Value Engineering 101

Presented by:

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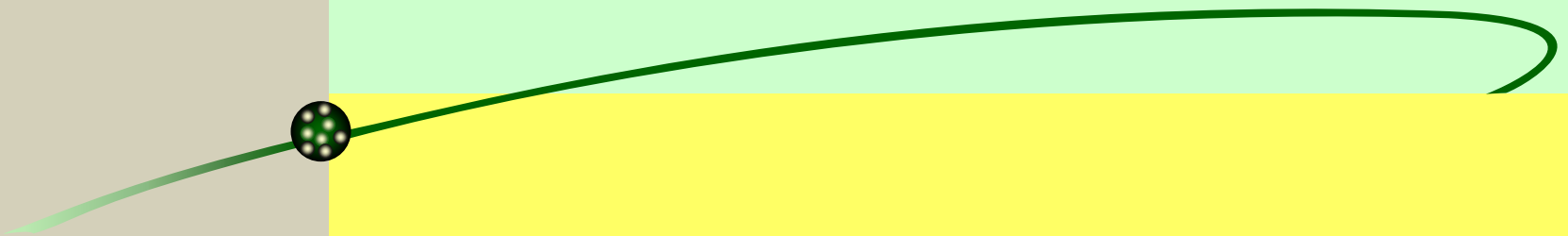
Value Engineering
Ministry of Transportation



A ship in port is safe, but that's not what ships are built for.

Grace Hopper

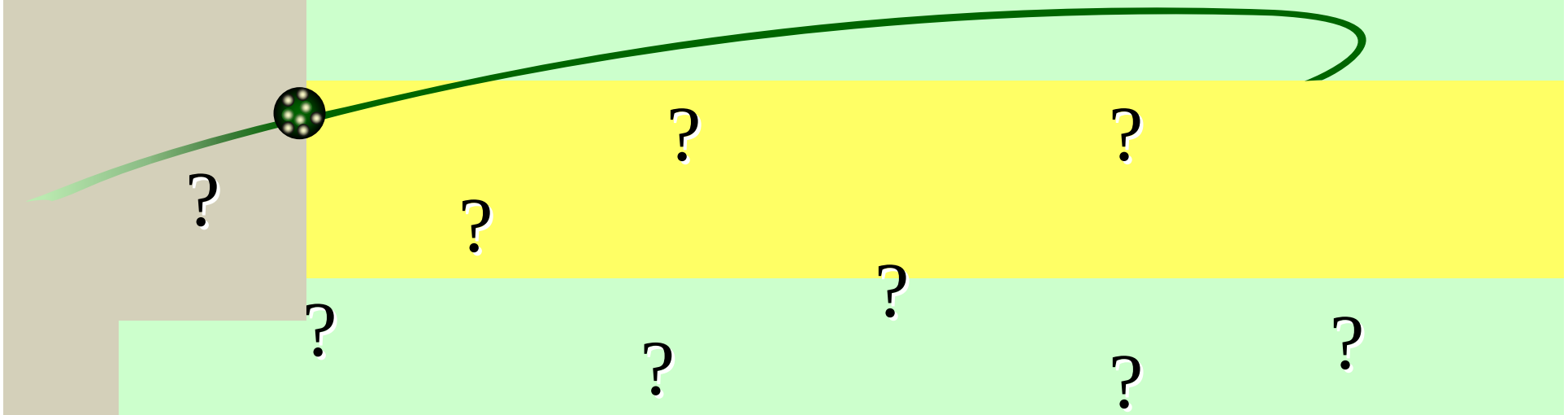
There is as much risk in doing nothing as in doing something.

Trammell Crow

No one ever achieved greatness by playing it safe. Harry Gray

You can't steal second with your foot on first. Chuck Noe

Cost and Quality have no direct relations Larry Miles



What Is Value Engineering?

Topics

- What is Value Engineering?
- History?
- Benefits
- How Does it Work?
- Video

Value Engineering Definition

The systematic application of recognized techniques which:

- Identify the function of a product or service,
- Establish a value for that function, and
- Provide the necessary function reliably at the least overall cost.

Value Engineering Definition (con’t)

In all instances, the required function should be achieved at the lowest possible life cycle cost consistent with requirements and/or performance, maintainability, safety and aesthetics.

Questions, Questions…

- **You're probably thinking:**

  Why use Value Engineering?

  Don't we do it all the time?

  How can it help me? Really?

  What's it all about?

Value Engineering is:

- A structured and systematic problem solving methodology
- A process designed to find creative alternative solutions
- Applied in a workshop environment by a Multidisciplinary team

Value Engineering is: (continued)

- Concerned with life cycle costs
- A flexible set of techniques
- Function oriented
- Focussed on

How Can We Improve Value?”

What VE Is Not:

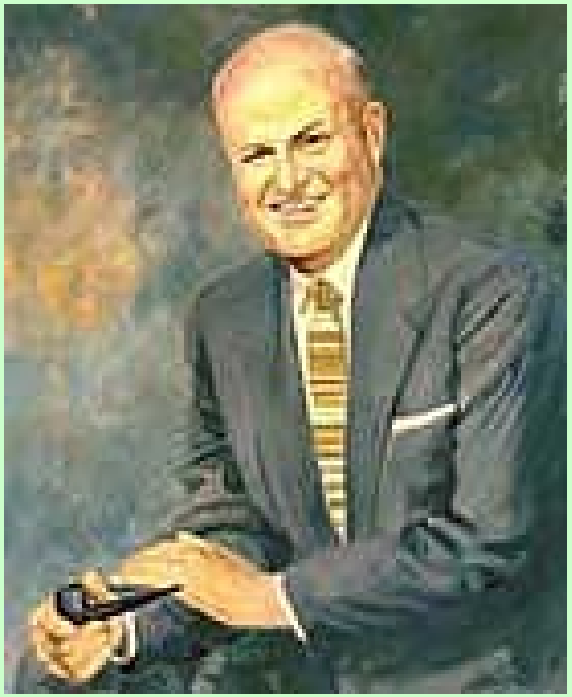
- Not just good engineering
- Not a suggestion program
- Not a routine project or plan review
- Not a cost reduction exercise

Value Engineering is also known as:

- Value Analysis,
- Value Planning,
- Value Management

History of VE

- Larry Miles, a purchasing engineer for General Electric, developed VE concepts during WW2.
- His problem was he could not get strategic materials to produce the turbo-supercharger for the B-17 and P-47.
- Larry developed a process that did not solve the problem (lack of a particular material), it solved the function!



