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Value Engineering

WSDOT

Embracing Creativity and Innovation

Value Engineering at WSDOT 2015 in Review

2015 brought many changes to WSDOT, not the least being our own and FHWA's emphasis on projects designed more with performance goals in mind rather than a general standards matrix.

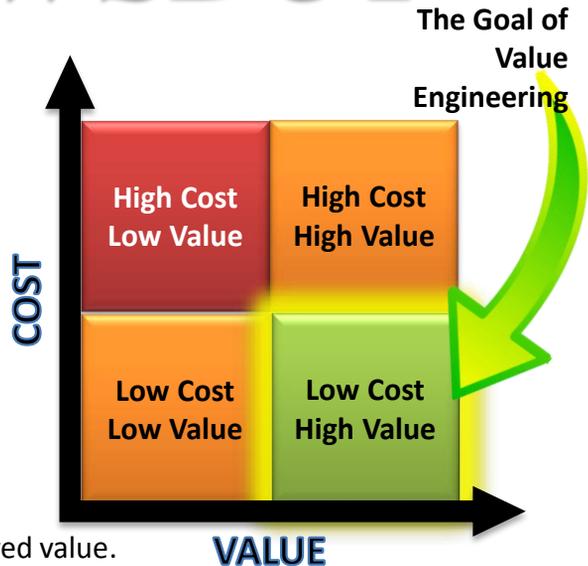
FHWA summarizes this approach accordingly:

"emphasizing a renewed focus on scoping projects to stay within the core purpose and need. By exercising a greater level of discipline, agencies may eliminate nonessential project design elements resulting in lower cost and improved value."

This approach enables States to deliver a greater number of projects than otherwise possible under their previous project development approaches. By implementing Performance Based Design, States realized cost savings by utilizing flexibility that exists in current design guidance and regulations."

WSDOT's Value Engineering (VE) program fully supports a Performance Based Design approach, essentially this is what Value Engineering is all about !

VE examines a project's proposed function, looks at the driving factors and identifies the intended function, purpose and need. It looks at cost effective solutions that meet the desired performance of a facility without compromise to safety. VE employs a multiple disciplinary team with expertise in the relevant functional areas of the project and engages stakeholders and communities.





Return on Investment For your Value Engineering (VE) Study

Value Engineering has tremendous potential for finding savings and efficiency in projects. VE offers a fresh view and diverse experience to open up innovations, methods and technologies. Keep in mind that timing of a Value Engineering study plays an important role as well.

Value Engineering studies conducted early in a projects development have the greatest potential to realize savings, efficiencies and coordination with stakeholders. Once a project is beyond 30% design many decisions have been made and a scope established.

2015 Study Summary

(These costs have all been rounded and averaged. No figures are final until project designs are complete)

During 2015 WSDOT conducted 5 *VE studies with an expected cost of \$470+ Million dollars. During these studies more than 200 Ideas were generated, 60 became Design Considerations, but 34 of those Ideas were developed into Design Recommendations, with a potential to save \$100 Million dollars and up to 36 months of Construction time.

Return on investment Averages:

The dollar value of projects studied ranged from \$13M - \$300M and the R.O.I. had a range of 135:1 at the low end, to 2500:1 on the high end.

The Value Engineering workshop averages for 2015 show significant potential saving obtained through VE

- Average Cost to conduct these studies - \$16,400
- Average project dollars saved for each dollar spent to conduct the study - \$19,800,000

Average R.O.I. > 1200 : 1

**Some VE Studies were conducted in conjunction with a Risk Assessment*

Application of VE in Major Projects

FHWA Value Engineering Summary Report states that:

"²The benefits and goals achievable by conducting a VE study will vary based on the timing of the study; likewise, if the **VE technique is employed multiple times during the development of a project each study would occur in a different context.** In the example of Major Projects, a handful of states described the typical milestones for conducting the multiple studies, and what each study would focus upon.

For instance, The Nevada DOT noted that the first VE analysis would generally be done early in the development phase to help minimize project impacts, develop an EIS or ROD, decide the best type of facility to build, and pinpoint its location.

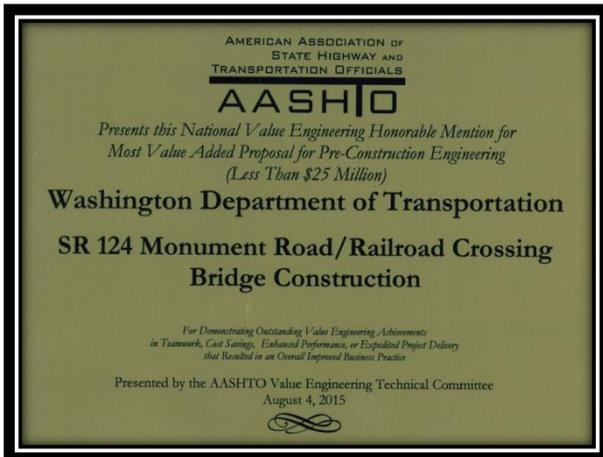
The second study would generally be performed during the intermediate design phase to address design issues (geometrics, drainage, construction staging, traffic control, signalization, roadbed design, structure details, etc.) and fine-tune the project before setting final right-of-way."

