Value Engineering

Value Engineering is merely Not!

- **Cost Cutting**
- **Project Elimination**
- **Scope Reduction**
- **Quality Compromise**
- **Detailed Cost Estimating**
- **Redesign**

An organized study of FUNCTIONS to satisfy the USER'S NEEDS with a QUALITY PRODUCT at the LOWEST LIFE CYCLE COST through APPLIED CREATIVITY

Definition of Value Engineering

- **Terms used to describe "Value Engineering"**
  - Value Methodology
    - **This is the "official" term used by SAVE International. It describes the overall body of knowledge.**
  - Value Analysis
    - **This was the first term used when the process was originally developed for manufacturing**
  - Value Engineering
    - **The term "engineering" was used to identify the process as it is applied to design and construction**
  - Value Management
    - **This less commonly used term refers to its application to business processes**

Value Engineering: An expression

- **The value of a function is defined as the relationship of cost to performance**

$$Value^{max} = \frac{(Function\ or\ Utility)\ or\ Performance^{max}}{Cost^{min}}$$

Range of Application of VE

- **VE applies to everything because every project or process has a function**
- **VE can be applied at any point of the design or process**
- **VE is a problem solving technique**
- **VE can be used as a technique for developing design criteria**

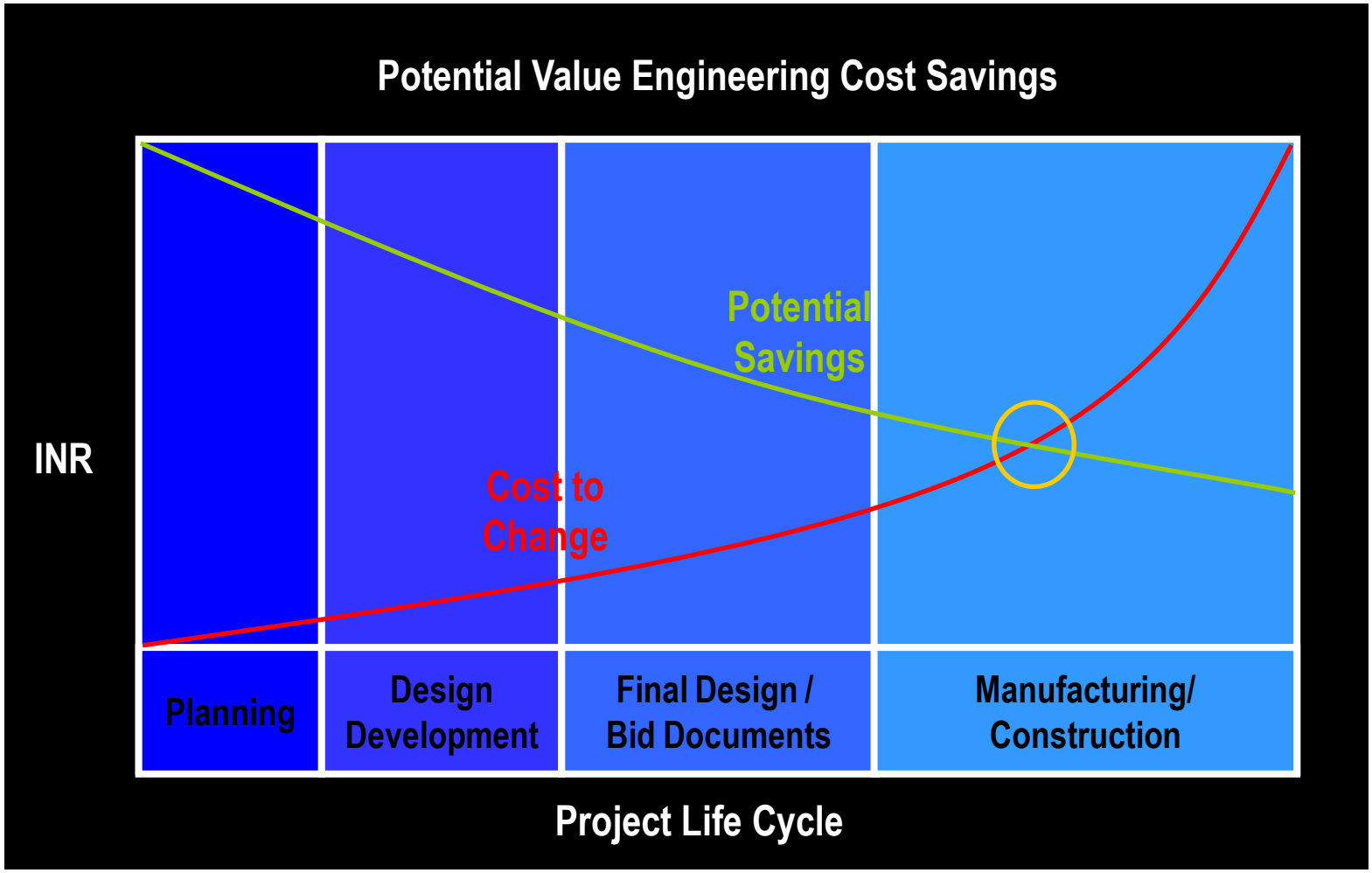
Reasons for Poor Value…

- **Lack of and/or poor coordination among designers**
- **Failure to network with customer – poor definition of needs and wants**
- **Design based on habitual thinking or mistaken beliefs**
- **Not enough time for project formulation and/or design**
- **Failure to utilize latest technologies**
- **Negative attitudes**

More Reasons for Poor Value…

- **Poor communication in developing project scope**
- **Lack of consensus among project stakeholders with regard to project scope**
- **Outdated or inappropriate design standards**
- **Incorrect assumptions based on poor information**
- **Fixation with previous design concepts**
- **Honest wrong beliefs**