The First VE Study

- Larry and his team determined the function of each part in the turbocharger.
- Found more cost effective materials to achieve the necessary functions.
- Pratt&Whitney Canada still have a VE program for development of engines.

Who Uses VE?

Value Engineering is used anywhere
Value for money is a concern:

- Purchasing
- Construction,
- Manufacturing
- Engineering
- Services Industry
- Health Care
- Government

Who Uses VE?

Organizations who have a climate that accepts change, have problems, and a concern for value for money:

- Pratt&Whitney
- Magna
- Canadian tire
- Shell
- MTO, Manitoba, Alberta, BC, Quebec
- Halton, Niagara, Peel, York, Durham
- DND, Transport Canada, Public Works
- United States – Parks, Highways, Interior, State, Defence, Army Corps…

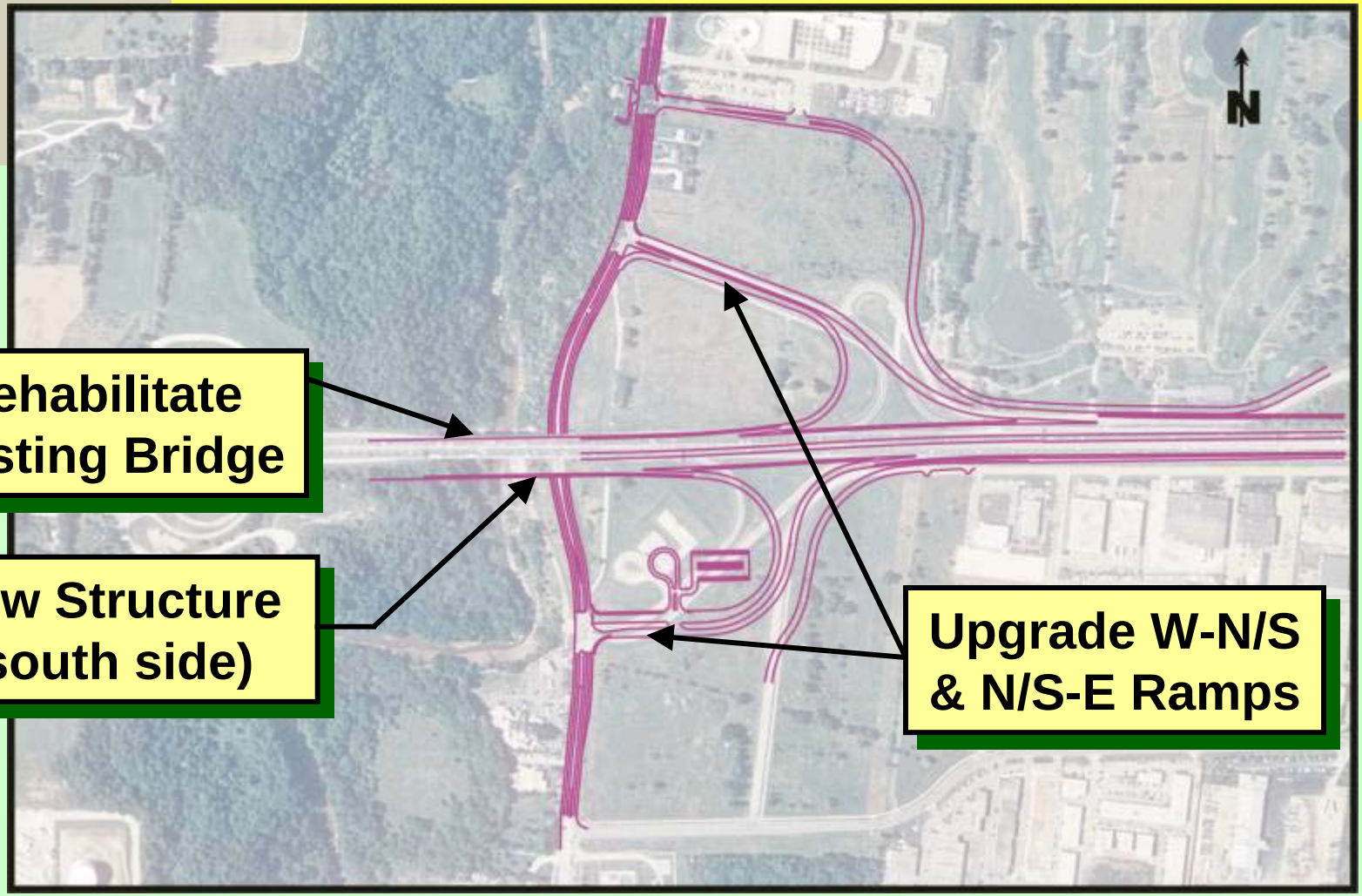
Why Use VE?

- Knowledge of Value Engineering will improve your ability to manage projects, solve problems, innovate, and communicate.
- A VE program in your organization will provide your staff with a definitive tool to improve value in any product, project or process.
- Cost savings, risk reduction, schedule improvements and even improved job satisfaction can and have been the outcomes of VE studies.

