Use of Price Escalation Clauses in Design Build Contracts

FHWA Summary Report

January 2025

U.S. Department of Transportation
Federal Highway Administration

Notice

This document is disseminated under the sponsorship of the U.S. Department of Transportation (USDOT) in the interest of information exchange. The U.S. Government assumes no liability for the use of the information contained in this document.

Non-Binding Contents

Except for the statutes and regulations cited, the contents of this document do not have the force and effect of law and are not meant to bind the States or the public in any way. This document is intended only to provide information regarding existing requirements under the law or agency policies.

Quality Assurance Statement

The Federal Highway Administration (FHWA) provides high-quality information to serve Government, industry, and the public in a manner that promotes public understanding. Standards and policies are used to ensure and maximize the quality, objectivity, utility, and integrity of its information. FHWA periodically reviews quality issues and adjusts its programs and processes to ensure continuous quality improvement.

Disclaimer for Product Names and Manufacturers

The U.S. Government does not endorse products or manufacturers. Trademarks or manufacturers' names appear in this document only because they are considered essential to the objective of the document. They are included for informational purposes only and are not intended to reflect a preference, approval, or endorsement of any one product or entity.

TECHNICAL REPORT DOCUMENTATION PAGE

1. Report No. FHWA-HIF-24-114	2. Government Accession No.	3. Recipient's Catalog No. N/A
4. Title and Subtitle Use of Price Escalation Clauses in Design Build Contracts FHWA Summary Report		5. Report Date January 2025 6. Performing Organization Code
7. Author(s) Patrick Raistrick, Eric Sideras, Hoai Thuong Tran		8. Performing Organization Report No. DOT-VNTSC-FHWA-25-02
9. Performing Organization Name and Address U.S. DOT Volpe National Transportation Systems Center 220 Binney Street, Cambridge, MA 02142		10. Work Unit No. (TRAIS) 11. Contract or Grant No.
12. Sponsoring Agency Name and Address Office of Preconstruction, Construction, and Pavements Federal Highway Administration 1200 New Jersey Avenue, SE Washington DC, 20590		13. Type of Report and Period Covered Summary Report, December 2023-July 2024 14. Sponsoring Agency Code HICP-20
15. Supplementary Notes		

16. Abstract

Different contracting mechanisms can mitigate risks associated with price volatility and procurement of materials used in construction. This project spotlights six State DOTs that have experience implementing price escalation clauses (PEC) in their design-build contracts. The States reflect regional diversity, disparate PEC experience, and varying project sizes.

17. Key Word Design-build, price escalation, contract, price index		18. Distribution Statement No restrictions. This document is available to the public through the National Technical Information Service, Springfield, VA 22161. http://www.ntis.gov	
19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages 41	22. Price N/A

Form DOT F 1700.7 (8-72) Reproduction of completed page authorized

Table of Contents

List of Tables iii
Introduction 1
Data Collection Methods 2
Background Research 2
Stakeholder Outreach 3
Key Findings 3
Approach 4
Application 8
Results 17
Takeaways 20
Conclusion 22
References 24
Appendix A – Interview Questions for State DOT Use of PECs on DB Contracts 27
Appendix B – Interview Takeaways Summary 29
Appendix C – NYSDOT: Form PA – Steel/Iron Price Adjustment Declaration Form 36

List of Tables

Table 1: Price Escalation Clause Cost Indices Used for Materials on Design-Build Contracts, by State DOT 9

Introduction

The price volatility of materials and supplies used in construction, such as asphalt, fuel, concrete, and steel can present challenges to contractors in making accurate or realistic bids for projects solicited by Federal, State, and local governmental agencies. Costs often fluctuate based on market conditions between the time a project is bid on and when materials and supplies are purchased. As a result, contractors may seek to minimize their cost risk by submitting bids with contingencies that are significantly higher than expected, or by refraining from bidding on certain projects altogether. This places governmental agencies at a disadvantage, since they would need to absorb the additional cost, choose from a smaller number of bidders for their projects, or both absorb the cost and choose from a small bidding pool.

To address these challenges, many State Departments of Transportation (DOTs) have traditionally built price escalation clauses (PECs), price adjustment clauses, or commodity price escalation protection into their construction contracts. While PECs typically refer to contract provisions that provide risk mitigation against rising prices for materials used in construction and supplies, commodity price escalation refers to protections against rising material costs only, and price adjustment clauses include protections against rises or declines of materials used in construction and supply costs. This document uses “price escalation clause” as an umbrella term for all three provisions. Herein, PEC refers to construction contract provisions that allow for protection against rising and falling prices of materials and supplies, to minimize the cost effects of price uncertainty throughout the lifecycle of the project.

The implementation of PECs in design-bid-build (DBB) programs is well documented. DBB involves a construction delivery system that uses separate contracts for the design and construction services for a project (a project’s design is completed prior to a contractor making a bid and beginning construction on the project). These contracts typically apply PECs to specifically determined construction quantities of materials and supplies.

In contrast to DBB, design-build (DB) is a construction delivery system that uses a single contract to cover design and construction services for a project (i.e., the same company will provide design and construction services and bid on both at the same time). DB can offer several advantages over DBB, including faster project delivery, greater efficiency and collaboration, potential cost savings, and potential work quality improvements. However, since the DB contractor typically only works from the project scope of work and initial design concepts at project bid, material types and quantities may only consist of gross estimates at that time (until the design is more fully refined). Additionally, price volatility remains an issue for the construction life cycle, where the cost of materials and supplies varies with time, and the contractor will likely not be able to purchase all commodities at the time the construction cost estimate is made. A contractor will therefore include what they consider an appropriate contingency in the total project cost proposal. In response, State DOTs are addressing, or seeking

to address, price volatility on DB contracts through PECs as well. DB contracts with PECs may provide opportunities to mitigate cost associated risk (with the hope that the contractor will provide a lower bid price if such a risk is reduced for them) and promote more competitive bidding processes (to provide the State DOT with a larger number of contractors to select from).

Although more State DOTs are beginning to use or experiment with DB contracts, there has not been uniformity in PEC application. Several State DOTs have contacted their respective Federal Highway Administration (FHWA) Division Offices seeking information on ways to incorporate such clauses into their State agency processes.

The Federal Highway Administration (FHWA) Office of Construction, Preconstruction, and Pavements (HICP), in partnership with the U.S. DOT Volpe Center (Volpe), has recently conducted research and outreach efforts to better inform State DOTs on key considerations for using PECs in DB contracts. The purpose of this report is to summarize the analysis of those efforts, presented through State DOT case studies, and meet the following objectives:

- Identify cases when a PEC should be considered for a DB contract.
- Promote an understanding of how to address market risks for long-term construction projects.
- Document practices to consider when structuring a PEC to minimize its manipulation.
- Identify PEC advantages and disadvantages on DB contracts.
- Share examples of price adjustment indices associated with DB contracting.

While this report is intended to serve as a resource for all State DOTs, it is not a substitute for the continued coordination that can help ensure PEC implementation is successful. It is recommended that State DOTs considering the use of PECs on their contracts contact their local FHWA Division Office for additional information, to better streamline the development process. This report is intended to provide information on how different State DOTs are implementing PECs on DB contracts only and should not be construed as providing conclusions or best practices for PEC implementation. Moreover, to ensure that this report fully captures how different State DOTs have implemented their PEC approaches and practices, where applicable, third-party or proprietary products including third-party periodicals, will be identified by their name. The U.S. Government and U.S. DOT are not endorsing these products or claiming that they are part of best practices, rather, this report is identifying the specific products for the purposes of sharing knowledge only.

Data Collection Methods

Background Research

The project team began by conducting background research in Fall 2023 to collect preliminary information on State DOT uses of PECs in DB construction contracts, which was intended to inform FHWA of potential approaches to addressing the price volatility of materials used in

construction by reducing market risks for long-term construction projects. This data gathering process involved internet research to explore readily and publicly available information from Federal and State agencies. The project team was not able to identify or review Federal resources on this topic but did collect information related to programs and practices at the State DOT level.

Stakeholder Outreach

Although the project team was unable to identify resources related to PECs in DB contracts for direct Federal projects in its research, it was able to identify six State DOTs that have experience implementing or piloting PECs in DB contracts: Florida (FDOT), Massachusetts (MassDOT), New York (NYSDOT), North Carolina (NCDOT), Texas (TxDOT), and Virginia (VDOT). FHWA HICP connected the Volpe team to its Division Offices and Specially Designated Project Oversight Managers (sdPOMs), who provided outreach information for relevant staff at their respective State DOTs. Using the FHWA Division Offices' recommendations, the project team scheduled interviews between December 2023 and March 2024 with State DOT staff who have experience with either developing their agency's PEC or implementing PECs into their DB projects.

While the list of stakeholders included in this collection of case studies is not exhaustive of all State DOTs that have experience with PECs, the limited sample size in this project does capture a reasonable representation of States with geographic diversity, project complexity, and levels of experience with PECs. The project team developed a set of standard interview questions for all interviews, which can be found in Appendix A – Interview Questions for State DOT Use of PECs on DB Contracts. The goal of the interviews was to explore thematic areas related to the use of PECs: **Approach**, **Application**, **Results**, and **Takeaways**.

