (recognizing right to recovery for Government's defective drawings and design that required contractor to obtain item impossible to produce); *Southern Paving Corp*.,

possibility and commercial impracticability has also arisen under a number of government contract cases, often focusing on contracts for research and development (R&D) or for technology creating or advancing the state of the art.[244] Included among the cases finding impossible or impracticable contracts are manufacturing contracts where an extensive R&D effort makes it impossible to meet production rates and when no contractor would be able to meet specified tolerances without significant waivers of contract requirements.[245]

The caselaw does contain some examples of performance specification cases where the doctrine of impossibility/commercial impracticability has been upheld.[246] One of the leading cases is *Foster Wheeler Corp. v. United States*,[247] where the court held that the government had assumed the risk that the contractor could manufacture a shock-hardened boiler using a government-specified technique that met the government's performance specifications. After finding the task impossible to perform, the court stated that two factual questions were relevant to the answer of who bears the risk: 1) which party had the greater expertise in the subject matter of the contract; and 2) which party took the initiative to draft the specifications and promote a particular method or design? The court found that, as between the contractor and the government, the government had more expertise than the contractor and that the contract's "extremely detailed performance specifications" were prepared by the government.

While some courts have agreed with contractors on impossibility/commercial impracticability vis-à-vis performance specifications, most courts have generally expressed a reluctance to do so. They find, in essence, that the "deal is the deal," and that by agreeing to the specification, the contractor/design-builder assumed the full risk of performance.

An example of this is *Colorado-Ute Electric Association v. Envirotech Corp.,*[248] where the design-builder agreed to meet certain performance requirements in its contract to provide the owner with a hot-side electrostatic precipitator at a coal-fired electric power plant. The design-builder agreed to comply with state air quality standards requiring that emissions opacity would not exceed 20 percent and warranted that it would bear the cost of all corrective measures and field tests until continuous compliance could be achieved. When the design-builder failed to achieve continuous compliance, it claimed that such compliance was "impossible" to accomplish. The court held that the design-builder had expressly warranted that it could provide Colorado-Ute with a satisfactory precipitator and thus assumed the risk of impossibility. The court stated that the design-builder's impossibility defense was "inconsistent with its express warranties and cannot be employed to avoid liability."[249]

Another instructive case in this area is *J.C. Penney Company v. Davis & Davis, Inc.,*[250] where the issue involved the quality of workmanship of certain sheet metal and coping work. The project specifications provided that the work must "be true to line, without buckling, creasing, warp or wind in finished surfaces."[251] The owner refused to accept the work because it did not comply with the specifications. The design-builder did not dispute the assertion that the work did not comply with the specifications, but instead claimed that it was impossible to comply with the specifications. The court found that impossibility is not a basis to allow the design-builder to recover its additional costs from the owner for attempting to comply with the specifications. The court reasoned that the specifications, although impossible to meet, were negotiated by the parties at arm's length. Therefore, the owner was totally within its rights to refuse a product that did not meet all of its bargained-for specifications.

Many contractors have tried to argue that specifications are commercially impracticable because they spend more money to perform than planned. This was the case in *Wilson Construction, Inc.*,[252] where a road construction contractor was required to process cleared trees through a chipping machine and distribute the chips onto the roadway embankment. The Board of Contract Appeals found this to be a performance specification, in that it provided no guidance as to the type of chipping machine or processes the contractor should use. The Board also commented on the commercial impracticability argument of the contractor and, citing other precedent, stated:

AGBCA No. 74-103, 77–2 BCA ¶ 12,813 (finding implied warranty pursuant to defective or impossible specification); *Thurmont Constr. Co*., ASBCA No. 13417, 69-1 BCA ¶ 7,602 (remanding for damages resulting from defective specification requiring contractor to procure item, listed in contract as "standard product" that had never been manufactured).

[244] *See generally* JOHN CIBINIC, RALPH C. NASH & JAMES F. NAGLE, ADMINISTRATION OF GOVERNMENT CONTRACTS, 314–322 (4th ed.), Wolters Kluwer Law & Business, 2006.