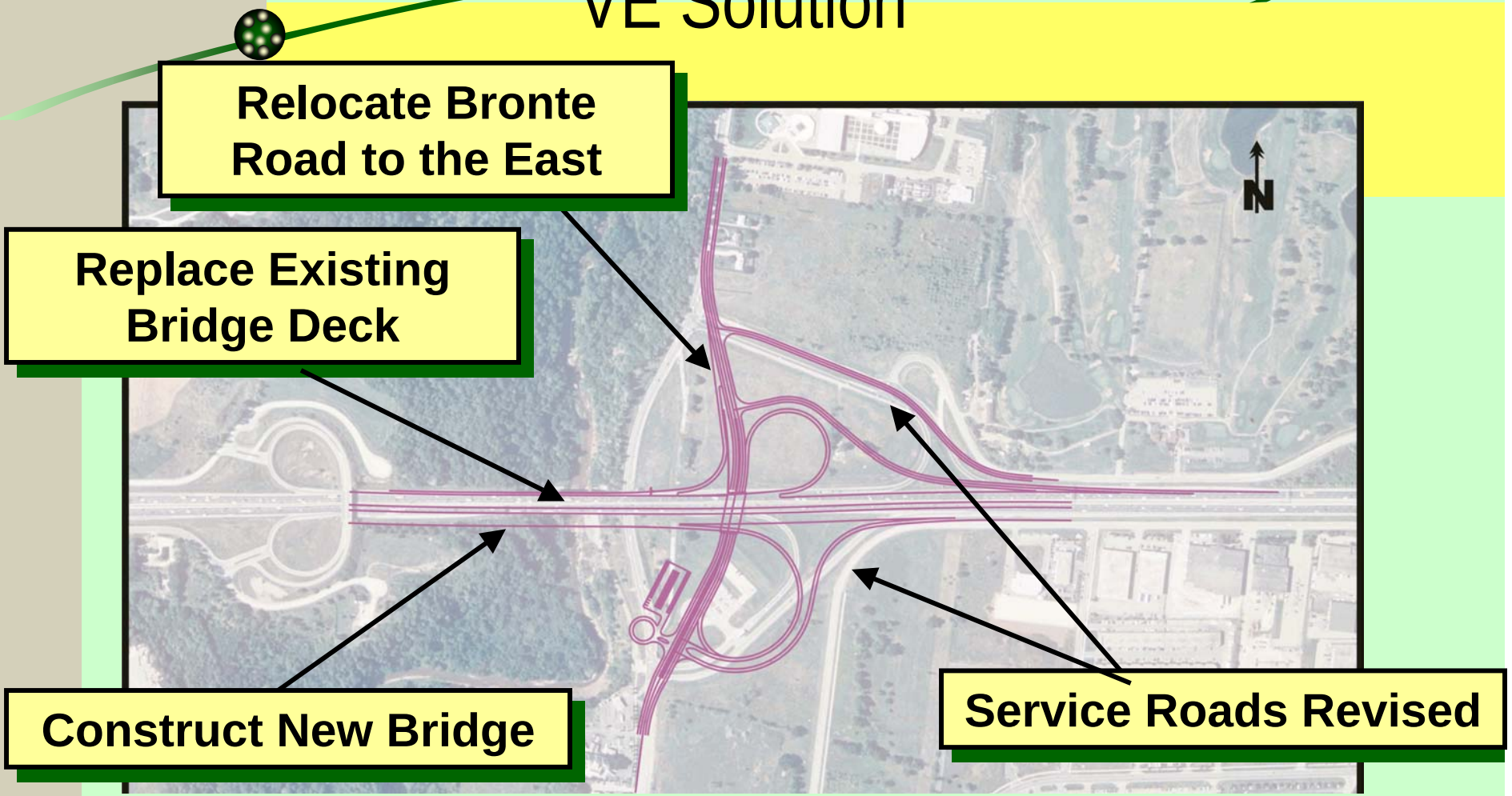
Why Does VE Work

- All Projects Have Unnecessary Costs
- Decisions Are Often Made Without Knowing The Cost Impact
- The Design Process Focuses On Expected Solutions
- Function Analysis

Expected Solutions



VE Solution



Move Bronte Road east, provide a better interchange

Challenge Paradigms…

Why Does VE Work

- Function Analysis Ensures Compatibility Between Capital Decisions And Program Requirements
- Focus Of A VE Study Is

  "How Can We Improve Value?"

Function

Function:

is the fundamental concept underlying Value Engineering.

Function

Function Analysis

- "Heart" of VE Process
- A New Way of Thinking
- A Catalyst to a Paradigm Shift

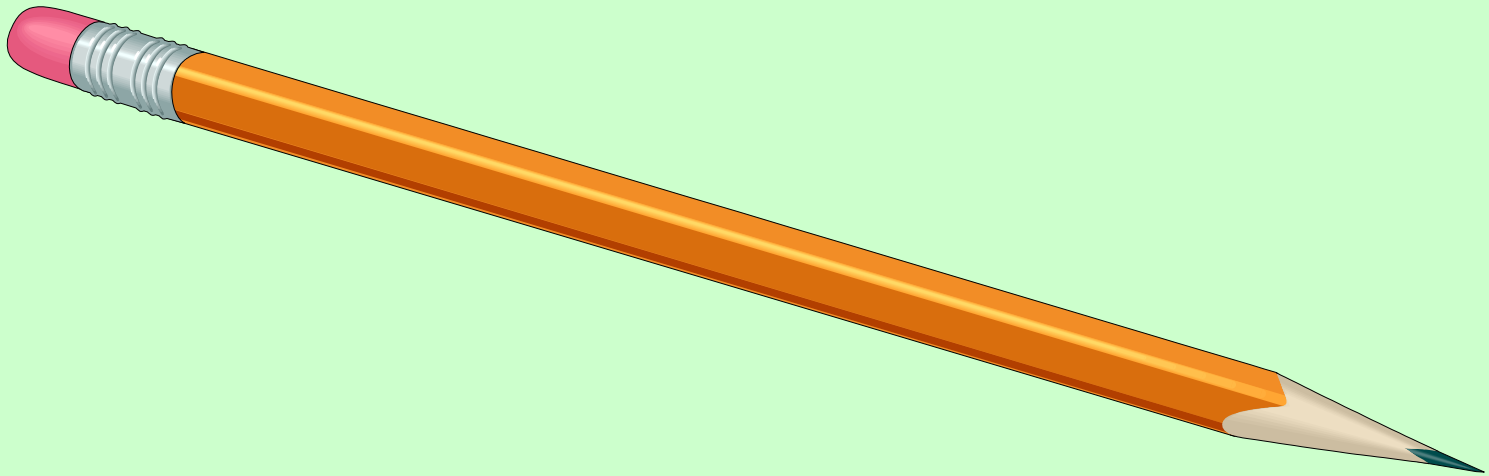
Function Analysis

The Two-Word Definition

- Verb - Noun
- Forces Conciseness
- Separates Functions
- Fosters A Mutual Understanding
- Gets to *What must be done?* Rather than *How it is being done*