Key Findings

Based on the answers provided by the State DOTs (VDOT, TxDOT, NYSDOT, MassDOT, FDOT, and NCDOT) in their interviews, the project team found that while there were some PEC commonalities across all State DOTs, each State DOT differed in how it executed these clauses for DB contracts. These findings highlight each State DOT's rationale, as well as the lessons learned during and following clause implementation. The findings, which reflect the information that each State DOT shared in its interview, are organized as a series of six case studies under the themes of **Approach, Application, Results,** and **Takeaways**. Agencies considering their own PECs on DB contracts may find the findings from one or more of these case studies helpful to assist their PEC development efforts.

Approach

While it is important to know how State DOTs are using price adjustments to address market price volatility, it is also helpful to understand the conditions and context for the development of a State DOT's PECs on DB contracts. This background informs a State DOT's approach for implementation, including how PECs are considered for DB contracts compared to DBB contracts, and whether there are any additional factors that could make PECs a less viable approach to risk mitigation compared to other alternative contracting methods.

Florida Department of Transportation (FDOT)

The Florida Department of Transportation (FDOT) has over 20 years of experience using PECs in DB contracts and employs DB contracts on 62 of its 665 active construction contracts as of February 23, 2024. These 62 contracts currently comprise over 30 percent of the overall program's $20 billion contract value. FDOT mandates that PECs be included on construction contracts (the contractor does not have a choice to opt in or out) and be applied as fuel and bituminous material price adjustments. These provisions do not differ between DB and DBB contracts.

FDOT's approach to implementing PECs stems from recognizing that price fluctuations in fuel and bituminous materials can vary greatly throughout the timeline of a contract and can pose a significant risk to FDOT, as well as to contractors bidding on a project. To protect both entities from these price fluctuations, which cannot be anticipated at bidding time, FDOT partnered with the transportation industry to develop provisions and a process that would best meet their needs. FDOT determined that when PECs account for monthly price adjustments to fuel and bituminous material, they can encourage contractors to provide a better bid price on construction projects since the price variability risk is reduced.

Massachusetts Department of Transportation (MassDOT)

The Massachusetts Department of Transportation (MassDOT) has utilized PECs since 2008, when they brought in a series of consultants to evaluate which commodities were experiencing price fluctuation. The end goal was to develop a PEC model that would yield a value deemed "comfortable," based on the bids they were receiving. In general, they have used escalation values ranging from 3 to 4.5 percent, based on market, inflation, complexity, and the commodities involved.

MassDOT's standard practice is to use a low-bid approach for any project under $15M. For Major Projects – which are defined in 23 U.S.C. 106(h) as projects receiving Federal financial assistance with an estimated total cost of $500M or other projects as may be identified by the Secretary of Transportation – MassDOT typically takes a best value design-build approach and

has done so for approximately the last ten years. MassDOT expects that in 2025, upwards of 55 to 57 percent of their construction spending will be in DB procurement.

For all Major Projects, MassDOT uses cost estimating that incorporates price escalation and has taken this approach since 2010. Prior to release of the Design Build Procurement documents, the agency conducts a Cost Estimate/Risk Analysis Review to evaluate the appropriate amount of contingency that should be applied to the budget to account for likely increases during construction, inclusive of Construction, Engineering & Inspection. These cost estimates are fully detailed using unit-bid items to the extent practical at the 25 percent design level, which are based on MassDOT's *Guide to Estimating Highway Projects*.[1] This contingency, which serves to capture the anticipated rate of escalation or de-escalation on the project, is applied depending upon market fluctuations, the commodities being used, and recent bid prices. As the project progresses, the estimate is revised as necessary and eventually rolled up into a lump sum for each pay group (earthwork, steel, pavements, etc.). In tandem to this, MassDOT engages with an independent cost estimator to evaluate the project in terms of cost, schedule, labor, and crew. This independent estimate tends to align more closely to those of the contractor's. MassDOT's estimate is heavily informed by quantity of items, while the independent estimate is informed primarily by schedule. MassDOT aims to have these estimates be within 5 percent of each other. If there is a discrepancy greater than that 5 percent threshold, a cost-resolution meeting is held to discuss the differences and approaches used. This resolution meeting ensures that estimates are realistic, fair, and equitable for all parties.

New York State Department of Transportation (NYSDOT)

The New York State Department of Transportation (NYSDOT) has used DBB contracts for decades and DB contracts since 2011, but began piloting incorporation of PECs into DB contracts in 2022 (NYSDOT's DBB program has allowed and used PECs for over a decade). This pilot was developed in response to construction industry concerns regarding the dramatic variability in material prices due to market and supply conditions. After consulting with the FHWA New York Division Office regarding how PECs were being utilized elsewhere, NYSDOT developed a steel/iron price adjustment special provision, associated declaration form that listed eligible items for adjustment (*Form PA Steel/Iron Price Adjustment Declaration Form*),[2, 3] and special specifications for payment (*Item 800.1600115 – Design-Build – Steel/Iron Price Adjustment*)[4] to help limit the financial risk to the contractor due to market volatility. Using Form PA, the contractor elects to opt-in or opt-out of applying the steel/iron price adjustment and special provision to the DB contract and submits it with the contractor's price proposal.

While NYSDOT developed a price adjustment for steel/iron, it noted in its interview that the construction industry was also concerned about price fluctuations in fuel. However, NYSDOT does not include a fuel adjustment provision in this pilot for DB contracts as it does for DBB contracts. This is because the fuel adjustment for DBB projects is quantity based. Including fuel

adjustments on DB would require a completely different approach and would have presented challenges to NYSDOT in managing whether or how fuel is being used over the course of the construction project contract. As such, the NYSDOT's PEC pilot on DB contracts is limited to steel/iron price adjustments.

As of December 2023, there is one active DB contract where the successful contract bidder has opted in to the steel/iron price adjustment (*D900056 – I-81 Viaduct – Phase 1, Contract 2*; contract awarded in July 2023),[3] though no payments had yet been made. In contrast, two contractors who won bids on two other DB projects opted out of the price adjustment (as both felt that steel/iron prices had peaked), and another two DB projects were either too limited in scope to be eligible to warrant a price adjustment provision or had not yet reached the point where the successful proposer team had been selected by NYSDOT. As a result, NYSDOT is in the early stages of considering the financial impacts of PECs on its DB program and whether to pursue an expansion of its use of PECs.

North Carolina Department of Transportation (NCDOT)

The North Carolina Department of Transportation (NCDOT) has experience with DB, DBB, Construction Manager/General Contractor (CM/GC), and Express Design Build (EDB) contracts, although the latter has not recently been in use. NCDOT has used fuel and asphalt cement price adjustments in both DB and DBB contracts as far back as the 1980s, with the intention of sharing the risk with contractors on the price variability of these materials to get better bid prices on its projects.

In late 2020, following market volatility and supply chain disruptions for steel, NCDOT began exploring a new provision to also address price fluctuations for steel. NCDOT worked with its Industry Work Group and investigated other State DOTs and their provisions, such as neighboring Virginia DOT (VDOT) and Ohio DOT, which appear to have simple provision administration. For example, VDOT, which is also explored in this report, uses largely the same language for its PECs in both DB and DBB contracts. VDOT also does not have separate construction specification standards depending on the contracting vehicle. Beginning in September 2022, NCDOT applies a steel PEC to contracts that meet all criteria and eligibility requirements.[5] The contractor has the opportunity to opt-into the steel PEC at the time of bid. In its Special Provision for Steel Price Adjustment SP01G, the agency provides a list of eligible steel items, such as encasement pipes and steel beam guardrails, and specifies the allowable adjustment dates for various items, such as delivery date from the producing mill, material received date, or cast date.[6] To date, while fuel and asphalt cement PEC provisions are standard in all DB contracts, the steel provision is not utilized as frequently, although NCDOT is beginning to see more projects opt-in recently.

Texas Department of Transportation (TxDOT)

Texas is a predominantly DBB State. The Texas Department of Transportation (TxDOT) also has statutory authority to utilize up to six DB contracts per fiscal biennium, although it is not meeting that cap as the agency has indicated it is selective with the projects that it chooses for DB delivery. TxDOT has used additional contracting vehicles in the past, such as an Exclusive Development Agreement (EDA) (later Comprehensive Development Agreements (CDA)). To use these alternates to DB and DBB delivery, the Texas legislature must add specific projects to the CDA legislation.

At the time of the interview, TxDOT had experience employing a PEC on one DB contract. Use of the PEC was originally intended as a one-time response to market volatility during the COVID-19 pandemic. In Summer 2021, the agency began wrapping up several DB procurements when the construction industry was impacted by significant supply chain disruptions and price volatility. The agency shared that during this time (2021 and 2022), the agency and contractors saw the Engineering News-Record's Construction Cost Index (ENR CCI) increase by up to 5.2 percent between proposal submittal and contract execution (typically 5 months), translating to an approximately 12 percent change per annum. During the prior decade, the growth in the ENR CCI averaged between 1.6 and 3.9 percent annually.

TxDOT's DB projects require that contractors submit fixed-price proposals. Given the uncertainty of winning a competitive contract, prime contractors have limited ability to fix vendor, supplier, and sub-contractor pricing between proposal submittal and contract execution, which can expose them to significant price risk during volatile periods. The materialization of price escalation risk negatively impacted contractors' profit margins for the DB projects TxDOT was procuring in Summer 2021, as significant price escalation occurred between proposal submittal and TxDOT's execution of contracts. As a result, TxDOT's Alternative Delivery Program was seeing fewer qualified bidders submitting contract proposals and, of the proposals that it was receiving, there were even fewer proposals that were within the agency's project budgets.

