

**Special Experimental Project 14 (SEP-14)  
Programmatic Use of Fixed Price Variable Scope Contracting on Capital Preventative  
Maintenance Projects  
2013 Annual Evaluation Report**

Introduction

The Michigan Department of Transportation (MDOT) received programmatic approval to utilize Fixed Price Variable Scope (FPVS) contracting on Capital Preventative Maintenance (CPM) Projects in December, 2012. The purpose of FPVS contracting is to construct the greatest amount of work with the available project budget and gain more value for the dollar by using this innovative contracting method.

This annual report covers FPVS CPM projects let in calendar year 2013.

FPVS Contracting Options

MDOT utilized three approaches to FPVS in 2013.

Type 1 FPVS projects receive bids based on the amount of work a contractor can complete based on a fixed dollar amount. The selected contractor is the one that bids the greatest amount of work. Type 1 FPVS projects are typically simple projects with very uniform work throughout the entire project. MDOT let five Type 1 FPVS projects in 2013, and they were all Hot Mix Asphalt (HMA) crack sealing projects.

Type 2 FPVS projects receive bids based on the amount of work a contractor can complete and a dollar bid that cannot exceed a maximum dollar amount. The contract for Type 2 FPVS indicates how bids will be considered and the contractor selected. MDOT let one Type 2 FPVS project that placed an epoxy overlay on several bridges in MDOT's Bay Region. On this type of FPVS project, the selected contractor is the one that provides the most work at or below a maximum price. In the event that two or more contractors propose the same amount of work, the selected contractor is the one that provided the most work at the lowest price bid.

Type 3 FPVS projects receive bids through traditional bidding procedures, and the contract is managed during construction so the final dollar amount of the contract is at a pre-established "fixed" dollar amount. The pay items and quantities contractors bid on are based on the amount of work that is estimated by MDOT to equal the fixed dollar amount. The remaining portion of the project is included in the design with "for information only" pay items and quantities on the plans or in the proposal. On Type 3 FPVS projects, if the low bid is below the fixed dollar amount, the project work is increased, and if the low bid is greater than the fixed dollar amount the project work is decreased. MDOT let one Type 3 FPVS project in 2013, and the scope of the project was concrete pavement repairs with an HMA overlay.

Project Development Considerations

All FPVS projects should be designed so the entire project exceeds the amount of work that can reasonably be expected to be constructed with the available budget. For example, if the project engineer estimates that 100 lane miles of roadway can be crack sealed, the project should have more than 100 lane miles available for contractors to bid on. The project needs to be cleared

through the environmental process and all permits obtained for the entire project and not just what is estimated to be constructed. Work cannot exceed what is environmentally cleared.

MDOT's CPM FPVS projects were classified as a programmatic categorical exclusion and were approved as part of the General Program Account (GPA) for capital preventative maintenance projects. The portions of the project that were not constructed will be included in future projects funded by the GPA

FPVS contracting can modify how projects bid, inspected, constructed and paid. Contract documents were included, when necessary, to provide clear bidding instruction, and to modify MDOT's typical process on design-bid-build (DBB) projects to conform to the intent of the FPVS contracting method while meeting state and federal requirements. FHWA Michigan staff reviewed and approved new contract language prior to advertising each FPVS project.

The Project Manager on each FPVS project also determined when a bid would be considered for rejection. On traditional DBB projects, this occurs when the low bid is greater than 10% of engineer's price estimate. On Type 1 and Type 2 FPVS projects, rejection of a bid would be considered if the bid would perform 10% less work than the engineer estimated. Type 3 FPVS projects follow the process for traditional DBB projects.

#### Bid Process and Results

MDOT receives bids electronically on all DBB projects. However, MDOT's system cannot accommodate the bidding process of Type 1 and Type 2 FPVS projects, and a hand delivered paper bid is required. Type 3 FPVS are bid electronically. Appendix A contains the bidding results for each type of FPVS, and includes the scope of work, dollar value, number of bidders, the bids from all bidders, and the engineers estimate.

All Type 1 FPVS projects received bids that accomplished at least the engineer's estimate of work. Three of the five projects completed all the possible work available to be bid on, which was up to 41% more work than originally estimated. None of the Type 1 FPVS projects were completed past the original contract completion date.

The one Type 2 FPVS accomplished all the work possible in the contract and provided a bid approximately \$96,000 below the maximum price. The Type 1 FPVS project was completed prior to the original contract completion date.

The engineer's estimate of work on Type 1 and Type 2 FPVS is based on historical average unit prices from a geographic area. The 2013 letting results from the Type 1 FPVS project indicate that the FPVS contracting method is cost effective, and that more work is being performed to preserve MDOT's roads than would have through conventional DBB. The single Type 2 FPVS project let in 2013 had very successful results, and 4 more bridges were overlaid than would have if the project was let using DBB, and at a price that was less than the maximum amount. The results of the Type 2 FPVS project are promising; however, additional projects will need to be analyzed in order to perform a more thorough evaluation of this method and determine if this method is effective for the department.