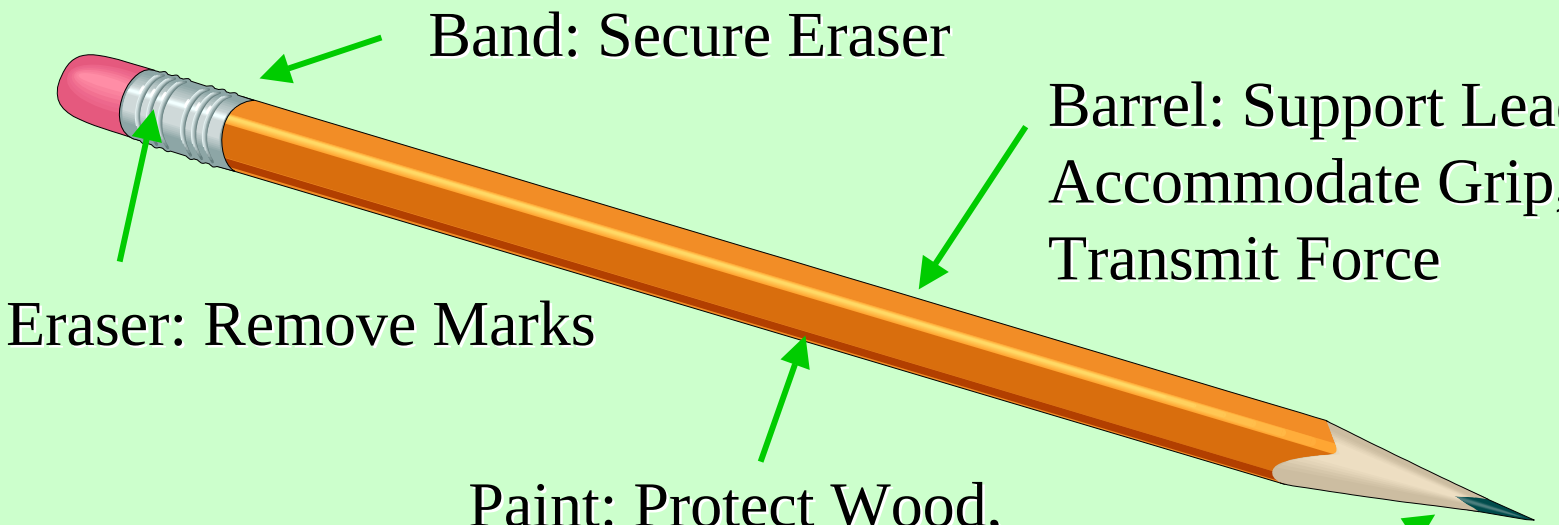
Pencil Example

- **What is the function of a pencil?**



Function Analysis Example

Pencil: Makes Marks



Pencil Example

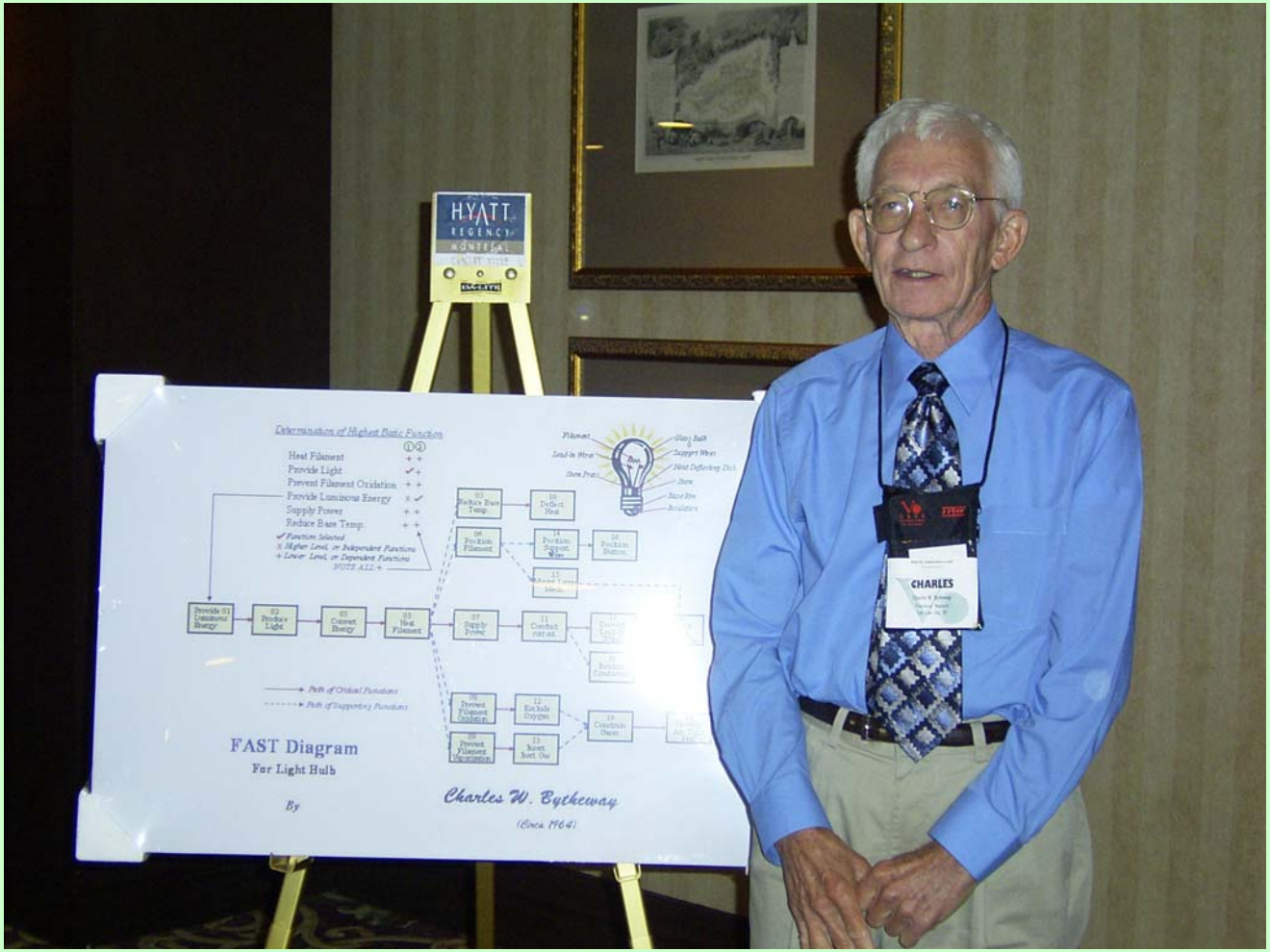
Pencil		**make marks**
•eraser	S	remove marks
•band	S	hold eraser
•barrel	S	hold graphite
•paint	S	protect wood/add beauty
•markings	S	identify product
•graphite	B	make marks