The Request for Proposals (RFP) for the I-35 Northeast Expansion (NEX) South Project in San Antonio was issued in November 2022. TxDOT aimed to develop an approach for this project to increase the pool of qualified bidders.(7) In early 2023, TxDOT conducted internal research, consulted with its financial advisors and industry partners, and coordinated with the FHWA Texas Division Office to develop a single-use relief procedure specifically for the I-35 NEX South Project, referred to as "price escalation protection." TxDOT utilized this project as a pilot to determine whether inclusion of a PEC could increase the quality and quantity of bidders. The agency is currently considering a similar price escalation protection mechanism on future projects given the demonstrated benefits and savings for both TxDOT and contractors on the I-35 NEX South Project. These results are further explored under **Results**.

Virginia Department of Transportation (VDOT)

The Virginia Department of Transportation (VDOT) was initially authorized by legislation to award DB contracts in 2001. The Code of Virginia was further amended in 2006, eliminating restrictions on the number of transportation projects the Commonwealth Transportation Board may award on a Design-Build basis (*Design-Build Procurement Manual*, 2022).[8] VDOT initially purchased a DB contract template from the Design-Build Institute of America and has since modified it to meet their requirements.

VDOT utilizes PECs through internally developed construction specification standards, which are not tethered to a specific contracting vehicle. PECs are available for fuel, steel, and asphalt and while the verbiage is largely the same for both DB and DBB contracts, there are some variations. Most notably, steel is handled differently on DB contracts, because of the assumptions that need to be made with respect to the expected tonnage amount at the time of bidding. Additionally, for DB contracts, there are limitations on when adjustment is permitted.

Application

The use of PECs on DB contracts by State DOTs may vary by the parameters considered, eligible materials, cost indices referenced, and time limits allowed to enact such provisions. This variance may reflect a State DOT's experience with executing PECs, as well as local needs and input provided from stakeholders. **Table 1** depicts a summary of the cost indices each State DOT references for materials eligible for price adjustments on DB contracts. A more detailed discussion of these indices and how they are applied is provided in the State DOT sections below.

Table 1: Price Escalation Clause Cost Indices Used for Materials on Design-Build Contracts, by State DOT

State DOT	Asphalt	Fuel	Steel	Bituminous Material	Concrete
FDOT	Not applicable	Average of terminal (rack) prices from across Florida (diesel and gasoline).	Not applicable	Average of terminal (rack) prices from across Florida.	Not applicable
MassDOT	Average selling price of PG64-28 paving grade asphalt, FOB manufacturer's terminal (*Asphalt Weekly Monitor)*	Price MassDOT – Highway Division pays for fuels (diesel and gasoline).	*Producer Price Index (PPI) for Semifinished Steel Mill Products, not Seasonally Adjusted*	Not applicable	*Engineering News Record – Construction Economics* (Portland cement)
NCDOT	*Monthly Terminal Asphalt Binder & Fuel FOB Prices* (*Connect NCDOT*)	Average reported terminal prices by Specification	*Fastmarkets* (proprietary data)	Not applicable	Not applicable
NYSDOT	Not applicable	Not applicable	*Producer Price Index (PPI) for Semifinished Steel Mill Products, not Seasonally Adjusted*	Not applicable	Not applicable
TxDOT	*Engineering News-Record Construction Cost Index* is applied to contractor's priced construction cost	*Engineering News-Record Construction Cost Index* is applied to contractor's priced construction cost	*Engineering News-Record Construction Cost Index* is applied to contractor's priced construction cost	*Engineering News-Record Construction Cost Index* is applied to contractor's priced construction cost	*Engineering News-Record Construction Cost Index* is applied to contractor's priced construction cost
VDOT	Average of regional supplier prices, after eliminating the high and low prices.	*U.S. On-Highway Diesel Fuel Prices, Lower Atlantic*	*Producer Price Index (PPI) for Semifinished Steel Mill Products, not Seasonally Adjusted*	Not applicable	Not applicable

Florida Department of Transportation (FDOT)

FDOT partnered with its transportation industry leaders to establish its PEC parameters, which include price adjustments for fuel and bituminous material. FDOT's PEC provisions are as follows:

For **Fuel**,

- If the original contract time duration between FDOT and the contractor exceeds 120 calendar days, FDOT will apply price adjustments on each applicable progress estimate to reflect the increases and decreases in gasoline and diesel prices from those in effect during the month when contract bids were received (lettings after January 2022 will only receive diesel fuel price adjustments, since diesel is the primary source of fuel used by construction equipment).
- Price adjustments are considered monthly and occur when the current fuel price (CFP) varies by more than 5 percent from the base fuel price (BFP – the price prevailing in the month bids were received by FDOT). Price adjustments are only made on the portion that exceeds 5 percent.

For **Bituminous Material**,

- If the original contract time duration exceeds 365 calendar days or the contract involves more than 5,000 tons of asphalt concrete, FDOT will adjust the unit bid price for bituminous material (excluding cutback and emulsified asphalt) to reflect increases or decreases in the Asphalt Price Index (API) of bituminous material from that in effect during the month when contract bids were received.
- Price adjustments are considered monthly and occur when the current API (CAPI) varies by more than 5 percent of the base API (BAPI) prevailing in the month bids were received, and then only on the portion that exceeds 5 percent.

For both fuel and bituminous materials, FDOT uses cost indices based on terminal (rack) prices it receives from across Florida. These prices are then averaged to provide the monthly indices (averaging prices from across the State is meant to mitigate differences due to geographical area). A list of FDOT's current and previous fuel and bituminous average price indices can be found on FDOT's website.[9] Additional information related to FDOT's fuel and bituminous materials adjustment contractor certifications, along with FDOT's list of items that require fuel adjustments and their fuel factors can also be found on FDOT's website.[10]

FDOT has considered information from Federal agencies, such as the US Energy Information Administration and the US Bureau of Labor Statistics Consumer Price Index, as well as subscription-based price providers such as OPIS (AAA) and DTN Fast Racks.

Massachusetts Department of Transportation (MassDOT)

MassDOT's stance on the implementation and execution of PECs in their DB contracts boils down to wanting to give a fair shot at an equitable price for both the Commonwealth and the contractor. The PECs are structured such that bidders cannot opt-in or opt-out. Eligible pay groups are steel, concrete, liquid asphalt, and fuel (both diesel and gasoline). While the contractor is locked into the bid price, they can submit adjustments to the contract for the life of the contract itself on those eligible pay groups. During construction, MassDOT tracks invoicing against the project schedule. They correlate what has been completed in the field and how that matches up against the project schedule.

Prices are identified in terms of dollars per gallon or dollars per ton and there is no control value placed on the anticipated escalation costs. Typically, MassDOT will have established the base price index for specific commodities in the contract's procurement documents when solicitation is started and requires the contractor to submit quantities for pay groups each month. From there, MassDOT's construction group analyzes what has been submitted and can provide a compensation adjustment to the contractor appropriately. This PEC applies both ways, and in some instances, MassDOT is entitled to a credit when prices drop. An overview of MassDOT's PEC provisions are as follows:

For **Fuel,**

- The fuel PEC is automatically executed for the eligible covered items listed in MassDOT's Fuel Price Special Provision.[11, 12, 13]
- Price adjustment is based upon fuel usage factors developed by the Highway Research Board in Circular 158 (July 1974). These factors are multiplied by the quantities of work done for each eligible covered item and further multiplied by the variance in price from the Base Price to the Period Price.
- The Base Price is as indicated on MassDOT's website for the month in which the contract was bid. The Period Price is the average of prices charged to the Commonwealth for the bulk purchases made during each month.
- Price adjustments will only be paid if the variance from the Base Price is 5 percent or more for a monthly period.

For **Liquid Asphalt,**

- The Liquid Asphalt PEC is automatically executed if a project contains over 100 tons of hot mix asphalt (HMA), per MassDOT's Special Provision.[11, 12, 14]
- Price adjustment is based upon the variance between the Base Price and the Period Price. Adjustment occurs on a monthly basis.
- MassDOT determines the Period Price using the average selling price per standard ton as listed in the "*East Coast Market – New England, Boston, Massachusetts area*" of the

"*Asphalt Weekly Monitor*". MassDOT updates the period price within two (2) business days of receipt of the relevant issue of the "*Asphalt Weekly Monitor*".

- Price adjustments will only be paid if the variance from the Base Price is 5 percent or more for a monthly period.
- The adjustment applies only to the actual virgin liquid asphalt content in the mixture placed on the job, per MassDOT's Special Provision.

For **Portland Cement,**

- The Portland PEC is automatically executed if a project contains over 100 cubic yards of Portland cement concrete, per MassDOT's Special Provision.[11, 12, 15]
- Price adjustment is based upon the variance between the Base Price and the Period Price. Adjustment occurs on a monthly basis.
- MassDOT determines the Period Price using the latest published price, in dollars per ton for Type I Portland cement as listed in the "*Construction Economics Section*" of *Engineering News-Record Magazine (ENR)*.[16] MassDOT updates the period price on the Wednesday immediately following the publishing of the monthly price in ENR.
- Price adjustments will only be paid if the variance from the Base Price is 5 percent or more for a monthly period.
- The adjustment applies only to the actual Portland cement content in the mixture placed on the job, per MassDOT's Special Provision.