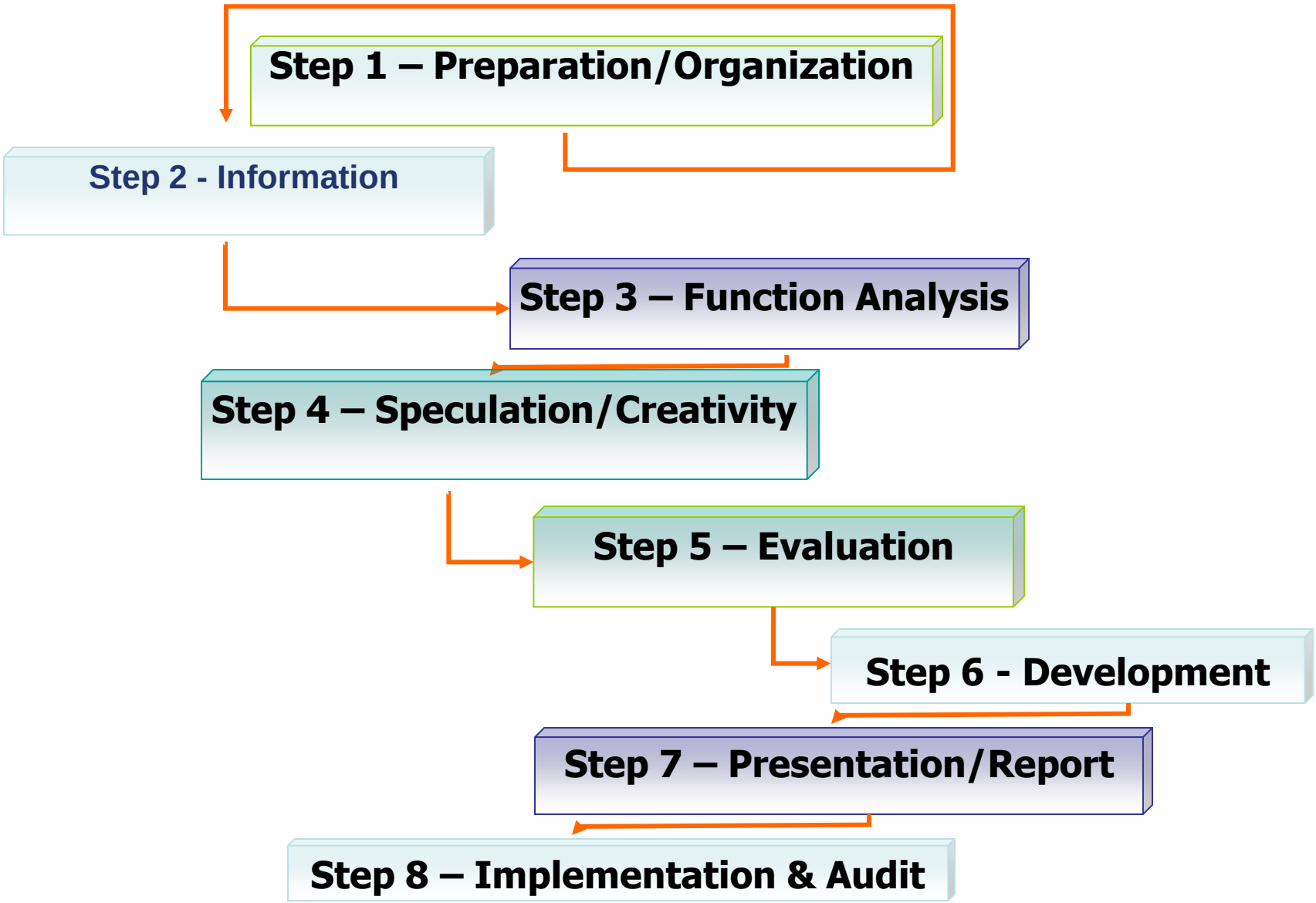
Timing the VE Effort



The Value Engineering Job Plan

- **Provides a systematic approach**
- **Divides the study into distinct work elements**

Value Engineering Is:



Information Phase
Purposes

- **To determine user needs**
- **To gather and tabulate information concerning the item as presently designed**
- **To build team knowledge and understanding of the project**
- **To completely understand the specific use of function requirements of the item**