B – Basic Function
S – Secondary/Supporting Function

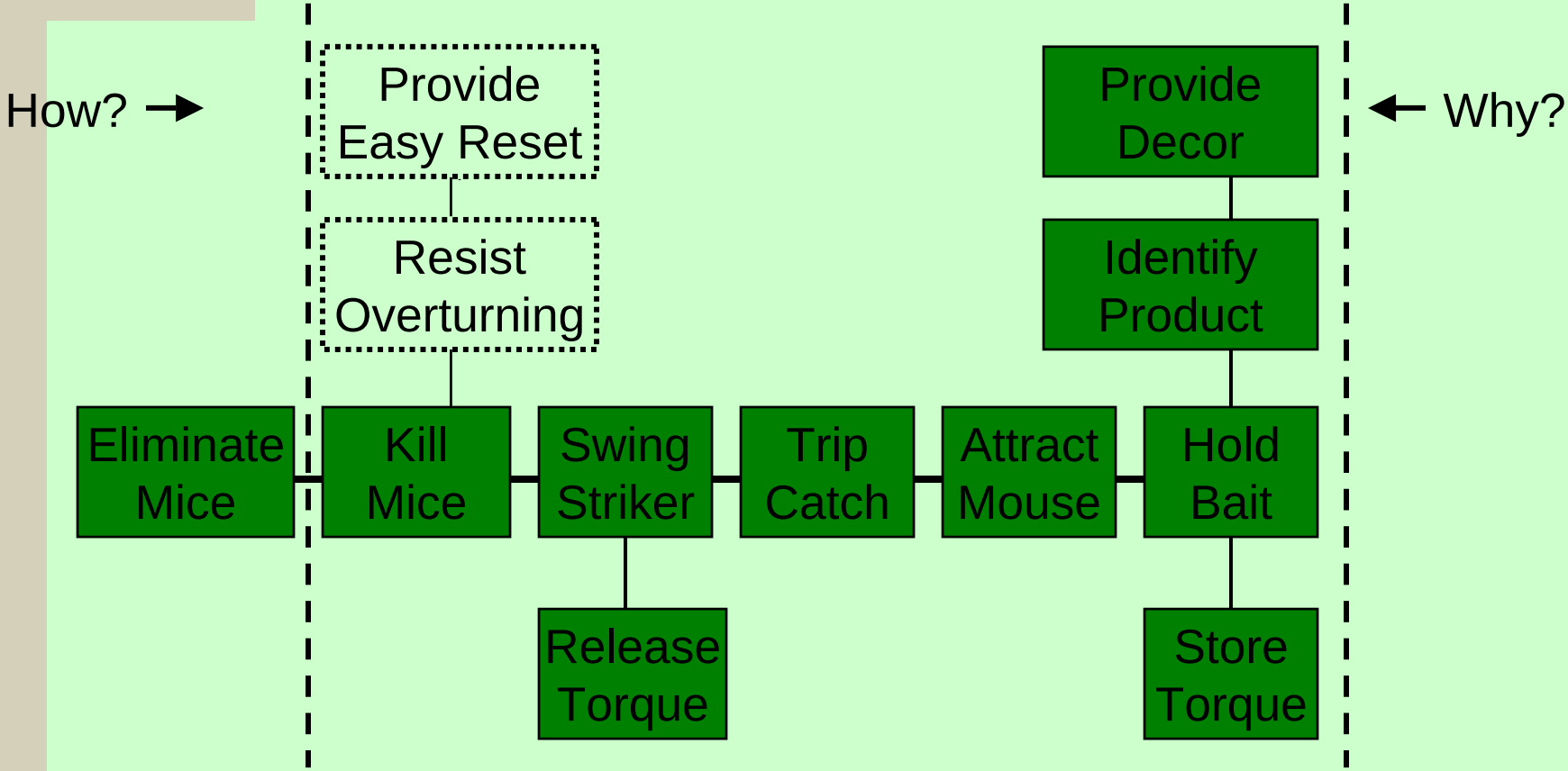
FAST Diagrams

- Function Analysis System Technique
- Invented by Mr. Charles Bytheway c. 1964
- Depicts “How” and “Why”
- Focuses VE study on the critical path functions
- Common myth