For **Steel,**

- The steel PEC is automatically executed for the eligible covered items listed in MassDOT's Steel and Reinforcing Steel Price Special Provision.[11, 12, 17]
- Price adjustments will only be paid if the variance from the Base Price to the Period Price is 5 percent or more for a monthly period.
- The Base Price is as indicated in a table developed by MassDOT and is included in each new contract. The table is updated monthly. The Period Price is determined using a combination of the Period Price Date (the date the steel was delivered to the fabricator as evidenced by an official bill) and the *Producer Price Index (PPI) for Semifinished Steel Mill Products, Not Seasonally Adjusted (WPU 101702),*[18] developed by the US Department of Labor, Bureau of Labor Statistics.
- Price adjustment for steel and reinforcing steel is only for the unfabricated structural steel and reinforcing steel on a project.
- The weight of steel subject to this PEC shall not exceed the final shipping weight of the fabricated part by more than 10 percent.

New York State Department of Transportation (NYSDOT)

NYSDOT has developed a price adjustment special provision for steel/iron for use as a pilot in select DB contracts. To exercise this provision, the contractor must complete *Form PA Steel/Iron Price Adjustment Declaration Form*, opting-in to some or all of the price adjusted features listed on the form (e.g. Stainless Steel Bar Reinforcement for Structures, Epoxy-Coated Bar Reinforcement for Structures, Structural Steel). The form must be submitted by the contractor with their price proposal, at which point all opt-in material price adjustments will apply for the duration of the contract, regardless of price index increases or decreases (i.e. the contractor cannot opt-in or opt-out of the price adjustments after the price proposal submission). NYSDOT also noted that the DB contractor's Release for Construction (RFC) plans must clearly indicate the quantities for the materials that are subject to a price adjustment, and that the contractor must submit monthly invoices and track quantities to account for all materials eligible for price adjustments.

This price adjustment special provision specifies that NYSDOT will calculate price adjustments based on the *Producer Price Index (PPI) for Semifinished Steel Mill Products, Not Seasonally Adjusted (WPU 101702)*,[18] which is published by the U.S. Department of Labor Bureau of Labor Statistics. Each month, NYSDOT will provide an average steel cost basis (CB) value and steel index value in its Engineering Bulletin entitled *Fuel, Asphalt and Steel Price Adjustments* (cost basis value refers to the average price of steel products, expressed in dollars per ton, used solely as a cost basis from which to compute steel/iron price adjustment).[19] NYSDOT will compare the contractor invoice month's steel index value (the *Monthly Steel Index*) to the steel index value that was valid when the contractor submitted their proposal and Form PA (the *Benchmark Steel Index*). If the monthly steel index increases more than 5 percent over the benchmark steel index, NYSDOT will pay the contractor an adjustment for eligible materials that were invoiced that month. Conversely, if the monthly steel index decreases more than 5 percent under the benchmark steel index, the contractor is responsible for crediting NYSDOT with an adjustment for that month's invoiced eligible materials.

The payments and credits are completed in accordance with the requirements of NYSDOT *Item 800.16000120 – Steel/Iron Price Adjustment*. NYSDOT also clarifies that there is a maximum steel/iron price adjustment, listed on a *Form SP* for *Item 800.16000120*, for the contract for all materials that the contractor opts-in for on *Form PA*. The net sum of payments and credits cannot exceed the amount identified for this item.

North Carolina Department of Transportation (NCDOT)

NCDOT allows PECs for asphalt cement, fuel, and permanent steel components incorporated into its DB projects. All price adjustments and guidance for NCDOT's construction contracts can be found in the agency's publication of *Standard Specifications for Roads and Structures*, which

was recently updated and published in January 2024.[20] This publication also explains in detail how prices and adjustments are calculated.

At least once each month, the NCDOT engineer prepares monthly progress estimates based on work progress and cost of materials during that period. These progress estimates determine the approximate partial payments each month. These payments are subject to correction in the final estimate and payment upon the end of the contract. The engineer may process two partial payments if they determine that the amount of work performed is sufficient to warrant such payment.

For **Asphalt**,

- NCDOT automatically applies the PEC to both DB and DBB projects, per Standard Specification Section 620 of *Standard Specifications for Roads and Structures*. Most contracts with asphalt line items are eligible for this provision.
- Price adjustments for each grade of asphalt binder are made according to fluctuations in the monthly average terminal Freight on Board (FOB) Selling Price of asphalt binder Grade PG 64-22 in relation to the Base Index Price contained in the contract.[20, 21] The average for the fuel adjustment is calculated using the average on the first day of the month in which the partial payment period ends. The monthly selling price of asphalt binder is calculated using the first business day of the calendar month during which the last day of the partial period occurs.
- The Asphalt Price used to calculate all asphalt mix types price adjustments is $40.00 per theoretical ton.

For **Fuel**,

- Contractors may opt-into the PEC for DB projects, but for standard DBB projects, it is automatically incorporated by Standard Specification, per Article 109-8. To participate in the PEC, the contractor must declare that they intend to participate at the time of price proposal submission.
- Price adjustments are made according to fluctuations in the average terminal price in relation to the Base Index Price contained in the contract, where the average terminal price is the average of the FOB price for diesel fuel at the terminals in Charlotte, Wilmington, and Selma, North Carolina.[20, 21] The average terminal price for the fuel adjustment is calculated using the average on the first day of the month in which the partial payment period ends.
  - NCDOT's 2024 Specifications and Special Provisions SP1-G43 details pay items that are eligible for fuel price adjustments if they are included in the contract, including asphalt items that have been listed in the pay items chart as eligible for fuel adjustments.[6]

For **Steel**,

- Contractors may opt-in to the PEC as long as they declare that they intend to participate at the time of price proposal submission.
- Contractors may opt-in to the clause for both DB and DBB projects as long as they provide the *SPA-1DB Form* listing the steel material or steel products they would like to have a price adjustment calculated. Whereas DBB contracts allow up to 14 days after bid to submit the *SPA-1 Form* with bond information, DB contracts require the SPA-1DB form at the time of the price proposal submission.
- NCDOT determines adjustments to the Monthly Index (MI) and the Bidding Index (BI) indices using a blend of proprietary monthly average prices from Fastmarkets,[22] where the MI uses adjustment indices from the month that steel was shipped from the producing mill, received on the project, or member cast; and the BI uses adjustment indices as listed in the Final Request for Proposal.[22] The *Product Relationship Table* for the Steel Price Adjustment SP-01 G047 details that adjustment date to be used for eligible steel products.[6]
- Price adjustments are based on the percentage of change in the index value listed in the Final Request for Proposals, including all Addenda, BI, and MI. The formula for calculating this adjustment can also be found in the Steel Price Adjustment SP-01 G047. However, calculations for the price adjustment are separate from the monthly progress estimate and will not be included in the total cost of work when it comes to determining the project progress or for an extension of the contract time.
- NCDOT's list of standard items eligible for the PEC can be found on the agency's Central Letting Resources.[23] Nuts, bolts, anchor bolts, rebar chairs, connecting bands, and other miscellaneous hardware associated with these items are not eligible for price adjustments.

Texas Department of Transportation (TxDOT)

Banding Approach

TxDOT's PEC approach for its I-35 NEX South Project provided price protection to both contractors and TxDOT in the event construction cost volatility occurred above or below normally expected values. The PEC was developed as a banding approach so that both TxDOT and the contractor share in potential construction cost volatility. During the window of protection, TxDOT would increase the DB price if the national Engineering News-Record Construction Cost Index (ENR CCI)[24] increases more than 4 percent per annum (with an 8 percent upper limit). A price decrease is triggered if the ENR CCI increases less than 1 percent per annum (with a -1 percent lower limit).[7] Price adjustments apply to construction costs that are defined by the bid form and are limited to the lesser of the construction cost on the form or 70 percent of the DB price. The price is not adjusted under what is considered "normal" market movements, which is an ENR CCI increase above 1 percent or less than 4 percent per annum.

Duration of Protection

TxDOT's PEC approach provided price protection for the period between proposal submission and 120 days following execution of a Notice to Proceed 1, or NTP1, which is a written notice from TxDOT to a design-build contractor authorizing commencement of specific work activities. NTP1 may be issued concurrently with contract execution. Based upon historical timeframes, this protection period would provide between 240 to 300 days of protection, including coverage for the timeframe after contract execution and before construction.[7] Since DB contracts are executed based on 30 percent design, when the required quantities of materials are still uncertain, the additional 120 days gives contractors a reasonable amount of time to progress with contracting for materials and subcontracts.

Indices to Measure Price Adjustment

TxDOT utilized ENR CCI[24] to measure market price volatility, which TxDOT has been using in its DB program since 2009. Because ENR CCI captures monthly average prices for cement, lumber, structural steel, and labor across 20 US cities, it better represents and reflects the national overall market changes compared to local indices that are specific to certain materials used in construction. Moreover, by using a broad-based materials index, price escalation calculations would not be significantly impacted by the volatile pricing for any one eligible pay item.