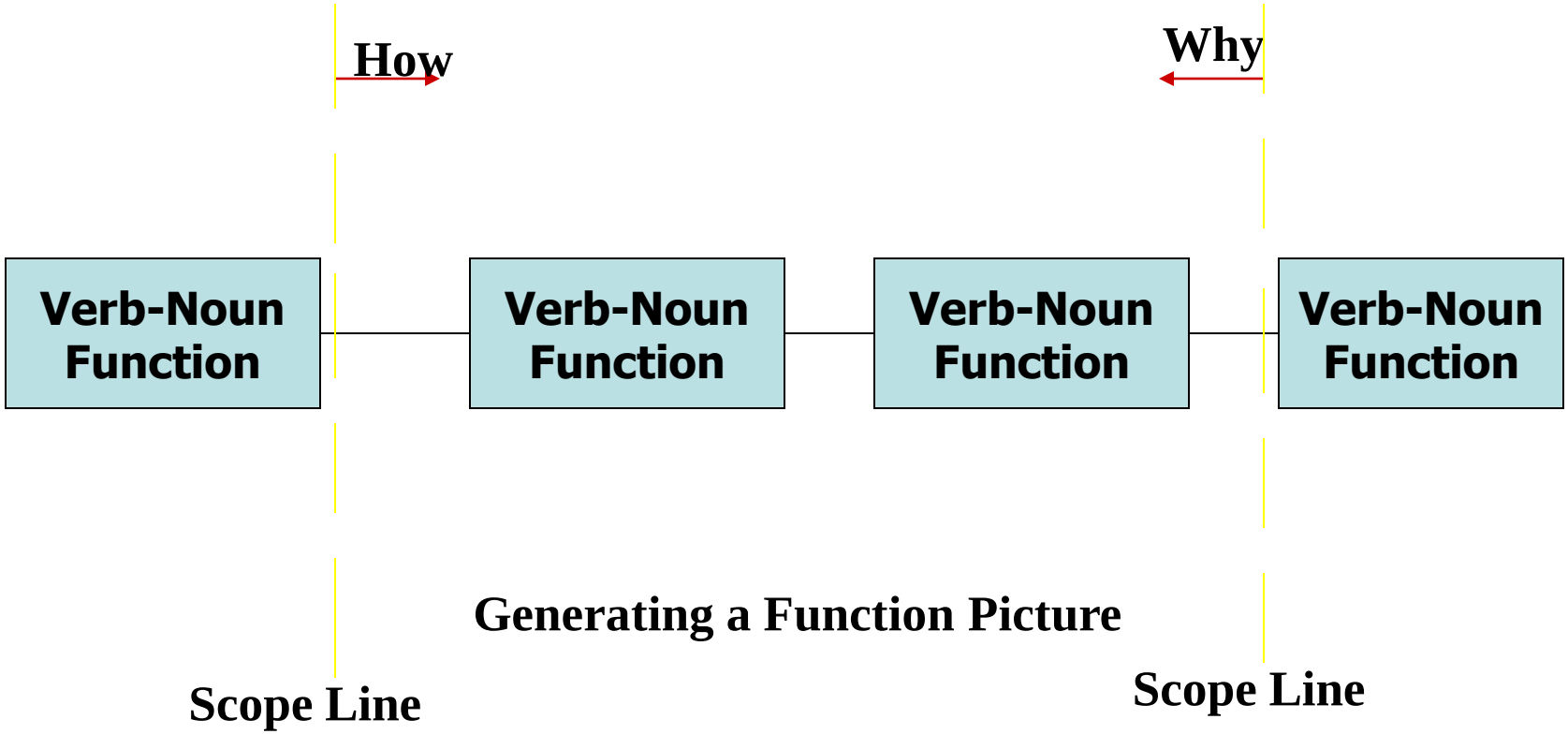
Information Phase
Techniques

- **Get all the facts from the best possible sources (e.g. design team)**
- **Develop cost models**
- **Determine and evaluate the function(s) of the present design**
- **Prepare a *FAST* (Function Analysis System Technique) diagram**
- **Identify & define project Performance Criteria**
- **Develop project Performance Ratings**
- **Determine present design objectives & constraints**
- **What does the customer want?**

Function

- **Specific purposes or intended use of an item (What is this? What is it supposed to do? What else can it do?)**
