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THE SOCIETY OF JAPANESE VALUE ENGINEERS (SJVE)

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(SYNOPSIS OF '72. SJVE CONFERENCE PAPER)

TITLE: VALUE ENGINEERING IN THE UTILIZATION PHASE OF EQUIPMENT

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The writer defines "VE in Equipment Utilization Phase" as VE approach to the entire life of plant equipment, that is the whole activity of efforts to increase the value of the particular equipment by each user, ranging from its initial installation in the plant all the way down to its final deactivation or disposal.

The objective of the Equipment Utilization VE as proposed here is to "maintain the function of the equipment in use at a minimum use cost." There may be some differences between this angle of VE and the more common aspects of VE in Design/Manufacturing phases, where the VE objective is accepted as "realizing the product's functions at a minimum level of its life-cycle cost."

The writer believes that there must be more appropriate approaches that should be directed to the Equipment Utilization Phase than those being applied to the Design/Manufacturing phases in any production activity.

This paper deals with the conclusions that the writer has arrived at by looking into how VE should best be applied to the Equipment Utilization Phase of production. The main points of the conclusions are as follows:

1. A thorough quantitative analysis of the function of equipment under review is a prerequisite.

Rationale: a) Alternatives that would be developed based on qualitative definitions would not always guarantee any realistic results; b) In the achievement of equipment functions, the user's requirements often do not come along with the original requirements as set forth in the equipment specifications; c) Such factors of equipment as achievement levels (attainment levels) of functions, user's physical environments, using conditions, etc. may have changed from the time of equipment installation.

2. The pursuit of functions should be directed not only to the structural elements of the equipment under review but also to the physical operation in the maintenance of equipment performance.

Rationale: Production through any type of manufacturing equipment always requires the software in terms of such operation as necessary to maintain equipment functions, as well as the hardware as the structural element of equipment. Both hardware and software are essential to the effective utilization of equipment, and they cannot be separated from the costs of equipment use.

3. In relation to the analysis of the cost of equipment utilization, the operation or running time of the equipment should be considered.

Rationale: VE in the Equipment Utilization Phase should consider such cost factors as that of the maintenance of equipment functions (materials, work manhours, etc.) as well as the losses caused when the equipment functions could not be maintained (decreased production, lowered quality, etc.).

These costs may easily vary by the influence of the running degree of the equipment under review. Therefore, a realistic cost could only be identified with due consideration of the running degree or frequency of that equipment.

4. Equipment functions should be evaluated qualitatively through use of Functional Validity.

Functional Validity = Functional Availability X Functional Attainment.

Rationale: Important here are not only the task of reducing the equipment's use cost but also the task of bringing up the level of functional attainment, through reducing trouble frequencies, extending the life of the equipment, preventing functional degradations, etc.

5. The equipment value should be evaluated by Value Indices, permitting the integrated evaluation of both functions and costs.

Rationale: Equipment users are concerned for how effectively the equipment functions could be attained consistent with the costs incurred. The equipment value can be determined by the degree of attainment of the required functions and at what use cost. Accordingly, a measure which can evaluate equipment value becomes necessary, and the following measure is used: Value Index == Functional Validity of Equipment/Use Cost/

Production equipment is more and more coming to the fore as an important element of production and productivity. Under such circumstances, a very essential problem to be solved is how to maintain equipment functions with a minimum use cost. In order to solve it, the writer feels that a new VE thought should be encouraged so that further value improvements can be attained from the equipment user's standpoint.