[245] *Id*. at 317–18.

[246] *See*, for example, *Stewart & Stevenson Servs., Inc*., ASBCA No. 43631, 97-2 BCA ¶ 29,252, where the contractor sought additional costs in connection with production and delivery of field generators for the Army. The Board concluded that the contract documents contained a mix of design and performance specifications, which gave the contractor the design discretion to choose and to assemble those components it believed would accommodate the government's performance requirements within the design parameters the government provided. The Board ruled that the contract was impossible or commercially impractical to deliver within the 150-day delivery schedule, and that because the government had greater expertise and experience and drafted the mix of design and performance specifications, it took on the risk of impossibility.

[247] 206 Ct. Cl. 533 (1975).

[248] 524 F. Supp. 1152 (D. Colo. 1981).

[249] *Id*. at 1159.

[250] 158 Ga. App. 169, 279 S.E.2d 461 (1981).

[251] *Id*. at 463.

[252] AGBCA No. 89-178-1, 92-2 BCA ¶ 24,798.

> Because of the potential for abuse, the boards and courts have not applied the commercial impracticability standard with frequency or enthusiasm. The mere fact that performance is more expensive than originally contemplated is not sufficient to invoke the standard. …Rather, to recover on this basis the contractor must show that performance was commercially senseless and that to hold it to the terms of the contract would be positively unjust.[253]

The court found that while the contractor's crew had spent additional monies overcoming obstacles in chipping, these obstacles did not give rise to the type of hardship that warranted a commercial impracticability finding.

Specifications that cannot be met by the contractor's proposed system also do not fall into the impossibility/impracticability defense. For example, in *Ruscon Constr. Co.*,[254] the contractor had an obligation to install a Halon fire suppression system that would, among other things, be a central storage type system that would produce a maximum of 6 percent Halon initially and 5 percent after 10 minutes in the fire area. The contractor was unable to build a central storage system that met the maximum Halon requirements, and claimed that the government should pay for the additional costs it incurred in creating a system that was located in each protected room. The Board of Contract Appeals held that while it might be impossible for the system the contractor chose to install to comply with the central storage system shown on the drawings, other systems could have achieved this, even if such performance was complicated and extremely difficult.[255]

Courts have been particularly reluctant to absolve a contractor/design-builder from liability under an impossibility defense when that party has participated in the drafting of the specifications. While different courts have articulated different reasons for this, a straightforward reason is that authorship of a specification tends to show that the author has superior knowledge concerning what is necessary to meet the contract's objectives and believes the specification sets forth what is necessary.[256]

One of the leading cases on this point is *Bethlehem Corp. v. United States*,[257] where the government had contacted several contractors, including Bethlehem, for consultation on the development of an environmental test chamber. During the course of those discussions, Bethlehem assured the government that it was possible to build a test chamber meeting the government's proposed specifications.

The court held that those assurances, coupled with the fact that Bethlehem was an expert in the field, constituted an assumption of the risk of impossibility. The court reasoned:

> Acceptance of [the contractor's] argument would mean that though a purchaser makes his choice because of the attractiveness of a manufacturer's representation and will be bound by it, the manufacturer is free to express what are only aspirations and gamble on mere probabilities of fulfillment without any risk of liability. In the fields of developing technology, the manufacturer would thus enjoy a wide degree of latitude with respect to performance while holding an option to compel the buyer to pay if the gamble should pan out.[258]

This principle was also cited in *Aleutian Constructors v. United States*.[259] Here, the Court of Claims held that by altering the government's initial design specifications for the design features at issue, the contractor had impliedly assumed the risk that performance under its proposed specifications may be impossible. The contractor agreed to construct an airplane hangar and dormitory building in Alaska, in an area known for its extreme weather conditions and high winds. During construction, the contractor obtained the government's approval to change the design of the roofing system provided that it warranted the materials and workmanship for a 5-year period and verified that the proposed design would withstand a certain wind uplift pressure.