  - Function is that which makes a product, process or project work or sell.
  - All cost is for function.
  - Primary functions posses value and are required to make a product work or sell.
  - Secondary functions have low value and are present due to the current design of the product.
- **That characteristic that makes a product or service have value**
- **Determine by considering the user's actual needs**

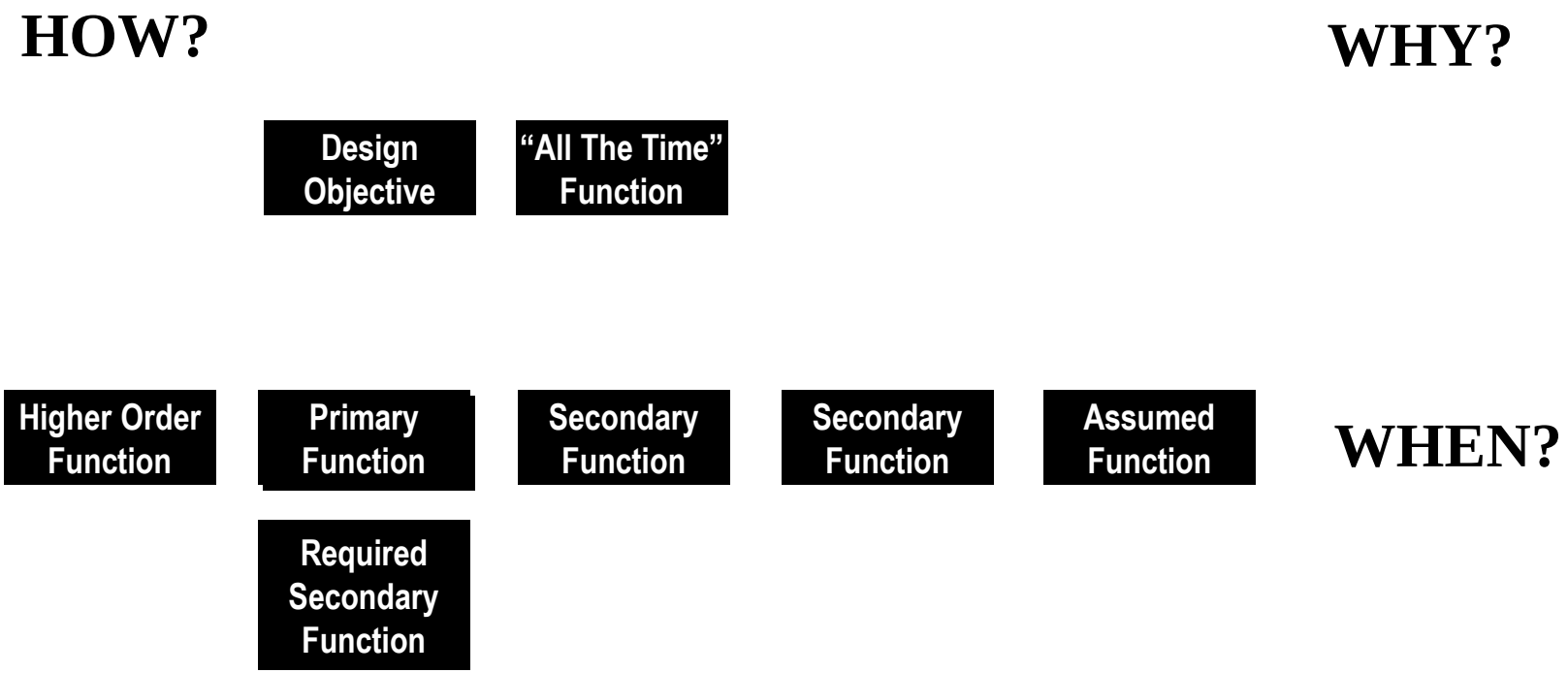
FAST Diagram
Function Analysis System Technique