The one Type 3 FPVS project received a bid that was 22.8% over the engineers estimate. Two other bids received on this project were 46% and 52% over the engineers estimate. This FPVS project had unique construction requirements including very limited timeframes to close I-94 for portions of the work and limited hours to construct the project outside of the freeway closures. Discussions with contractors and the project office did not indicate the FPVS contracting method was a reason for the high bids. Future pilot projects using Type 3 FPVS will assist in determining if this method is effective for the department.

The Type 3 FPVS project also had contract language in the Notice to Bidder for Fixed Price-Variable Scope Contracting on I-94 that would allow MDOT to add funding to the project after award in order to complete portions of the project that could not be completed for the original dollar amount. Instead of managing the project to the established fixed price, additional funds became available after the award and MDOT exercised this option and completed the entire project.

#### Industry Coordination and Reaction

Early in the project development process MDOT met with representatives from Industry to discuss the innovative contracting methods being used on a project. MDOT has required mandatory pre-bid meetings on all types of FPVS projects when they are first used to help clarify any portion of the process. MDOT has used Type 1 FPVS on crack sealing several times, and no longer has pre-bid meetings on these projects.

MDOT also discussed upcoming innovative contracting projects, including FPVS, at meetings with industry groups including the Michigan Infrastructure and Transportation Associates (MITA), the Asphalt Paving Association of Michigan (APAM), and the Michigan Road Preservation Association (MRPA). MDOT publishes potential future innovative contracting projects on its website at [www.Michigan.gov/ic](http://www.Michigan.gov/ic) in order for any interested party to see upcoming projects. This coordination assisted in industry's understanding and acceptance of the FPVS contracting method.

MRPA represents contractors that perform preservation work including HMA crack sealing and chip seals. MRPA has indicated that its members are supportive of the use of FPVS, and feels this method keeps funding in their niche industry that is typically moved from their industry's work if there are bid savings on projects. MITA and APAM have not voiced opposition to MDOT's use of FPVS.

#### Administrative Consideration

One of the goals of using FPVS is to reduce the amount of work required by staff to manage MDOT's program. A project with a constrained budget reduces the burden on staff to reallocate funds from projects if the estimate is exceeded or reduced. By using a fixed amount of funds, MDOT did not have to search for additional projects to allocate any bid savings to, or conversely find additional funds from un-let projects. This process saved the Department staff time and effort.

### Additional Comments and Recommendations

Based on MDOT's experience in 2013, MDOT has the following recommendations:

1. The maximum limits of the work should exceed the estimated amount of work. Bidding history should be reviewed for the type of work being contracted to estimate the normal variations in bids on DBB projects to initially estimate the minimum amount of work that should be included beyond the estimated amount of work.
2. Coordination with all stakeholders, including internal, industry, and federal highways is important and should be done early in the project's development. MDOT personnel that were critical to coordinate with are from the environmental, planning, contracting, design, construction and technical subject matter experts.
3. When first developing a new contracting method such as FPVS, or applying an established FPVS contracting method to a new type of work, include adequate time in the development schedule to coordinate the development of contract documents. Concepts can sound easy, but developing the details properly can take more time than is typically included in the schedule.
4. When pre-bid meetings are held, provide examples of bids that are acceptable, and bids that contain errors.
5. In January 2014, MRPA requested MDOT to consider using FPVS as the standard contracting method for crack sealing projects. MDOT is currently evaluating this request.

### Contract Information

Unique contract items or traditional contract items modified by MDOT on the 2013 FPVS projects are listed below. A specific contract can be found by looking up each project on MDOT's e-Proposal website (<http://mdotcf.state.mi.us/public/eprop/login/index.cfm>). Once registered, enter the e-Proposal website by typing in the user's email address and password. Instructions for registering new users are on the left side of this page. Select the letting date from the "Lettings" area on the left side of the page, then select the item number from the pull down menu. The project proposal and any addenda will be available for downloading from this location.

#### Type 1 FPVS Projects

- Schedule of Items\*
- Notice to Bidder for Low Bid Determination\*\*
- Special Provision for Hot Mix Asphalt Crack Treatment, Special\*\*\*
- Special Provision for Warranty Work requirements for Hot Mix Asphalt Crack Treatment, Special\*\*\*
- Special Provision for the Preparation of Bid and Delivery of Bid\*\*\*\*

#### Type 2 FPVS Projects

- Schedule of Items\*
- Notice to Bidder for Low Bid Determination\*\*
- Special Provision for Performance Warranty, Thin Epoxy Bridge Deck Overlay\*\*\*

#### Type 3 FPVS Projects

- Notice to Bidder for Fixed Price-Variable Scope Contracting on I-94\*\*

\* The Schedule of Items of modified to reflect FPVS contracting and how the project is bid

\*\* The Notice to Bidders provides information on how the bids will be received and considered in order to select a contractor.

