Tailoring VE to Fit Your Project

2006 CSVA Conference

BRIAN RUCK, P. Eng., C.V.S.
TSH Associates - Whitby Ontario Canada

Presentation Outline

• Traditional VE Approach
• Key VE Principles
• Sample Projects
• Conclusion
Traditional Approach

✓ One size fits all
✓ 5 Day Workshop
✓ Pre and Post Workshop involving VE Team
✓ Time from start to finish? - 4 to 8 weeks

Traditional Agenda

• Methodology
  - PRE-STUDY
  - VALUE STUDY
    • Information Phase
    • Function Analysis Phase
    • Creative Phase
    • Evaluation Phase
    • Development Phase
    • Presentation Phase
  - POST-STUDY
Enhancements to Traditional Approach

- Performance Measures
- Risk Based Estimates
- Safety Assessments
- Functional Performance Criteria
- Scenarios
- Others

_BUT:_ Do you need all or any of these to improve your project?

But what if?

- You don’t have 5 days (or longer)
- You don’t have available budget
- Your project isn’t “big” enough for 5 days
- You can’t sell a 5 day workshop to your boss(es)
- You still believe that your project could be improved
What can you do?

There are only two choices:

1. Don’t do a VE Study; or
2. Try a non-traditional approach

Observations

✓ One size does not fit all
✓ VE can be tailored to your project
✓ Key fundamentals must be maintained
**Fundamentals of VE - Teamwork**

- It is widely accepted and proven that projects are best assessed using a systematic team approach whose members have differing skill sets.
- Why?
  - “The sum of the parts is greater than the whole”
  - Common and unique knowledge and experience exists within the team
  - Results in better decisions

---

**Fundamentals of VE - Project Understanding**

- You can’t study a project that you know nothing about!
- Gather as much information about the project as possible
- Visit the site to gather first hand “feel” of the project
- Look for value mismatches
- Could be done in advance of the workshop to save time
Fundamentals of VE - Function Analysis

- What is a function?
  – Work performed by a product, element, process, or procedure
  – It answers the question: “WHAT DOES IT DO?”
- For Cost Reduction, we ask “how can it be made/done for less?”
- For Value Engineering, we ask “how else can this function be provided and at what cost?”

Fundamentals of VE - Creativity

- Use key project functions to identify areas for further study
- Separating creativity from judgement allows a VE Team to:
  – Generate a quantity of ideas
  – Associate ideas
Modified VE Components

**Mandatory**
- Teams
- Information
- Function Analysis
- Creativity

**Optional**
- Judgment
- Development
- Presentation
- Risk Assessment
- Functional Performance Specs
- Safety Assessment
- Performance Criteria
- Scenarios

Modified VE Workshop Duration

- Most usual length for typical VE workshop is 4-5 days
- Modified VE can be completed in as little as ½ day depending on complexity and desired outcome
- Optimized modified VE – about 2 days
Sample Projects

Burlington Pier

• Project was tendered and came in about 100% over budget
• No more budget available
• Either reduce cost, or project doesn’t get built
• ½ day VE workshop
# Agenda

**Burlington Waterfront Redevelopment Project - Waterfront Pier**

**Minutes to Review: Pier section and tender review**

**Date & Time:** January 30, 2006, 10:00 a.m. to 3:00 p.m.

**Place:** Room 101, City Hall

**Facilitator:** Brian Rock, TIE

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Speaker</th>
<th>Approx. Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction</td>
<td>J. Kelly</td>
<td>1:00 to 1:15</td>
</tr>
<tr>
<td>2</td>
<td>Background info</td>
<td>V. White</td>
<td>1:15 to 1:45</td>
</tr>
<tr>
<td>3</td>
<td>Consideration of Project Goals and Objectives</td>
<td>All</td>
<td>1:45 to 2:15</td>
</tr>
<tr>
<td>4</td>
<td>Contract and procurement information and models</td>
<td>All</td>
<td>2:15 to 2:45</td>
</tr>
<tr>
<td>5</td>
<td>Discussion/evaluation of Contract Ideas</td>
<td>All</td>
<td>2:45 to 3:15</td>
</tr>
<tr>
<td>6</td>
<td>Public Action</td>
<td>All</td>
<td>3:15 to 3:30</td>
</tr>
<tr>
<td>7</td>
<td>Adjournment</td>
<td></td>
<td>3:30</td>
</tr>
</tbody>
</table>
Burlington Pier