The Purpose of a *FAST* Diagram is

- Show specific relationships of all functions with respect to each other
- Deepen the understanding of the problem to be solved
- Promote discussion and information gathering – team building
- Support the process of creativity

FAST Diagrams



Speculation Phase
Purposes

- To generate a large number of alternatives that provide the item's basic function(s) without considering their practicality

Speculation Phase
Techniques

- **Use creative thinking**
- **No rules – no limits**
- **Forget about scope, speculate on the FUNCTION - not on the item**
- **Don’t let regulations or people control your thinking**
- **If you don’t look for the *second* right answer, you won’t find it**
- **Eliminate/simplify: modify and/or combine alternatives**
- **Think – get out of the comfort zone and enjoy it!**
- **Keep talking, keep generating**
- **Its about CHANGE!**

Creativity

Brainstorming Rules & Objectives…

- **Criticism/evaluation is prohibited (at this time)**
- **Free-wheeling is welcomed and encouraged – be uninhibited and think as a child**
- **Be spontaneous – rapid fire 'gut feels'**
- **Quantity is desired over quality – cover the walls**
- **Combine and add to ideas**
- **Build upon another person's ideas**
- **How do others solve similar problems**
- **Record <u>all</u> ideas**

Analysis Phase
Purposes

- **To evaluate, criticize, and rank alternatives**
- **Identify advantages and disadvantages as compared to the baseline project**
- **Which alternatives offer the best combination of:**
  - Design-ability
  - Construct-ability
  - Operational ease
  - Quality assurance
  - Customer satisfaction
  - And… low life-cycle cost
- **To develop alternatives that offer the greatest increase in value**

Analysis Phase
Techniques

- **Prior experience**
- **Collective ‘Gut” feels**
- **Stakeholder input**
- **Use cost references**
- **Apply matrix techniques**
  - Define performance measures
  - Weight and rank measures
  - Evaluate alternatives
- **Make sketches**
- **Consult experts**
- **Use your own judgment**

Also to consider…
Life Cycle Cost Analysis! (LCC)

- **A definition…**

  "The systematic evaluation of alternative designs and the comparison of their projected development/design, manufacturing/ construction, operation/maintenance and disposal costs or salvage value over a specified time period."

Development Phase
Purposes

- **To select the best alternative(s)**

- **To develop complete written and oral proposals**

Development Phase
Techniques

- **Recommend specifics, not generalities**
- **Make sure your report describes the disadvantages as well as the advantages**
- **Gather convincing facts**
  - Assure technical adequacy
- **Spend your client's money as you would your own**
  - Complete order-of-magnitude cost estimate w/LCC
- **Prepare Proposal**
  - Finalize *FAST* diagram for proposal
  - Sell the idea through the justification
  - You *<u>are</u>* selling something uncomfortable to most people – CHANGE!
- **Mistakes will cast doubt on your validity**

Presentation Phase
Purposes

- To present value engineering study proposal(s) to the decision makers/stake holders
- To obtain approval/support
- To enhance potential implementation

Presentation Phase
Techniques

- Again, you are selling CHANGE!
- Your enthusiasm will sell your proposal
- Use *FAST* diagram as a communication tool – Are the most important functions satisfied?
- Be brief, pertinent and convincing
- Keep it simple

Presentation Phase
Techniques

- Anticipate/remove road blocks – understand their point of view
- Network with people and gain support
- BUT – you can’t please everybody
- AND – don’t overload the cart with too much information

GAGE'S TWELVE STEPS FOR V.A. (E.L.Gage)

1. Select the product to be analysed - Multiplicity of components; Small difference between use value and cost value; Large volume; Market competition
2. Extract the cost of the product
3. Record nos. of components
4. Record all the functions
5. Record the number or quantity- current as well as in forseeable future
6. Determine the primary function, in view of the purchaser
7. List all other ways of achieving the primary function - brainstorming
8. Assign cost to all alternatives
9. Examine the three cheapest alternatives
10. Decide which idea should be developed further
11. What other functions and specifications features must be incorporated
12. What is needed to sell the ideas - Anticipated savings/improvements etc.