The First FAST Diagram



Mousetrap FAST Example



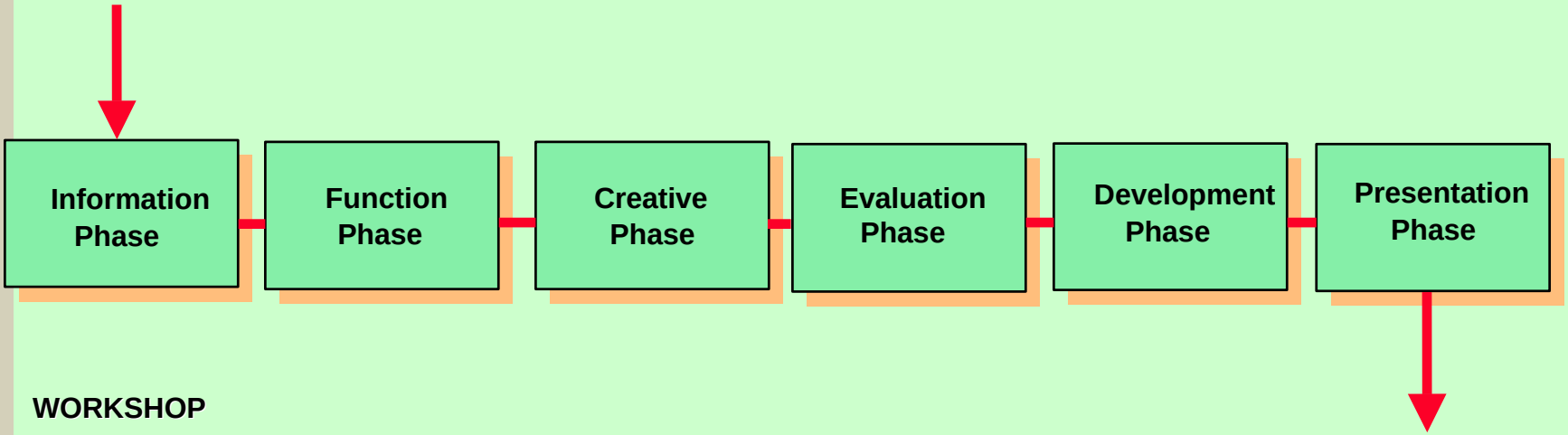
The VE Workshop

The Setting:

- A room with tables, phones, walls and project information,
- Three to five days,
- Experienced study leader,
- Multidisciplinary team of 5 to 8.

VE Process Diagram

PRE-WORKSHOP ACTIVITIES



WORKSHOP

POST WORKSHOP ACTIVITIES

Information Phase

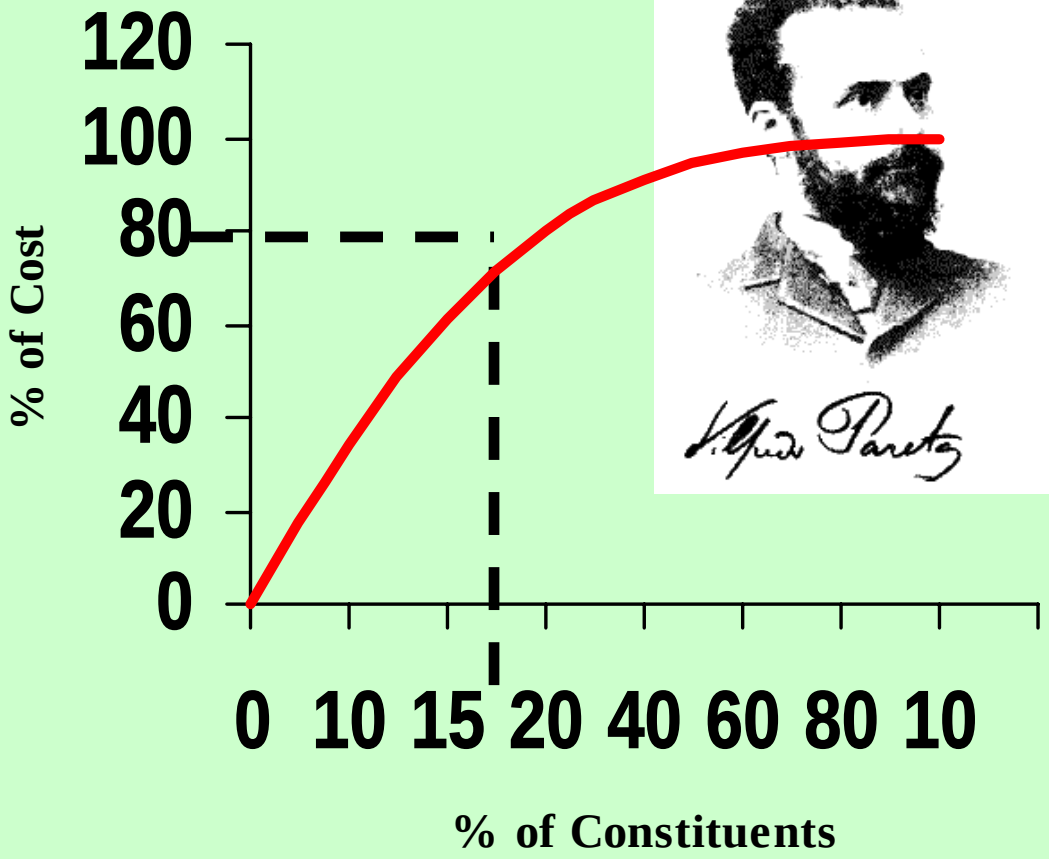
Key Questions "WHY"

- What Is The Problem?
- Why Is It A Problem?
- Why Must It Be Solved?
- Why Was It Solved As Proposed?
- What Does It Cost?