- VE Process allowed participants to focus in on key areas
- Key project elements were identified as “sacred” while compromise was possible on others
- Development work occurred after workshop by design team

**The Brant Street Pier**

**Description:**
- Support: Single Caisson with steel framed reinforced concrete deck
- Deck width: 6.5m to 7.0m
- Deck length: 165m to 180m +/-
- Features: Beacon Node and Dock Node, LED accent lighting concept retained, caisson extensions provide variable height profile effect
- Foundation: Reinforced Concrete Caisson on spread footing with rock anchors, option to pre-cast or cast-in-place footing (Approx. 9 battered caissons on deck, 10 vertical on nodes)

**Comment:**
- Constructability: Option to tender as foundation alternative for single caisson design, pre-cast or cast-in-place footing, open to wider scope of contractors
- Achieves Original Design Objectives: Retains 'S' shape and majority of original Pier Aesthetic design and use area
- Potential for Cost Reduction: High (subject to confirmation)

**Notes:**
- Original Pier Design deck width: 7.5m, Deck Length: 202m, Galvanized Steel Caissons at 12.0m c/c on 1:6 batter (Approx. 17 battered deck caissons, 8 battered node caissons)
- 1.8m dia. drilled caisson below water level
- Rock anchors
- Cast-in-place or pre-cast footing

---

**Alternative 1**

**Description:**
- Support: Single Caisson with steel framed reinforced concrete deck
- Deck width: 6.5m to 7.0m
- Deck length: 165m to 180m +/-
- Features: Beacon Node and Dock Node, LED accent lighting concept retained, caisson extensions provide variable height profile effect
- Foundation: Reinforced Concrete Caisson on spread footing with rock anchors, option to pre-cast or cast-in-place footing (Approx. 10 battered caissons at deck, 12 vertical at nodes)

**Comment:**
- Constructability: Option to tender as foundation alternative for single caisson design
- Achieves Original Design Objectives: Retains ‘S’ shape and majority of original Pier Aesthetic design and use area
- Potential for Cost Reduction: Medium (subject to confirmation)

**Notes:**
- Original Pier Design deck width: 7.5m, Deck Length: 202m, Galvanized Steel Caissons at 12.0m c/c on 1:6 batter (Approx. 17 battered deck caissons, 8 battered node caissons)
- 1.2m dia. galv. Steel caisson
- Galv. steel beam and stringers
- Reinforced conc. deck
- Steel cable railing

---

**Alternative 2**

**Description:**
- Support: Single Caisson with steel framed reinforced concrete deck
- Deck width: 6.5m to 7.0m
- Deck length: 165m to 180m +/-
- Features: Beacon Node and Dock Node, LED accent lighting concept retained, caisson extensions provide variable height profile effect
- Foundation: Reinforced Concrete Caisson on spread footing with rock anchors, option to pre-cast or cast-in-place footing (Approx. 10 battered caissons at deck, 10 vertical at nodes)

**Comment:**
- Constructability: Option to tender as foundation alternative for single caisson design, pre-cast or cast-in-place footing, open to wider scope of contractors
- Achieves Original Design Objectives: Retains ‘S’ shape and majority of original Pier Aesthetic design and use area
- Potential for Cost Reduction: High (subject to confirmation)

**Notes:**
- Original Pier Design deck width: 7.5m, Deck Length: 202m, Galvanized Steel Caissons at 12.0m c/c on 1:6 batter (Approx. 17 battered deck caissons, 8 battered node caissons)
- 1.2m dia. galv. Steel caisson
- Galv. steel beam and stringers
- Reinforced conc. deck
- Steel cable railing