Soon after installation, the roofing system failed and the contractor was forced to make substantial repairs and modifications to the roofing system. The contractor claimed for the repair costs, alleging defective specifications and impossibility. The court rejected the claim, reasoning that when the contractor persuaded the owner to change its design to one proposed by the contractor, the contractor assumed the risk that performance under its proposed design may be impossible. Accordingly, by assuming responsibility for the design, the contractor assumed liability for all damages and losses

---

[253] *Id*.

[254] ASBCA No. 39546, 90-2 BCA ¶ 22,768.

[255] *See also* S & D Mechanical Contractors, Inc. v. Enting Water Conditioning Sys., 593 N.E.2d 354 (1991), where an equipment vendor agreed to provide all water softening and dealkalizer equipment for a boiler replacement system at a VA hospital. The composite specifications contained specific performance requirements that established minimum levels of performance. The vendor was unable to meet all of the performance requirements, even though it provided, in some instances, substantially more than the minimum performance for some of the individual requirements. The court concluded that given that the overall design of the system was left to the discretion of the vendor, it had to determine how to achieve the entirety of the performance metrics.

[256] Golden & Thomas, s*upra* note 111. *See also* Austin Co. v. United States, 161 Ct. Cl. 76, 81, 314 F.2d 518, 520–21 (Ct. Cl. 1963), discussed further below, where the court made its reason quite clear:

> This court has always held that the Government is responsible for its own specifications and, if for any reason, plaintiff had been hindered in performance or suffered losses by reason thereof, due to defective specifications, the Government is liable for such losses. [citations omitted] We can think of no reason why the converse of this should not apply to plaintiff. * * * In other words, plaintiff drew up the specifications and thereby undertook a firm obligation to perform thereunder. In this climate plaintiff must turn the same square corners as required of the Government and is bound by specifications of its own making.

[257] 199 Ct. Cl. 247, 462 F.2d 1400 (1972).

[258] *Id*. at 255.

[259] 24 Cl. Ct. 372 (1991).

arising from the inability of the design to meet the owner's performance goals.

Austin Co. v. United States[260] involved a contractor seeking costs it incurred in developing a digital data recording and transcribing system. The contractor reviewed the original government specifications and concluded that it would not be possible to meet them. It proposed its own approach, which the government accepted and incorporated into the contract. After the contractor made efforts to develop the system, the government terminated the contract after it became apparent that the contractor could not make the system work as required. The court concluded that even though the original specifications were impossible to meet, the contractor assumed the risk of impossibility of performance when it proposed and promised to perform under its own substitute approach:

> [Austin] not only believed it possible, but promised to perform under its own substituted specifications. Under these circumstances, we are faced with the fact that [Austin] had full knowledge of the perils of performance and entered into the contract with its eyes wide open. This, in our opinion, would indicate that plaintiff fully assumed the risks of impossibility of performance.[261]

Other cases in both construction and technology/R&D contracts have reached similar results.[262]

Finally, it should be noted that some contractors/design-builders have argued that if their ability to meet a performance specification costs a substantial amount of money, they should be relieved based on commercial impracticability. While it is true that the amount of money to comply with a specification is a factor, the courts have looked at the overall nature of the undertaking and what has been promised before accepting this excuse.

One of the most interesting design-build cases to make this point is *Lockheed Martin Idaho Technologies Co. v. EG&G Idaho Inc.*,[263] where a $178 million turnkey environmental remediation subcontract contained a number of performance specifications and guarantees. Although it spent substantial money and time trying, the subcontractor, which was a division of Lockheed, was never able to meet its contractual obligations and was ultimately terminated for default. It raised a number of defenses in the lawsuit that followed, including the argument that the cost of meeting the specifications was so high (almost $250 million) that the subcontractor's lack of performance should be excused on the basis of commercial impossibility.