Pareto's Law of Distribution

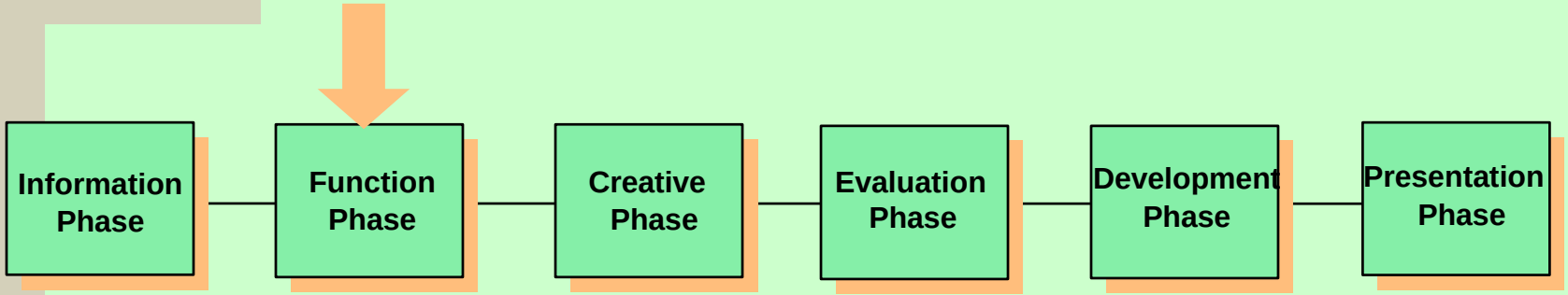
"The 80 / 20 Rule"

20% of the items in any complex thing account for 80% of the cost.



Vilfredo Pareto, 1848-1923

Workshop - Function Phase

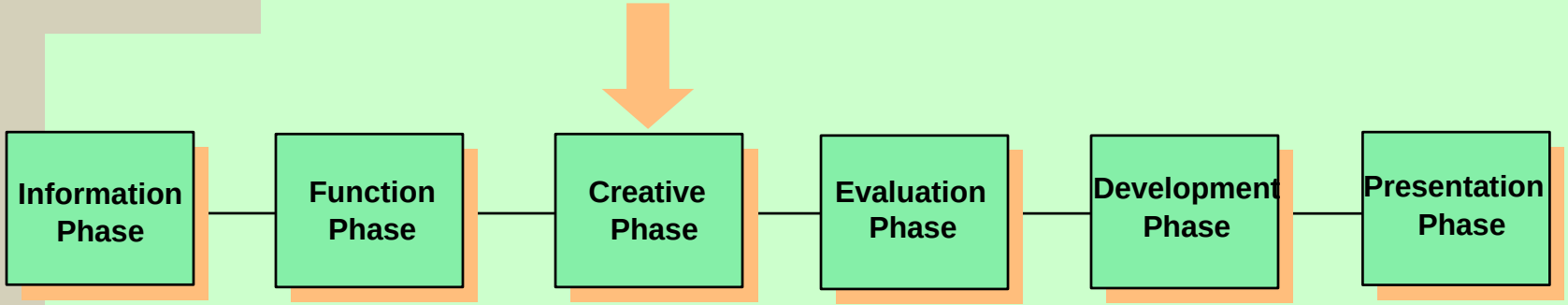


What must be done versus how is it being done?

Techniques

- Function Analysis
- Categorize Functions
- Function Logic FAST diagram
- Value Index (Worth to Cost)

Creative Phase

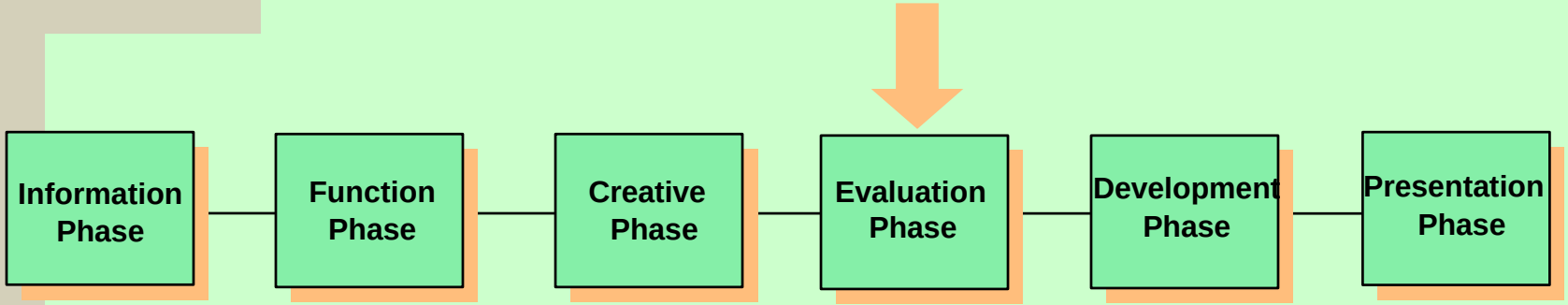


What Else Will Accomplish the Basic Function(s)?

Techniques

- Creative Thinking - Brainstorming
- Set aside policies & rules
- Depart from the Norm
- Good Human Relations

Evaluation (or Judgement) Phase



Select the Best Ideas for Development"

Techniques

- Analysis Matrix
- Voting
- Voting with Discussion
- Consensus

Development Phase

Information Phase → Function Phase → Creative Phase → Evaluation Phase → **Development Phase** → Presentation Phase

Turn Ideas into Supported Recommendations for Change

Techniques

- Explain & Validate Concepts
- Develop Scenarios to compare to base case
- Make Comparisons – measure performance & cost of scenarios and base case

Presentation Phase

Information Phase → Function Phase → Creative Phase → Evaluation Phase → Development Phase → **Presentation Phase**

Present Results of Study to the Owner

Techniques

- Oral Presentation
- Written Report
- Answer Questions
- Discover Oversights

Value Societies

- SAVE International http://www.value-eng.org/
- Canadian Society of Value Analysis (CSVA) http://www.scav-csva.org
- Indian Value Engineering Society (INVEST) http://www.invest-in.org

More Information

- **MTO - www.mto.gov.on.ca/english/transtek/ve**
- SAVE International www.value-eng.org
- Canadian Society of Value Analysis (CSVA) www.scav-csva.org

SOCIÉTÉ CANADIENNE D'ANALYSE DE LA VALEUR
CANADIAN SOCIETY OF VALUE ANALYSIS

- Institute of Value Management www.ivm.org.uk

SAVE Certification Program

3 Levels

Associate Value Specialist

Value Management Practitioner

Certified Value Specialist

Certified Value Specialist Manager

VE Training

- SAVE Certified Module I course
  - 5 day course that combines 20 hours of training with 20 hours of live project work
  - Course certified by SAVE International
- SAVE Certified Module II course
  - VE practitioners
  - Facilitation skills

Where can VE help?

