



# **THE GENERAL PROBLEM- SOLVING PROCESS**

IENG 301

FUNDAMENTALS OF  
WORK STUDY AND  
ERGONOMICS

# GENERAL PROBLEM SOLVING PROCESS

Methods design, is a form of creative problem solving.

The following five steps, of the general problem solving process, are useful in the logical and systematic approach to solving almost any problem.

1. **Problem definition**
2. **Analysis of problem**
3. **Search for possible solutions**
4. **Evaluation of alternatives**
5. **Recommendation for action.**

# 1. Problem Definition

Problem Definition-Statement of purpose, goal or objective-Formulation of the problem

a- Criteria-Means of judging successful solution of problem

b- Output requirements:

1. Maximum daily output
2. Seasonal variations
3. Annual volume
4. Expected life of product, shape of volume growth and decline curve

c- Completion date and time available:

1. to design,
2. to install and try out facilities,
3. to bring output up to full production

# 2. Analysis of the Problem

(No evaluation is to be made at this step)

1. Specifications or constraints, including any limits on original capital expenditures
2. Description of present method if operation is now in effect. This might include:
  - a) Process charts,
  - b) Flow diagrams,
  - c) Trip frequency diagrams,
  - d) Man and machine charts,
  - e) Operation charts, and
  - f) Simo charts.
3. Determination of activities that man probably can do best and those that the machine can do best and man-machine relationships.
4. Re-examination of problems and determination of subproblems.
5. Re-examination of criteria.

## Notes:

- Evaluation of the facts should not be made during the analysis stage.
- Critical judgment should be deferred until later in the problem-solving process.

## 3. Search for Possible Solutions

The basic objective of course is to find the preferred solution that will meet the criteria and the specifications that have been established.

This suggests that several alternative solutions be found and then the preferred solution can be selected from these.

### **Note:**

It is wise to take a broad and idealistic view in considering possible solutions to the problem.

## 4. Evaluation of Alternatives

We may have accumulated a large number of ideas bearing on the problem. Some of these can be eliminated rather quickly and the remaining solutions can be considered more carefully.

An examination can be made to determine to what extent each solution meets the criteria and conforms to the original specifications.

It frequently is desirable to select three solutions:

- 1) The ideal solution,
- 2) the one that is preferred for immediate use, and
- 3) possibly another that might be used at some future time or under different condition.

The evaluation of the preferred solution requires careful consideration of future difficulties that might be encountered, such as time and cost to maintain and repair the equipment, the adjustment to widely varying sizes or product mix, etc....

The recommended solution may be the one that is most likely to be accepted and put into effect rather than the ideal solution.

## **5. Recommendation for Action**

In many cases, the person who solves the problem is not the one who will either use the recommended solution or give final approval for its adoption. Therefore, after the preferred solution has been found, it must be communicated to other persons.

The most common form of communication is the written or oral report.

In some cases, a formal and carefully prepared presentation is needed, including the use of charts, diagrams, photographs, three-dimensional models, or working models.

In any event, the presentation should be made in a logical and straitforward manner. It should be easy to follow and to understand. The source of all facts should be indicated, and any assumptions should be clearly stated.

## **5. Recommendation for Action**

A concise written summary should be a part of every report. In the industrial situation, the complete cycle might include a follow-up to ensure that the proposed solution has actually been put into effect. Then an audit or a check from time to time might be made to determine what difficulties were being encountered and to evaluate the over-all results of the installation.

It is desirable to know whether the actual operating method is producing the results claimed for it in the proposal.

To continue further, a re-evaluation or restudy of the method might be made with the purpose of finding further possibilities for improvement, and so the problem-solving cycle would be repeated.

In most business and industrial operations there is no final solution to a problem. A given solution may be put into effect and used until a better one can be found.