After a 4-month trial, the court rejected the notion that there were any legitimate excuses to the subcontractor's nonperformance and required, among other things, that the subcontractor return all of the money it had been paid under the subcontract ($54 million). The court looked to the binding nature of the performance specification, the subcontractor's contractual commitment, and the fact that the subcontractor knew the risks it was taking yet still signed a fixed-price contract: "Perhaps it was unwise for [the subcontractor] to accept such risk. But that is the deal it struck and this court will not re-write the deal."[264] In rejecting the subcontractor's commercial impracticability defense, the court stated that "given the resources of [the subcontractor], the gap between $760 million and $517 million (or more) is not great, and certainly does not indicate that the project is commercially impracticable."[265]

2. Owner Involvement and Interference

An owner can potentially jeopardize its rights to shift the risk of achieving performance specifications to the contractor by interfering with the design or construction process. Consider, for example, *Armour & Company v. Scott*,[266] which arose out of a design-build contract for the construction of a meatpacking plant. The court found that the owner became so actively involved in the design process by modifying the electrical and mechanical systems and ultimately increasing the facility size that it assumed the role of a de facto partner of the design-builder. These substantial interferences constituted a breach of contract by the owner and effectively negated the performance specification's risk-shifting process.

Sometimes, despite the best efforts of the owner to develop a performance specification and enable the design-builder to meet it, circumstances related to owner involvement can impact the single point of responsibility. Consider, for example, *Allen Steel Co. v. Crossroads Plaza Associates*,[267] which involved a commercial facility in Salt Lake City, Utah. In response to an owner's solicitation for design-build proposals for structural steel work, a contractor submitted a proposal containing three structural design alternatives. However, the proposal specifically stated the following:

> This proposal is offered for the design, fabrication, and erection of the Structural Elements only for the tower and mall. …Owner's engineer is to check this design and make changes if necessary to enable him to accept overall responsibility for the design. Changes that effect [sic] quantity, weight, or complexity of structural members will require an adjustment in price.[268]

The proposal was accepted and the contractor was directed to prepare detailed plans for steel fabrication based on its proposal. During the course of performance, however, inspectors from Salt Lake City stopped

[260] 161 Cl. Ct. 76, 314 F.2d 518 (1963).

[261] *Id.* at 81.

[262] *See, e.g.*, Oak Adec, Inc. v. United States, 24 Ct. Cl. 502 (1991).

[263] 2004 U.S. Dist. LEXIS 24460 (D. Idaho 2004).

[264] *Id*. at 93

[265] *Id.* at 74.

[266] 360 F. Supp. 319 (W.D. Pa. 1972).

[267] 119 UTAH ADV. REP. 6 (1989), withdrawn, 1992 LEXIS 30 (Utah 1991). While this case was withdrawn and has no precedential value from a litigation perspective, it provides an example of how an owner's involvement can be perceived by a trier of fact.

[268] *Id*. at 5.

construction due to what they perceived as structural defects. The owner retained its own engineer to correct the defects. Steel had to be torn down to remedy the problem, resulting in delays to the project and substantial cost overruns. The owner backcharged the contractor for such costs, prompting litigation between the parties.

The sole issue in the case was whether the contractor had effectively disclaimed responsibility for design defects by placing responsibility for the design within the control of the owner through its proposal. The court found that although the owner had only provided general design parameters for the structural steel, the contractor had effectively disclaimed its responsibility, since it had provided a design for purposes of the bid and transferred the risk of verifying adequacy of the design to the owner.

Another case that demonstrates how an owner's involvement can jeopardize its position on a performance specification is *P.J. Dick Incorporated v. General Services Administration*,[269] where a performance specification was essentially changed to a design specification that the owner was deemed to have warranted. The original specification for this courthouse renovation project called for crack control joints that subdivided areas into a maximum of 200 ft^2, giving the contactor discretion as to the placing of these joints in areas of less than 200 ft^2. The government modified this specification to require crack control joints only at the center line of the columns. The Board of Contract Appeals concluded that the principal causes of the severe cracking and debonding of the concrete topping were the improper control joints, and that the government, by requiring the location of these joints, bore responsibility.