VE can help where there is scope for change:

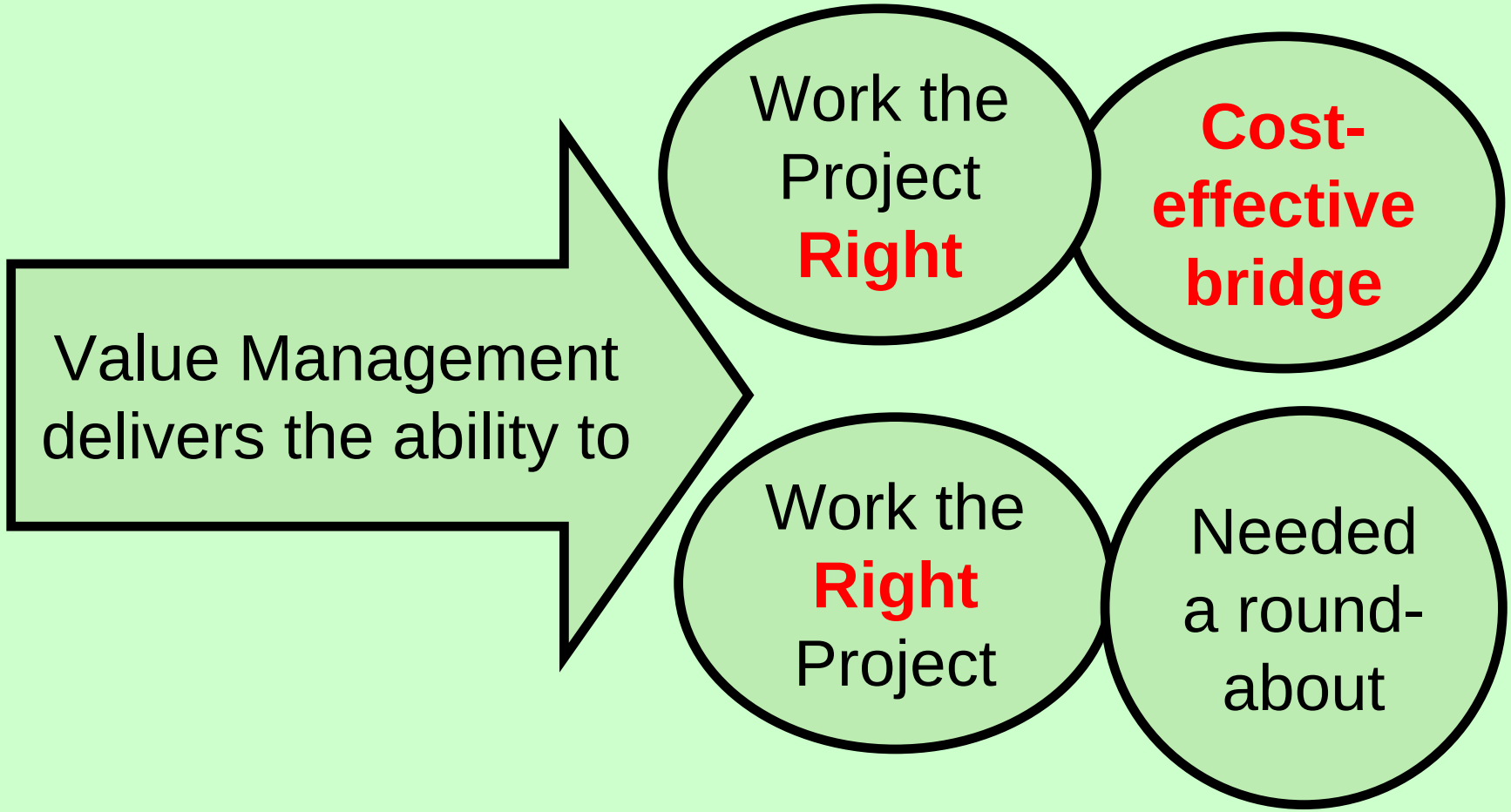
- Difficult or contentious projects – cost – schedule – scope
- Projects and processes where communications are difficult (silos) and horizontal integration is desired.
- Projects or products where innovation is required.
- High value projects – capital – labour – services

Benefits of a VE Program?

- Accomplish more projects for the same money
- Validate that capital expenditures are appropriate for program needs
- Validate planning & design decisions
- Validate project costs
- Improve project designs, function, performance & safety

What are the Benefits of a VE Program?

- Save money and time



Project Selection

- Projects with Construction cost greater than the $10 million
- Expansion Projects
- New Interchanges
- Projects with complex designs
- Projects with complex staging
- Route Planning projects
- Projects with construction concerns

How to Support the VE Program

- Make Yourself and Staff available to Participate on VE Studies
- Make Yourself and Staff available for VE Training
- Make sure You are Planning the VE Efforts as Early as Possible

How to Support the VE Program

- Participate in the Decision Making Process with a Positive and Open Mind
- Don’t Reject Concepts just because....
- Be Supportive and Lead by Example

Video Presentation

Abilene Paradox

Questions

Questions

Questions

Questions

Questions

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