---

**Alternative 3**

**Description:**
- Support: Two Caisson/ Pipe Pile with pre-cast or cast-in-place pier cap with pre-cast or cast-in-place slabs, Galvanized coating on caissons/pipe piles
- Deck width: 7.5m
- Deck length: 170m to 190m +/-
- Features: Beacon Node and Dock Node, Accent lighting concept to be determined
- Foundation: Two Drilled/Driven Caisson/Pipe Piles at 12.0m c/c (Approx. 38 vertical caissons)

**Comment:**
- Constructability: Option to tender using marine or land based ‘top-down’ construction, option to construct ‘Linear’ deck alignment
- Achieves Original Design Objectives: Can retain ‘S’ shape and original use area, support design significantly reduces element of ‘Uniqueness’
- Potential for Cost Reduction: High (subject to confirmation)
Burlington Pier Results

- Pier was shortened
- Foundations were simplified
- Span lengths were increased
- Project was redesigned, re-tendered and came in 1% over engineer’s estimate
- Testimonial “The VE workshop was able to bring everyone with a winning idea together in a common venue to reach an acceptable compromise”

17 Wing Consolidation CFB Winnipeg
17 Wing Consolidation – Log and HQ Buildings – Winnipeg - DND

- Consolidation of units from south to north side of base
- Relocation strategies had been developed
- Project was to be completed by design build
- VE scope - review siting and develop functional space plans for buildings
- VE recommendations would be included in DB RFP

Value Engineering Study – June 27, 2002
Logistics Building
Winnipeg, Manitoba
T SH Project 4 25 0688

AGENDA

9:00 - LEARNING OBJECTIVES
9:05 - INTRODUCTION TO WORKSHOP INFORMATION PHASE
- Welcome & Opening Remarks
- Team Introductions
- Objectives of the Workshop
- Workshop Organization and Agenda

9:45 - PROJECT BRIEFING
- Project Story
- Presentations by Santa Care
- Questions classifications by VE Team

10:00 - Break

10:15 - DATA REVIEW
- Cost Model
- Right-of-Way (ROW) Cost by Parcel
- Review of Documents

11:00 - FUNCTIONAL ANALYSIS
- Identification of basic functions
- FAST Diagnos

12:00 - LUNCH

1:00 - COST WORTH ANALYSIS

1:30 - CREATIVE BRAINSTORMING

4:00 - EVALUATION IDENTIFICATION OF BEST IDEAS

5:00 - ADDITIONAL
17 Wing Consolidation – Log and HQ Buildings – Winnipeg - DND

- VE Study was 1 day long with a VE team of 26 people from various disciplines
- It was agreed that the development and presentation phases would not be completed
- Key functions
  - Construct Buildings
  - Store Materials
  - Store Vehicles
  - Maintain Vehicles
  - Accommodate Staff

A total of 84 ideas were generated
- 43 ideas were recommended for further study
- 8 ideas were identified that were outside scope of the study but were recommended to Sr. Command for revisions to existing policies
- Feedback from project architect was that most ideas were incorporated into the DB RFP
Claresholm and Nanton Realignment Study – Hwy 2 Alberta

- Project involved the four laning of Highway 2 south of Calgary
- 2 town were going to be by-passed, study was to provide access to Towns
- Project was at functional planning stage
- A 3 day workshop was undertaken
  - The site visit was optional for team members not familiar with project on the afternoon before the workshop
  - The formal presentation phase was eliminated
Claresholm and Nanton Realignment Study
– Hwy 2 Alberta
Workshop Results

• 48 ideas generated – 27 shortlisted
• Team developed top 3 scenarios at each location ranging in cost from $36M to 54.5M
• A weighted evaluation method was used to select the preferred scenarios at each location

Conclusions

• VE is a very flexible process
• Almost any project can benefit from a VE study
• New VE tools are emerging and are useful for some projects
• Not all projects need the full approach
• Give it a try!