An interesting perspective on the impact of owner involvement is demonstrated by *Seaview Electric Company*,[270] which involved the manufacturing of wind measuring sets for the Army. The contract called for an end product that met the performance and other requirements of the specifications. While the contractor ultimately met the requirements, it argued that it cost more money than expected as a result of inadequacies in the model that the Army furnished during the bidding process. The Board of Contract agreed that the Army's model was unsuitable for its intended purpose and that the contractor was entitled to an equitable price adjustment.

I. Proving Causation

Many of the cases discussed above describe how courts decide the question of whether a specification is sufficiently detailed to invoke the *Spearin* doctrine. Contractors who do not meet their burdens to prove the existence of a design specification typically fail to get contractual relief. However, it is important to note that even if the contractor can prove that it was confronted with a design specification, it must still show the "cause and effect" between deficiencies in the design specification and the problems it ultimately encountered.

An example is *Caddell Construction Co. v. United States*,[271] where the court was confronted with a claim by a steel subcontractor based upon defective design documents on a VA hospital. The court concluded that the structural steel portion of the contract was a design specification. It noted that the VA had not dictated every aspect of the hospital's construction and had left key aspects of the construction, such as sequencing and scheduling, up to the contractor. However, there were nine pages of structural steel specifications with specific instructions on what type of bolts, washers, nuts, welds, finishes, and connections, among other things, could be used for the construction. The court stated that "this was clearly a 'road map' for the structural steel fabricator to follow."[272]

Notwithstanding this finding, the court concluded that the contractor had not demonstrated that the steel design caused the additional costs and project delays. It found that the large number of requests for information (RFIs) generated by the steel specifications were not sufficient to demonstrate that the plans were defective, and that the alleged defects in the specifications were not significant. The court attributed the RFIs to the steel subcontractor's questionable schedule and general contractor's misunderstanding as to erection sequencing.

It is beyond the scope of this digest to discuss the many cases addressing cause-and-effect requirements for proving *Spearin* claims. *Caddell* is a good example of why simply providing that there are some defects in the design specification is not enough. The contractor must show that the defects are significant and affected its work. The contractor must also meet myriad requirements in the contract relative to notice, proof of delay, and critical path impact, and demonstrate that its additional costs were directly related to the defective specification. It must also generally show that it fully complied with the design specification in order to argue that *Spearin* applies.[273]

J. The Effect of Disclaimers

As is evident from the many cases discussed above, an owner's attempt to disclaim *Spearin* liability will generally be unsuccessful. This was evident from *Spearin* itself, where the United States Supreme Court made clear that the owner's implied warranty was a fundamental obligation that could not be overcome by contract language. There are myriad construction law

[269] GSBCA Nos. 11697, 12132, 94-3 BCA ¶ 26,981.

[270] ASBCA No. 6966, 61-2 BCA ¶ 3,151.

[271] 78 Fed. Cl. 406 (2007).

[272] *Id.* at 414.

[273] *See*, for example, Jonovich Cos., Inc. v. City of Coolidge, No. 2, CA-CV 2011-0029 (Ariz. Ct. App. Oct. 31, 2011), where a contractor was not able to claim that the specifications were defective when it used native soil as embedment and backfill material for a pipeline construction, contrary to the requirements in the design that the sand and gravel be certain approved materials.

cases in both the federal and state courts that reinforce this principle, not only for defective specification claims, but also for differing site condition claims.[274] Therefore, using contract language that says, in essence, that "this is a performance specification and contractor assumes all risk of meeting the required results," will likely not relieve the owner from liability if it uses a design specification and has, for all practical purposes, taken all discretion away from the contractor. However, if the owner uses the above language in the context of a pure performance specification, then a trier of fact will likely find that the contractor has taken all risk of performance. Of course, there are no "bright line" answers, as noted many times in Section VIII, and a contractor may be able to overcome the disclaimer by showing impossibility, owner interference/involvement, or that the owner's performance specification conflicted with another design specification.

IX. CONCLUSION

An owner that has been exposed to liability for defective specifications may think that converting to performance specifications is the best approach to solving its problems. As made clear by the caselaw, while performance specifications are not always an adequate defense to a contractor's claims, they certainly can improve an owner's liability position if the performance specification is written properly. Triers of fact routinely find contractors responsible for meeting performance specifications, regardless of the financial consequences.