Projects that usually provide the highest potential for Value Improvements

- Projects with alternative solutions that vary the scope and cost.
- New alignment or bypass sections.
- Widening of existing highways for capacity improvements.
- Major structures. & Interchanges of multilane facilities.
- Projects with expensive environmental or geotech. requirements.
- Projects with difficult materials requirements/sources.
- Major reconstruction of existing highways.
- Projects with major traffic control.
- Projects with multiple stages.



Regardless of project cost or complexity Value Engineering provides the added benefit of engaging Stakeholders and facilitating involvement and decision ownership.



Value Engineering Award presented to WSDOT at the AASHTO National Value Engineering Peer Exchange in Washington DC during a special Awards Showcase session August 4, 2015.

SR 124

Monument Rd/RR Xing - Construct Bridge

Project Cost: \$8.7 Million

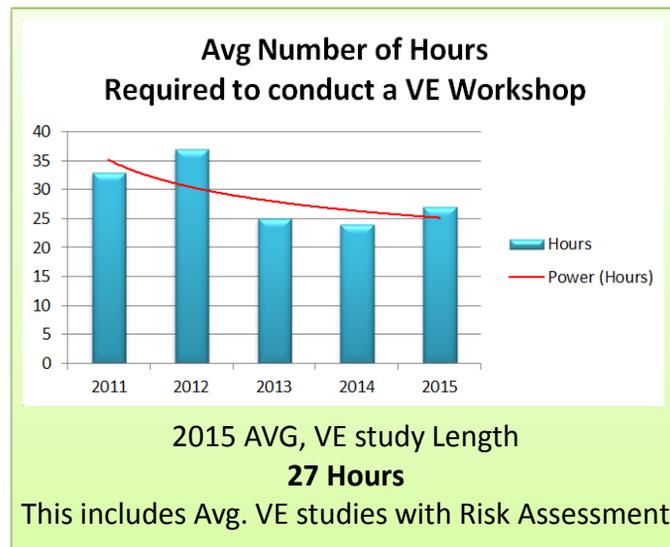
This study included the UPRR Western Region Representative as a VE Team member. Their knowledge of UPRR's policies and practices greatly benefited the team even on this small project. They were able to adjust alternative solutions and make the major safety improvements necessary at this location while remaining in compliance with Railroad facility regulations.

How Long does a VE Study Need to be?

Although the standard time for a full VE study that employs the 6 step job plan is 40 hours, it really is dependent on the complexity of the project under study. That complexity can be technical in nature, have political sensitivity or have aspects of both.

The VE study job plan is **completely scalable**, From a 1-day charrette style using the VE tools for a collaborative session to draft a solution for specific problems (note this is not considered a formal VE) To a multi – week study that might be employed for projects of great complexity and many moving parts.

However most VE studies at WSDOT can be conducted in **3 1/2 days**



How much does a project have to cost to make a VE Study worth while?

Project size does not matter when selecting a project which to apply Value Engineering. WSDOT's thresholds are \$20 million for Structural projects and \$25 million for the rest. However, \$5 million to \$5 billion, no matter how you slice it VE will add value to projects when applied correctly.

Choose the right Projects or Project Elements to study

Just because a project meets the threshold, does not automatically make it the right project in which to apply Value Engineering.

On the other hand, it does not matter if a project falls under the threshold, Value Engineering can be applied to enhance the performance of a facility or reduce its cost, by digging into questions and uncertainties, or as a tool to build consensus - sometimes even just getting the right stakeholders in the room is where value is found.

Timing

Be sure to put the VE Study(s) in your project schedule timed to achieve the greatest benefit for the project. Schedule early when exploring project alternatives, schedule a 2nd VE study if needed, later when examining complex project elements for alternative solutions.

Team

Choose team members for the expertise that complements the project under study. The team composition can make or break a study and a carefully chosen team will pay for itself many times over.



Workshop Spotlight Innovative Idea

New Ramp Terminal

BASELINE:

The southbound off-ramp from I-5 to SR 161 is currently a one lane ramp that widens to 3 lanes at the intersection of SR 161 and 356th Street. The addition of this ramp requires the acquisition of 4 commercial properties in order to provide the necessary limited access. **COST \$9.6M**

RECOMMENDATION:

Move the end of the access controlled area approximately 500' to the east. Establish a ramp terminal using a roundabout and connect to SR 161 using a City street.

ASSUMPTIONS/CALCULATIONS

Based upon previously constructed one lane roundabouts with no right-of-way acquisition, the estimated construction cost of this roundabout is \$0.80 million, + \$1.44M to purchase access control.

**Potential Savings =
\$8.16 Million**

Advantages:

- Moves the limited access away from SR 161
- It would allow the City street to remain allowing the businesses to continue to access SR 161
- Roundabout ramp terminal would provide a gateway and prevent wrong way movements and a well defined transition from interstate and City street speeds.
- Continues to provide access to WSDOT surplus property which improves the value