Virginia Department of Transportation (VDOT)

In general, VDOT utilizes a market-based process to determine fluctuations in prices, either through national, public construction indices or through a targeted scan of suppliers for regional items. While this approach is generally acceptable for larger ticket items, VDOT recognizes that specialty items are sometimes not adequately captured. An overview of VDOT's PEC provisions are as follows:

For **Fuel**,

- A list of eligible fuel items is outlined in VDOT's Special Provisions for Fuel Adjustment.[25]
- A public index (*U.S. Department of Energy, Energy Information Administration, U.S. On-Highway Diesel Fuel Prices, Lower Atlantic*), is used to define price escalation or de-escalation.[26]
- Values in dollars per gallon for the base index as well as the current index are provided on VDOT's website. The base index price is calculated using the data from the month preceding receipt of bids. The current index price is calculated using the data from the month preceding the particular estimate being vouchered for payment.[27]
- VDOT stipulates that the fuel PEC must be exercised within 21 days from letting notification of award. Contract execution occurs 60 days after letting. Bidders are required to submit

specific forms, identifying the eligible items they want to submit adjustments for prior to contract execution.[28]

For **Asphalt**,

- Similar to the fuel adjustment, a list of eligible items related to asphalt adjustment are outlined in VDOT's Special Provision for Asphalt Adjustment.
- VDOT does not utilize an index to capture fluctuating prices for asphalt. Instead, VDOT conducts a scan of geographically separated asphalt suppliers in the region and uses a market-based analysis to average the expected costs to determine the appropriate adjustment for the PEC. Analysis results are then retained as historical data. The average state-wide prices in dollars per ton are published on VDOT's website.[27] VDOT collects terminal prices from approximately 12 terminals each month prior to updating the published values.
- All bidders are automatically enrolled in VDOT's Asphalt PEC.

For **Steel**,

- Similar to the fuel and asphalt adjustment, a list of eligible items related to steel adjustment are outlined in VDOT's Special Provisions.
- VDOT uses the *US Department of Labor, Bureau of Labor and Statistics Producers Price Index* for capturing fluctuations in steel prices.[18]
- Price adjustment for steel products is capped at a 60 percent increase or 60 percent decrease of the cost of steel items based on the PPI values at the time adjustment is being considered and the average weighted price of steel from the contractor's proposal.
- Similarly to fuel adjustment, VDOT stipulates that the steel PEC must be exercised within 21 days from letting notification of award. Contract execution occurs 60 days after letting. Bidders are required by VDOT to submit specific forms, identifying the eligible items they want to submit adjustments for prior to contract execution.
- For steel adjustment, VDOT requires that steel be ordered within 30 days of execution and that the contractor provides proof of payment showing actual price paid vs. the price at bid, otherwise the contractor is no longer eligible for adjustment on eligible steel items. If the contractor follows through on the required documentation, VDOT pays the difference between the actual price and price at bid.

Results

The results discussed herein refer to each State DOT's experience with implementing a PEC in its DB contracts. Due to every State's unique circumstance and priority, the frequency of PEC usage, any observable advantages and disadvantages, contractors' reception, and success in risk mitigation may differ according to the State's context.

Florida Department of Transportation (FDOT)

FDOT uses PECs on all construction contracts (DB, DBB, and others). As of February 23, 2024, there are 665 active construction contracts, 62 of which are DB contracts. The frequency of PEC use reflects FDOT's view that they are advantageous to include within all construction contracts, as the potential for price adjustments based on price increases and decreases allows both FDOT and contractors to share the risk associated with price fluctuations in fuel and bituminous material costs. Contractors are also encouraged to provide better bid prices with this lower risk, such that FDOT receives a more favorable cost for construction services.

While FDOT did not cite any distinct disadvantages to using PECs (other than the extra bit of effort to get rack prices each month), it did note that there has been some pushback from contractors when the price of fuel or bituminous concrete decreases relative to the prices at bid, since contractors would then be responsible for crediting FDOT with the cost difference (subject to provision specifications). However, FDOT cited that these PECs were still received well by contractors, as there was a shared need and desire between FDOT and the transportation industry to develop the PEC process and implement these specifications. Further, no specific negative impacts to the crediting process or associated State-industry relationships were identified.

Massachusetts Department of Transportation (MassDOT)

MassDOT has used PECs on every DB project since 2010. They reiterated that the PECs are structured to give both the Commonwealth and the contractor a chance at a fair and equitable price.

MassDOT uses a combination of internal milestone cost estimates and independent third-party cost estimates to evaluate the escalation or de-escalation throughout the project lifecycle. This approach ensures that MassDOT is using realistic values that are compared directly to an independent third-party and lends credibility to their stance on fair and equitable pricing. MassDOT stated that they have not noticed tangible disadvantages to its implementation, and that they have seen a largely neutral or positive reception.

New York State Department of Transportation (NYSDOT)

Due to the recent and limited nature of their PEC applications on DB contracts (only one DB contract is actively utilizing a price adjustment provision as of December 2023), NYSDOT does not yet have concrete results from their pilot efforts. NYSDOT cited a need to analyze the relationship between projects where contractors opted in versus opted out, with the hope that opting in to the steel/iron price adjustments lowers the financial risk for contractors and provides a more level playing field between larger and smaller contractors. NYSDOT was also curious to determine if larger contractors would continue to opt out since they tend to have more control over how and when they can make their material purchases.

NYSDOT indicated that their local transportation industry is receptive to PECs on DB contracts in concept. Contractors attempt to forecast market trajectories, and if there is uncertainty with these trajectories, they are more likely to opt-in to the price adjustment provision. Larger contractors tend to have greater financial means. When materials pricing drops, these contractors could potentially see a financial benefit to locking in higher steel/iron pricing. Smaller contractors may see the benefit of financial protection by opting in, since they would be reimbursed after price indices exceeded 5 percent of their baseline indices.

North Carolina Department of Transportation (NCDOT)

NCDOT noted that the inclusion of a PEC in its DB projects did not affect the number of potential bids. However, it is likely that bidders are responding with more competitive prices in their proposal since they do not have to include large contingencies to limit their own risks. NCDOT also shared that because a PEC for fuel and asphalt has been available to DB projects for so long, this provision is now standard and well received by both large and small contractors.

Because NCDOT only recently introduced a PEC for steel, the provision has not gained traction with contractors. NCDOT has also found that contractors are more hesitant to opt-in to the steel PEC compared to other materials mainly due to what is viewed as burdensome paperwork and tracking materials back to the mill source. NCDOT has overseen a few contracts with steel provisions to date and plans to review the results from those contracts to make any necessary changes. It is also looking into expanding the list of items eligible for steel price adjustments.

Texas Department of Transportation (TxDOT)

At the time of the interview, TxDOT only had experience employing a PEC on its I-35 NEX South DB Project. However, it is currently working through the process to determine if this clause will be programmatic. After introducing a PEC to this project in 2023, TxDOT retained three shortlisted proposers, received three quality proposals, and was able to award a contract to a bid whose DB price came in $110 million under the agency's estimates and budget. Positive feedback and reception from proposers indicate that many would not have submitted a bid if they had to build large contingencies into their cost estimates to absorb risks.

The incorporation of a PEC served as a safety net that allowed prospective contractors to submit more realistic bids that better reflected true costs. Moreover, because prices were blinded, they did not affect each proposer's technical score in the best value determination. Overall, because the PEC mitigates financial risks for both the State DOT and project contractors, TxDOT did not receive any pushback on its inclusion in the final contract.

Virginia Department of Transportation (VDOT)

PECs are eligible for every VDOT project. While VDOT does not have definitive data on the execution of PECs, it was noted during the interview process that execution of the steel PEC is

low. Execution of VDOT's steel PEC requires contractors to purchase steel products far earlier in the process than is typical for steel construction. Given the tight deadlines associated with the execution of the steel PEC and the timeframe for purchasing the steel products, VDOT stated that contractors in the area usually opt out of this PEC. However, VDOT noted that contractors tend to opt-in to the fuel PEC if the project is expected to have high fuel consumption. The asphalt PEC is automatically applied to every project.

VDOT noted that even during periods of high price volatility, such as the COVID-19 pandemic, they did not see an appreciable difference in the quantity or make-up of the contractor pool that typically bid on projects in the area. Prior to the COVID-19 pandemic, VDOT's DB contracts did not typically include a steel PEC. However, it has become more common since.

Takeaways

The final takeaways include each State DOT's lessons learned and recommendations for other State agencies that are looking to develop their own PEC. These recommendations offer different approaches to developing a new PEC, as well as highlight the value of cross-collaboration and stakeholder buy-in. A more detailed list of takeaways, arranged by interview question, is found in Appendix B – Interview Takeaways Summary**.**

Florida Department of Transportation (FDOT)

FDOT offered lessons learned that other agencies planning to use PECs on DB construction contracts should consider. It stated that an agency's use of PECs will depend on how that State's DB projects are structured. FDOT ties all fuel and bituminous material adjustments to eligible pay items with individual factors. Since DB contracts are paid as lump sum contracts (with no pay items), contractors are required to certify the number of gallons (for fuel and bituminous materials) used on the contract during each monthly estimate period, based on the contract Schedule of Values (which are descriptions of pay items). If other States wish to develop PECs similar to FDOT's, processes such as this would need to be created for adjustment consistency between contract types.

Massachusetts Department of Transportation (MassDOT)

MassDOT continuously emphasized the importance of fair and equitable price adjustments throughout the lifecycle of the project. It was noted that one of the most important considerations in implementing a PEC for MassDOT is to have defined quantity control processes in place. Not only does the contractor need to track materials appropriately, but the State DOT needs to as well. MassDOT emphasized that there needs to be consensus between the State DOT and the contractor about the quantity of materials used, otherwise there is not a way to substantiate requests for adjustment.

New York State Department of Transportation (NYSDOT)

Due to the recent and limited nature of their PEC applications on DB contracts (only one DB contract is actively utilizing a price adjustment provision as of December 2023), NYSDOT's lessons learned from their pilot effort have not yet been fully developed.