However, the decision to use performance specifications affects far more than an owner's risk profile. These specifications not only impact the way an owner will procure, contract, and manage their projects, but they have a profound impact on how contractors will execute their work. As a result, owners need to understand the practical consequences of using these types of specifications and assess whether they can live with these consequences.

The most critical consideration is whether the owner is prepared to give the contractor sufficient flexibility and discretion to perform the work. If an owner wants to dictate how the contractor will perform the work, then it will likely not feel comfortable using performance specifications. While the owner could create a composite specification to narrow the contractor's freedom, the owner should remember that it will likely bear the risk of ambiguities and deficiencies in what it has provided. Stated differently, an owner's use of performance words like "watertight" will not shift risk to the contractor when the owner has given the contractor a fully completed design and the contractor had no meaningful discretion in achieving the end result. Perhaps more importantly, by constraining the contractor's discretion, the owner may nullify one of the key benefits of performance specifications—the contractor's creativity.

Even if the owner is willing to give the contractor discretion in achieving an end result, it needs to carefully assess how the contractor's performance will be measured. On process plants, owners will verify compliance with a thorough acceptance test that will run for a specific period of time. While a state highway agency might be able to use this approach on a systems contract, it is much more difficult to do so for traditional construction elements, for the reasons expressed earlier in this digest. The ongoing research into PRS and PBS may help alleviate this issue, but that will take time.

A final consideration for owners to remember is that in some areas they may be far more experienced and have more information than the contracting community. *Foster Wheeler*, *Helene Curtis,* and several of the other cases explain that when the owner has superior expertise and has created a performance requirement that cannot be achieved, the contractor will have a reasonable chance to absolve itself from liability. This is particularly true in lump-sum contracts. The trouble spot for highway agencies may be in the use of O&M performance-based contracting for existing assets. Agencies undoubtedly have (at least in theory) far more information about their financial and technical experiences than contractors who will be bidding for these services. In the event of a problem, it is probable that the contractor would argue that the agency should bear some responsibility for the problem. With the proliferation of DBOM and DBFOM contracts, it is likely that this issue will be the subject of future legal precedent.

---

[274] *See generally* CIBINIC, NASH & NAGLE, *supra* note 244, at 272–96.

ACKNOWLEDGMENTS
This study was performed under the overall guidance of the NCHRP Project Committee SP 20-6. The Committee is chaired by MICHAEL E. TARDIF, Friemund, Jackson and Tardif, LLC. Members are RICHARD A. CHRISTOPHER, HDR Engineering; JOANN GEORGALLIS, California Department of Transportation; WILLIAM E. JAMES, Tennessee Attorney General's Office; PAMELA S. LESLIE, Miami-Dade Expressway Authority; THOMAS G. REEVES, Consultant, Maine; MARCELLE SATTIEWHITE JONES, Jacob, Carter and Burgess, Inc.; ROBERT J. SHEA, Pennsylvania Department of Transportation; JAY L. SMITH, Missouri Department of Transportation; JOHN W. STRAHAN, Consultant, Kansas; and THOMAS VIALL, Attorney, Vermont.

JANET MYERS provided liaison with the Federal Highway Administration, and CRAWFORD F. JENCKS represents the NCHRP staff.

Transportation Research Board
500 Fifth Street, NW
Washington, DC 20001

NON-PROFIT ORG.
U.S. POSTAGE
PAID
WASHINGTON, D.C.
PERMIT NO. 8970

ISBN 978-0-309-28335-9

90000

9 780309 283359

Subscriber Categories: Construction • Law • Maintenance and Preservation • Materials

These digests are issued in order to increase awareness of research results emanating from projects in the Cooperative Research Programs (CRP). Persons wanting to pursue the project subject matter in greater depth should contact the CRP Staff, Transportation Research Board of the National Academies, 500 Fifth Street, NW, Washington, DC 20001.