\*\*\* Special Provisions are modified to reflect changes needed for FPVS contracting

\*\*\*\* The Special Provision for the Preparation of Bid and Delivery of Bid provides instruction on how to submit a paper bid on a project. This special provision was not in all paper bid FPVS projects, but will be included in all future projects.

### Future Projects

Appendix B contains the known FPVS CPM projects that MDOT intends to pilot in future years. This list is periodically updated during the year if new CPM projects are approved for using FPVS contracting.

Appendix A: Bid Letting Results

Type 1

Type	Job No.	Region	Project Scope	Project Limits	Fixed/Max. Cost	Letting Data	No. of Bidders	Max. Bid	Winning Bid	Eng. Est of Work	Gain/Loss (Lane Mile)	Gain/Loss (Percent)	Other Bids	Other Bids	Other Bids
Type 1	113534 118723	Grand	HMA Crack Treatment	Various Locations within the Grand Region's jurisdiction	\$165,000	Item 601, 11/6/13 Letting	3	59.46	59.46	42.00	17.46	41.57%	37.37	48.79	
Type 1	120223	North	HMA Crack Treatment	Various locations	\$530,000	Item 602, 12/11/13 Letting	4	220.47	220.47	184.07	36.4	19.78%	207.2	170.6	112.2
Type 1	116254	University	HMA Crack Treatment	Various Locations within the TSC's jurisdiction	\$332,270	Item 601, 3/6/13 Letting	4	132.72	132.72	132.72	0	0.00%	128.2	111	100.9
Type 1	116328	University	HMA Crack Treatment	Various Locations within the TSC's jurisdiction	\$373,635	Item 601, 4/10/13 Letting	3	259.3	190.01	149.54	40.47	27.06%	137.4	129.8	
Type 1	116313	University	HMA Crack Treatment	Various Locations within the TSC's jurisdiction	\$400,000	Item 602, 5/8/13 Letting	2	261.8	188.52	158.00	30.52	19.32%	157.8		

Type 2

Type	Job No.	Region	Project Scope	Project Limits	Fixed/Max. Cost	Letting Data	No. of Bidders	Max. Bid	Winning Bid	Eng. Est of Work	Gain/Loss (Dollar)	Gain/Loss (Percent)	Other Bids	Other Bids
Type 2	118486	Bay	Bridge Epoxy Overlay	Up to 14 Bridges in the Bay Region	\$583,000	Item 601, 6/12/13 Letting	3	11,165 Syds	11,165 Syds	8247	Bid savings of \$96,263.96	35.38%	Bid 11,165 Syds and \$491,000	1 bid not accepted

Type 3

Type	Job No.	Region	Project Scope	Project Limits	Estimated Cost	Letting Data	No. of Bidders	Winning Bid	Other Bids	Other Bids
Type 3	118953	University	Conc. Joint Repairs, Coldmilling, HMA Overlay	I-94, M-14 to Carpenter Rd	\$3,656,838	Item 602, 6/12/13 Letting	3	\$4,528,305.59	\$5,351,273	\$5,560,692

Appendix B: Future FPVS CPM Projects

Job No.	Construction Year	Region	Office	Scope of Work	Location	Est. Dollar Amount
TBD	2014	Superior	Superior Region	HMA Crack Treatment	Various locations	\$1,400,000
120183	2014	University	Jackson	HMA Crack Treatment	Various locations	\$400,000
120358	2014	University	Lansing	HMA Crack Treatment	Various locations	\$400,000
120312	2014	University	Brighton	HMA Crack Treatment	Various locations	\$400,000
119097	2014	Bay	Davison	Chip Seal	M-25, M-142, M-138	\$1,700,000
119963	2014	Bay	Mt. Pleasant	HMA Crack Treatment	Various locations	\$390,000
120141	2014	University	Lansing	Cold Milling & HMA Overlay	M-106, Green Rd. to Territorial Rd, Ingham and Jackson Counties.	\$1,000,000
106863	2014	North	Gaylord	Crush and Shape, HMA Overlay	US-127, Muskegon River north 3.75 Miles.	\$5,880,000
120223	2014	North	Cadillac	HMA Crack Treatment	Various locations	\$530,000
120356	2015	Bay	Davison	HMA Crack Treatment	Various Locations	\$495,000
TBD	2015	Grand	Grand Rapids	HMA Crack Treatment	Various Locations	TBD \$400,000 to \$700,000
TBD	2015	Metro	Taylor	HMA Crack Treatment	Various Locations	\$600,000
TBD	2015	Metro	Oakland	HMA Crack Treatment	Various Locations	\$600,000
TBD	2015	North	North Region	HMA Crack Treatment	Various Locations	\$400,000
TBD	2015	Southwest	Marshall	Double Chip Seal	US-12, St. Joseph County Line to M-86	\$1,200,000
TBD	2015	Superior	Superior Region	HMA Crack Treatment	Various Locations	\$1,400,000
TBD	2015	Superior	Superior Region	Chip Seal	Various Locations	\$3,500,000
120333	2014	North	Gaylord	Chip Seal	M-33, I-75 to M-55	\$724,200