North Carolina Department of Transportation (NCDOT)

Because NCDOT has been using PEC for fuel and asphalt since as far back as the 1980s, its biggest lessons are most salient for the recently developed steel provision. The agency found that the greatest advantage to the steel PEC is that they have been able to mitigate risks for their DB projects, since the contractor would not have to include those risks in their bidding prices. The agency recommends that other States looking to develop their own PEC secure buy-in with the industry and work collaboratively to develop the provision. Additionally, it would be helpful to have regular meetings with the industry, using those opportunities to identify issues that States can resolve.

Texas Department of Transportation (TxDOT)

For other States that are interested in developing a PEC for their DB contracts, TxDOT recommended that agencies start their dialogue with their FHWA Division Office early on. This will help with developing the language and application of the PEC. For example, TxDOT initially did not cap the amount of allowable escalation. However, after consulting with FHWA, the price escalation for the I-35 NEX South Project was capped at a -1% and 8% movements per annum in the ENR CCI.

Additionally, TxDOT recommends that States tie the PEC timeframe to a fixed date such as contract execution, rather than to a variable date such as NTP1. NTP1 issuance may be subject to certain delays, but contractors still have the ability to begin executing agreements and locking in prices with subcontractors and material suppliers after contract execution. Therefore, rather than tying the clause execution to NTP1, it is suggested that it be tied to contract execution.

Even though its PEC was successful and well received, TxDOT did experience confusion from some bidders about the implementation of the provision. After developing the clause language and before contractors submit their bids, it is important to make sure that prospective bidders understand and correctly interpret how the PEC is applied to their contract and, in TxDOT's case, that any payout associated with rising or falling prices can go in either direction. Additionally, utilizing a PEC opt-out option can be beneficial to certain contractors who are uncomfortable with the PEC provisions. For ease of implementation, TxDOT also recommended that other States investigate a broad index-based approach rather than a materials-based index that will require regular measurements of quantities.

Virginia Department of Transportation (VDOT)

VDOT emphasized the importance of keeping PEC development and execution as simple as possible. It was noted that PEC execution is intended to mitigate risk, and that if the use of the PEC is not simplified, then the contractor may not consider the level of effort required worth the savings. VDOT suggested that other agencies seeking to implement PECs in DB contracts use a singular index for an entire pay item group to simplify management and tracking. VDOT stressed that when State DOTs attempt to implement PECs for multiple commodities at a singular item level, it becomes too cumbersome to manage and effectively execute.

Conclusion

To support State DOTs that are seeking to develop their own PECs on DB contracts, FHWA HICP, in partnership with Volpe, studied and interviewed six State DOTs with varying levels of experience implementing a price escalation clause, including Florida (FDOT), Massachusetts (MassDOT), New York (NYSDOT), Texas (TxDOT), and Virginia (VDOT). These DOTs provide a selective representation of PEC application in the context of various project sizes, project budgets, geographies, approaches, and experience levels. This diversity was exhibited in the interview responses, which were organized under the following themes: **Approach, Application, Results**, and **Takeaways**. In general, State DOTs did not share as many similarities as they did differences. The divergent interview responses reflect each State DOT's unique experience with PECs and the recommendations each offered for other States considering PEC implementation on DB contracts.

For their **Approach**, all State DOTs reported that they either consulted or collaborated with their FHWA Division Office, contractors, consultants, or the transportation industry while they were researching and developing their PECs. Similarly, most State DOTs developed their provisions with the intention of mitigating contractor and State DOT cost risks to secure more competitively priced proposals. Interviews with representatives from each State DOT highlighted the need for a tailored approach depending on the State DOT's program administration, project delivery system, project size, and preferences. For example, while some State DOTs shared that their PEC provision is the same between DB and DBB contracts, others use PECs that are specific to each contracting vehicle.

The greatest divergence in responses pertains to how State DOTs execute their PECs in DB contracts**.** Due to the diverse methods of **Application**, this Summary Report is only able to review each State DOT's practice as an example of how to implement PECs. For example, while one State DOT may have over 30 years of experience with PECs, another is only recently piloting their provision; while one State DOT may apply their PEC to the total construction cost, another requires contractors to opt-in and itemize the quantities of each material that are eligible

for a price adjustment. The stakeholder interviews illustrate a spectrum of experiences and approaches that reflects each State DOT's unique project delivery program.

However, despite their disparate approaches and applications, State DOTs that have completed DB projects with PECs have similar **Results**. State DOTs reported that the primary advantage they have observed is more quality bids with competitive budgets because a PEC can be designed to protect both the State DOT and the contractor against risks associated with market volatility. In the case of TxDOT, the agency was able to secure a contract that came in approximately $110M under budget since the contractor did not need to add large contingencies to their project costs. Moreover, all State DOTs shared that contractors and industry groups in their respective States have been receptive of a price adjustment provision. This positive feedback has inspired some State DOTs to consider expanding their PEC eligibility or officially incorporating it into their DB program after their pilot program.

The major **Takeaways** from the stakeholder interviews demonstrate that all State DOTs interviewed have recommendations and lessons that they want to share, despite their differing experience level with PEC in DB contracts. The primary lesson that some State DOTs highlighted was communication—it is important to clearly communicate with contractors early on so that everybody understands what the PEC entails and how it is a protective provision for both the bidder and the State DOT. Other State DOTs stressed the importance of simplicity after reflecting that a new PEC may require additional administrative work that may be too burdensome for contractors and the State DOT's field engineers.

The six State DOTs in this Summary Report represent only a limited number of agencies. While agencies such as NYSDOT, TxDOT, and NCDOT are still evaluating the results of their latest projects, this report may serve as a helpful resource for agencies considering full implementation of a PEC into DB contracts.

References

1. Massachusetts Department of Transportation. “Guide to Estimating Highway Projects.” www.mass.gov, 2023. https://www.mass.gov/doc/guide-to-estimating-highway-projects.

2. New York State Department of Transportation. “I-81 Viaduct Project - Phase 1, Contract 2, Request for Proposals,” 2022. https://www.dot.ny.gov/main/business-center/designbuildproject56/repository/D900056%20-%20ITP%20-%20General%20Instructions%20-%20CONFORMED.pdf.

3. New York State Department of Transportation. “NYSDOT Design Build Projects D900056 - I-81 Viaduct - Phase 1, Contract 2.” New York State Department of Transportation, 2023. https://www.dot.ny.gov/main/business-center/designbuildproject56.

4. New York State Department of Transportation. “Item 800.16000120 – Design-Build – Steel/Iron Price Adjustment.” Accessed March 15, 2024. https://www.dot.ny.gov/spec-repository-us/800.16000120.pdf.

5. North Carolina Department of Transportation. “Steel Price Adjustment Special Provision and Guidance.” *Connect NCDOT*, August 4, 2022. https://connect.ncdot.gov/resources/Specifications/APA%20Documents/Steel%20Price%20Adjustments%208-4-2022.pdf.

6. North Carolina Department of Transportation. “2024 Specifications and Special Provisions.” connect.ncdot.gov. Accessed March 29, 2024. https://connect.ncdot.gov/resources/Specifications/Pages/2024-Specifications-and-Special-Provisions.aspx.

7. Texas Department of Transportation. “I-35 Northeast Expansion (NEX) from I-410 South to FM 1103.” www.txdot.gov. Accessed March 29, 2024. https://www.txdot.gov/projects/projects-studies/san-antonio/i35-nex-i410-south-fm1103.html.

8. Virginia Department of Transportation. *Design-Build Procurement Manual*, 2022. https://www.vdot.virginia.gov/media/vdotvirginiagov/doing-business/technical-guidance-and-support/technical-guidance-documents/alternative-project-delivery/DB_Procurement_Manual_Revised_March_2022_acc03072023_PM.pdf.

9. Florida Department of Transportation. “Fuel and Bituminous Average Price Index.” FDOT. Accessed March 26, 2024. https://www.fdot.gov/construction/fuel-bit/fuel-bit.shtm.

10. Florida Department of Transportation. “Fuel & Bituminous Forms.” FDOT. Accessed March 26, 2024. https://www.fdot.gov/construction/fuel-bit/fuelforms.shtm.

11. Massachusetts Department of Transportation. “MassDOT Current Contract Price Adjustments | Mass.gov.” www.mass.gov, 2024. https://www.mass.gov/info-details/massdot-current-contract-price-adjustments.

12. Massachusetts Department of Transportation. “MassDOT Special Provisions | Mass.gov.” ww https://www.mass.gov/info-details/massdot-special-provisions.

13. Massachusetts Department of Transportation. “Monthly Price Adjustment for Diesel Fuel and Gasoline,” 2009. https://www.mass.gov/doc/document-00812-english/download.

14. Massachusetts Department of Transportation. “Monthly Price Adjustment for Hot Mix Asphalt (HMA) Mixtures,” 2016. https://www.mass.gov/doc/document-00811-english-metric/download.

15. Massachusetts Department of Transportation. “Price Adjustment for Portland Cement Concrete Mixes,” 2009. https://www.mass.gov/doc/document-00814/download.

16. Engineering News-Record. “Construction Economics.” BNP Media, 2024. https://www.enr.com/topics/604-construction-economics.

17. Massachusetts Department of Transportation. “Price Adjustments for Structural Steel and Reinforcing Steel,” 2023. https://www.mass.gov/doc/document-00813-price-adjustments-for-structural-steel-and-reinforcing-steel/download.

18. United States Department of Labor. “Archived Producer Price Index Detailed Report Information: U.S. Bureau of Labor Statistics.” www.bls.gov. Accessed March 26, 2024. https://www.bls.gov/ppi/detailed-report/.

19. New York State Department of Transportation. “Fuel, Asphalt, & Steel Price Adjustments.” New York State Department of Transportation. Accessed March 26, 2024. https://www.dot.ny.gov/main/business-center/contractors/construction-division/fuel-asphalt-steel-price-adjustments.

20. North Carolina Department of Transportation. “Standard Specifications for Roads and Structures.” *Connect NCDOT*, January 2024. https://connect.ncdot.gov/resources/Specifications/2024StandardSpecifications/2024%20Standard%20Specifications%20for%20Roads%20and%20Structures.pdf.

21. North Carolina Department of Transportation. “Monthly Terminal Asphalt Binder & Fuel FOB Prices - Asphalt & Fuel Price Averages.” Ncdot.gov, 2024. https://connect.ncdot.gov/projects/construction/Lists/Monthly%20Terminal%20Asphalt%20Binder%20%20Fuel%20FOB%20Prices/Asphalt%20%20Fuel%20Price%20Averages.aspx.

22. Fastmarkets, 2024. https://www.fastmarkets.com..

23. North Carolina Department of Transportation. “Central Let Resources.” connect.ncdot.gov. Accessed March 29, 2024. https://connect.ncdot.gov/letting/Pages/Central-Letting-Resources.aspx.

24. Engineering News Record. “Construction Economics.” BNP Media, 2024. https://www.enr.com/economics.

25. Virginia Department of Transportation. “Optional Adjustment for Fuel,” 2005. https://www.vdot.virginia.gov/media/vdotvirginiagov/doing-business/technical-guidance-and-support/construction/adjustment-indices/Fuel_Adjustment_Spec.pdf.

26. U.S. Energy Information Administration. “Petroleum & Other Liquids.” Eia.gov. Accessed March 26, 2024. https://www.eia.gov/petroleum/gasdiesel/.

27. Virginia Department of Transportation. “Adjustment Indices | Virginia Department of Transportation.” www.vdot.virginia.gov, March 26, 2024. https://www.vdot.virginia.gov/doing-business/technical-guidance-and-support/construction/adjustment-indices/.

28. Virginia Department of Transportation. “Extranet Server - Forms Database.” vdotforms.vdot.virginia.gov. Accessed March 26, 2024. https://vdotforms.vdot.virginia.gov/SearchResults.aspx?strFormNumber=C-21B.

Appendix A – Interview Questions for State DOT Use of PECs on DB Contracts

Topic: Background and Overview

1. What contracting vehicles does your organization have experience with? Which type(s) do you use most often?
2. Can you tell us about your use of price escalation clauses on design-build construction contracts?
    a. How does this provision differ from those for design-bid-build contracts?
3. Why did you decide to or want to add PEC to your design-build construction contracts?
    a. If your organization currently does not use PEC in design-build contracts, is there a reason why?
4. How did your organization approach development of this provision?
    a. Were you involved with developing this clause?

Topic: Application

5. How did you define the clause parameters?
    a. What cost indices did you consider or use?
    b. What materials are eligible?
    c. Was there a time limit to exercise the clause?
6. What project parameters led you to consider using PEC? (size, length of time, etc.)
7. Did you consider market parameters when applying PEC (e.g., expected inflation, geographical differences)?
8. Were there any challenges in using a PEC?
9. Were these clauses used as a risk mitigation technique?

Topic: Results

10. How often has your PEC been applied to design-build construction contracts?
11. Have you noticed any advantages to allowing a PEC in design-build contracts?
    a. Have you noticed any disadvantages to using a PEC in design-build contracts?
12. How was a PEC received by project bidders, including designers and contractors?
13. Were there any findings or conclusions that changed the way your agency thinks about PEC and how they are applied to design-build construction contracts?
14. For those with multiple uses, are there changes or adaptations in the PEC use since the initial application?
15. Were these successful in addressing the uncertainty and risk in the project(s)?

Topic: Lessons Learned

16. What, in your experience, would be the biggest lesson learned throughout the development process of your PEC(s)?
17. What lessons learned would you want to share with other agencies who are planning to use PECs in their design-build construction contracts?
18. Do you have any materials or templates that you would like to share with us?

Appendix B – Interview Takeaways Summary

Interview Topic: Approach

1. **What contracting vehicles does your organization have experience with? Which type(s) do you use most often?**
    - All State DOTs have some experience with or use DB, though the extent of experience and frequency of use varies by State DOT.
    - VDOT has their own DB contract template, developed from a DBI template.
    - MassDOT tends to use DB for major projects.
    - NYSDOT has experience with DB contracts.
    - TxDOT has statutory authority for up to 6 DB projects per biennium, but isn't hitting that cap.
    - FDOT has significant experience with DB contracts. As of February 2024, 62 of FDOT's 665 active contracts are DB contracts.
    - NCDOT has experience with DB contracts.

2. **Can you tell us about your use of price escalation clauses on design-build construction contracts?**
    - All State DOTs have at least some experience incorporating PECs into DB contracts, but that experience ranges from just starting to pilot these clauses to widespread use. Some State DOTs (VDOT, NYSDOT, and FDOT) specifically mentioned that PECs in their DB contracts are the same or similar to that of their Design-Bid-Build (DBB) contracts.
    - VDOT uses the same or very similar PECs in DB as DBB.
    - MassDOT uses PECs frequently (including DB).
    - NYSDOT is piloting a PEC in a DB project, which includes provisions for steel adjustment.
    - TxDOT has only 1 project (I-35 San Antonio) using PECs so far. Implemented because by contract execution, profit margins disappeared due to escalations. Contractors didn't want to bid on these projects. TxDOT needed a relief procedure.
    - FDOT has significant experience using PECs on DB contracts, as FDOT requires them (contractor does not have a choice to opt in or out).
    - NCDOT uses PECs for asphalt, fuel, and steel components on DB contracts.

    a. **How does this provision differ from those for design-bid-build contracts?**
        - Some State DOTs specified that the PEC provision did not differ (or was at least substantially similar) between DB and DBB contracts, while others specified some differences.
        - For VDOT, the same clauses apply to both DB and DBB, though there are limitations where the adjustment can be made for DB (same contract verbiage, but when it can be executed is different).

- For NYSDOT, the clauses are opt-in for both DB and DBB. DB is opt-in based on proposal before award and DBB is post-award.
- For FDOT, the DB provision does not differ from DBB. In either case, PECs are a requirement.
- For NCDOT, there is no change for asphalt between DB and DBB, while there are differences for fuel and steel. For fuel, the contractor may opt in for an adjustment on DB (automatically included for DBB). For steel, a form must be submitted with the price proposal on DB (the bidder has 14 days after bid to submit the form on DBB).

3. **Why did you decide to or want to add PEC to your design-build construction contracts?**
   - Reasons for adding PECs to DB contracts varied significantly by State.
   - MassDOT wanted to implement more equitable pricing for both the State DOT and contractor.
   - NYSDOT was responding to feedback from the industry, the NY State Executive, and State legislation.
   - TxDOT was in response to the events in 2021 (profit margins disappeared due to price escalations) and contractors were unwilling to bid without a protective clause.
   - FDOT uses PECs for risk reduction purposes, where the aim is for the contractor to provide a better bid price if the risk is reduced through PECs.
   - NCDOT wanted to have risks shared between NCDOT and the contractor, and hopefully receive better bid prices for projects.

   a. **If your organization currently does not use PEC in design-build contracts, is there a reason why?**
      - All States use PEC in DB contracts to some degree, though NYSDOT is only in the piloting stage.
      - NYSDOT noted that adjustments in DBB cannot be applied to DB because fuel adjustments are quantities based, and DB does not provide quantities. NYSDOT also felt that risk mitigation is the responsibility of the bidder. With PEC, there is no longer an incentive to mitigate risk.
      - NYSDOT is waiting to review the results from a pilot program.

4. **How did your organization approach development of this provision?**
   - State DOTs which provided a specific response all indicated that they sought guidance, discussion, or assistance from FHWA, contractors, consultants, and the transportation industry when developing a PEC provision.
   - MassDOT contracted with consultants to advise.
   - NYSDOT discussed with FHWA how PEC clauses were being used and adapted existing DBB provisions to avoid "reinventing the wheel." The agency then developed a pilot program to test out their DB provisions.
   - TxDOT conducted internal research (with financial advisers and a provisioner) and worked with their FHWA Division Office to craft their PEC language. TxDOT also conducted a study to determine the best index to use.

- FDOT partnered with the transportation industry to develop PECs to meet their needs, protecting both from unanticipated fuel and bituminous price fluctuations.
- NCDOT worked with their Industry Work Group and examined other States' provisions.

Interview Topic: Application

5. How did you define the clause parameters?

- Clause parameters were defined differently based on the State. Commodities subject to PECs included some combination of steel, concrete, fuel, petroleum, diesel, gasoline, asphalt, and bituminous materials.
- VDOT's parameters are outlined in the special provisions they use. For example, steel adjustment is limited based on the original quantity of steel; fuel and asphalt require the contractor to elect which work items are available for adjustment, within the first 20 days of the contract; the design builder has to elect-in based on quantities in their proposal, to determine eligibility.
- NYSDOT specified a draw down item with a maximum dollar amount associated.
- TxDOT specified that clause parameters are research based, with FHWA involvement, and tied to ENR construction cost index.
- FDOT worked with its transportation industry to establish clause parameters.

a. What cost indices did you consider or use?

- Cost indices used varied significantly by State DOT, with some tying commodities to a national or public index, scanning regional supplier costs, reviewing internal cost estimating manuals, or making price comparisons at time of bid versus invoice period.
- VDOT uses national index for steel, public index for fuel, and regional supplier costs for asphalt.
- MassDOT uses an internal Cost Estimating Guide Manual, which accounts for fluctuations in the market and industry.
- NYSDOT uses price at time of bid and compares it to the month that supplier invoiced material. Based on Bureau of Statistics data.
- TxDOT uses Engineering News Record Construction Cost Index (broad index to avoid localized spikes on a specific material).
- FDOT uses terminal (rack) prices from across Florida for fuel and bituminous materials. These prices are averaged to get monthly indices.
- NCDOT uses average monthly terminal prices for asphalt, average reported terminal prices by specification for fuel, and Fastmarkets for steel.

b. Was there a time limit to exercise the clause?

- Some State DOTs have no time limit to exercise a clause, while others prescribe specific limits, which could vary based on the commodity. There are also differences about whether contractors need to opt in for these clauses or not.
- VDOT's time limit and the need to opt in varies by commodity (steel and fuel is 21 days from letting of notification of award; for asphalt, everyone is automatically enrolled).
- MassDOT has no time limit to exercise the clause.
- TxDOT allows within 120 days after contract execution. TxDOT opted contractors in this past round due to their support, but an opt out option may be possible in the future based on lessons learned.
- NYSDOT allows monthly credits based on price index for that month.
- FDOT's construction projects would all receive fuel and bituminous adjustments if the contract met specification criteria. There is no choice to opt in or out.
- NCDOT requires the bidder to declare if they are participating at the time of price proposal submission.

6. What project parameters led you to consider using PEC? (size, length of time, etc.)

- At least one State DOT (MassDOT) mentioned that the scope complexity and schedule of a project led them to using PECs.
- NCDOT uses PECs for asphalt on most contracts with asphalt line items, for fuel when the fuel adjustment provision is included in the contract, and for steel when the steel adjustment special provision is included (12-month duration or longer, with significant steel items).

a. Eligible materials

- While there were some overlaps between materials considered for most State DOTs, there were some differences too.
- VDOT: fuel, steel, asphalt
- MassDOT: steel, concrete, petroleum related materials, diesels, gas
- NYSDOT: steel
- TxDOT: PEC applied to total construction cost (not material specific)
- FDOT: fuel and bituminous materials
- NCDOT: fuel, steel, asphalt

7. Did you consider market parameters when applying PEC (e.g., expected inflation, geographical differences)?

- Most State DOTs considered some combination of supplier geography, project location, and inflation.
- VDOT considered supplier geography.
- MassDOT and TxDOT considered inflation, while MassDOT also mentioned project location.
- FDOT averages prices from across Florida to mitigate differences in pricing for fuel and bituminous materials due to geographical area.

8. **Were there any challenges in using a PEC?**
    - For MassDOT, one contractor questioned whether a PEC was even applicable and didn't want it.
    - For NCDOT, some contractors are still reluctant to use the steel price adjustment because of the paperwork required.

9. **Were these clauses used as a risk mitigation technique?**
    - Yes, overall. PECs are seen as a risk mitigation technique.

Interview Topic: Results

10. **How often has your PEC been applied to design-build construction contracts?**
    - The frequency of PEC application to DB contracts varies by State.
    - VDOT: PEC is eligible on every project.
    - MassDOT: every DB project since 2010.
    - NYSDOT: waiting for pilot results to determine future use.
    - TxDOT: I-35 NEX South project was a one-time solution, but PEC is being considered for inclusion in future projects.
    - FDOT: PEC is included in all construction contracts.
    - NCDOT: fuel and asphalt PECs are included in most DB contracts, while steel PECs have only been used on a limited number of projects.

11. **Have you noticed any advantages to allowing a PEC in design-build contracts?**
    - State DOT responses ranged from needing more information to assess, to seeing a huge advantage in allowing PECs in DB contracts.
    - MassDOT: benefits to both State DOT and contractor.
    - NYSDOT: would need to do a comparison between opt-in and opt-out to compare data, but hoping that results will show risk reduction.
    - TxDOT saw a huge advantage because they were able to save $110M and secure a bidder that otherwise would have dropped out due to risk. Bids that have to bake risk into them were coming in above State DOT estimates.
    - FDOT: price adjustments provide risk mitigation for all construction contracts.
    - NCDOT: better likelihood of more favorable bid prices.

    a. **Have you noticed any disadvantages to using a PEC in design-build contracts?**
        - State DOTs have either not seen any disadvantages or are still waiting for pilot results to make a comparison (NYSDOT).

12. **How was a PEC received by project bidders, including designers and contractors?**
    - State DOTs indicated that bidders are either used to PECs, view them favorably, or both.
    - NYSDOT mentioned that smaller contractors may like the protection that PECs offer.

- TxDOT indicated that PECs were seen favorably by their shortlisted DB contractors, but speculated that select players are less fond of it because they are also usually material suppliers. PECs level the playing field and reduce their competitive edge.
- FDOT stated there was a need across the board, so PECs were received well.

13. Were there any findings or conclusions that changed the way your agency thinks about PEC and how they are applied to design-build construction contracts?

- MassDOT and FDOT said there was nothing that changed their thinking, and NYSDOT is still waiting on pilot results to make a determination on how it proceeds.
- NCDOT is considering expanding the list of eligible pay items for steel of its PECs, now that a few contracts have utilized the steel provisions.

14. For those with multiple uses, are there changes or adaptations in the PEC use since the initial application?

- Responses and details to this question were limited, but MassDOT mentioned it just made updates within the last year.

15. Were these successful in addressing the uncertainty and risk in the project(s)?

- Overall, yes. NYSDOT is waiting for pilot results.

<u>Interview Topic: Takeaways</u>

16. What, in your experience, would be the biggest lesson learned throughout the development process of your PEC(s)?

- State DOT answers varied from keeping things simple, watching what contractor says, determining if the PEC provision should be optional or opt-in, to no major lesson due to similarities with PECs in other contract vehicles.
- VDOT: keep it simple and use one index for a pay group rather than singular items.
- MassDOT: district engineers would know better about lessons learned.
- NYSDOT: there were a lot of complaints about lack of fuel adjustments. There is also additional burden on PM team in the field to identify and confirm weight.
- TxDOT: make sure that all parties understand how the provision works and that it goes both ways.
- FDOT: no major lessons, because FDOT had been using PECs on DBB Lump Sum contracts, where there was a schedule of values. When FDOT used PECs on DB contracts, it used a similar strategy, but on a larger scale.

17. What lessons learned would you want to share with other agencies who are planning to use PECs in their design-build construction contracts?

- VDOT: keep it simple and use one index for a pay group rather than singular items.
- MassDOT: quantity control is important to make sure that the contractor is compensated correctly.
- NYSDOT: having a special provision and spec specific to DB. Be as specific as possible to avoid exploitation.
- TxDOT: start dialogue early with FHWA partners and Division Office. Tie clause executive to a milestone to target highest risk timeframes for proposers from when they turn in their bid. Look at a banded approach with capped risks for both State DOT and proposer and broad index-based approach on DB.
- FDOT: if using the same schedule of values for each contract type, one can apply PECs to DB contracts fairly easily.
- NCDOT: there is a significant level of paperwork initially.

18. Do you have any materials or templates that you would like to share with us?

- VDOT: PEC index on website
- NYSDOT: list of DB projects on website
- TxDOT: white paper and AASHTO presentation
- MassDOT: cost estimating guide
- FDOT: PEC index, contractor certification of fuel and bituminous materials, and list of pay items on website
- NCDOT: price adjustments for asphalt and steel

Appendix C – NYSDOT: Form PA – Steel/Iron Price Adjustment Declaration Form

The following Steel/Iron Price Adjustment Declaration Form is offered as an example of how a State DOT might allow a contractor to opt-in to an adjustment for materials used in construction.

FORM PA

STEEL/IRON PRICE ADJUSTMENT DECLARATION FORM

(To be submitted with Volume 1 of Proposal)

Price Adjusted Feature	**Features/Locations**	**Opt-In? (yes or no)**
Material Spec 709-13 – *Stainless Steel Bar Reinforcement for Structures*	Concrete Decks, Approach Slabs, Barriers, and Substructures for: BIN 1066669, Ramp SN, Ramp SS	
Material Spec 709-04 – *Epoxy-Coated Bar Reinforcement for Structures*	Substructures for: BIN 1066669, Ramp SN, Ramp SS Retaining Walls At-grade Barriers and PCC Pavement	
Material Spec 715-01 – *Structural Steel*	Girders, Stiffeners, and Diaphragms for: BIN 1066669, Ramp SN, Ramp SS	

We/I, the undersigned, understand that by writing yes in the opt-in column, signing this form, we are declaring our intent to apply the Specification – Item 800.16000120 – Design-Build – Steel/Iron Price Adjustment and Special Provision SP-XX for Steel/Iron Price Adjustment to this Design-Build Contract and agree to comply with the terms and conditions for participation as stated in the aforementioned Specification and Special Provision. The signed Form PA shall be submitted with the Price Proposal.

Signed: _____

Printed name: _____

Title: _____

Date: _____

(To be executed by the Proposer's designated Lead Principal Participant)