

Appendix B-5

Method for Cost Reduction and Improvements at Manufacturing Sites

The secrets (know-how) of rapid cost reduction at manufacturing sites are as follows:

1. A special two-person cost reduction shall be put under the direct control of a factory manager.
2. Obtain information about the existence of problems on manufacturing sites by means of questionnaires
3. The special cost reduction team shall visit the shop which identified a problem, and solve the problem.
4. Settlement is accelerated if a member of the team takes photographs of the manufacturing sites with problems, writing directly on the photograph the problem and instructions for measures to solve the problem(s).
5. For cases which require a long period to solve or settle, B-6 "Effective And Proper Method for Progress Control" shall be applied.

Method for Cost Reduction and Improvements at Manufacturing Sites

1. Recognition of Essential Features

- (1) Specific "entrance to possible cost reduction and improvements" at manufacturing sites is determined by the "existence" of "a problem requiring solution or necessary condition" which requires the execution of cost reduction and improvements.
- (2) The "existence" of "a problem requiring solution or necessary condition" cannot be found without "eyes and opportunity, or a trigger."
- (3) The opportunity to create the above "eyes and opportunity" is given by clear expression of object terms such as "cost reduction, quality improvement, time saving, functional improvement, work load leveling, danger prevention, and so on" and asking oneself or a person in charge "the proper questions."
- (4) Accordingly, the person in charge naturally notices "a problem requiring solution or necessary condition," if you put the "objective items," "proper questionnaire along the objectives," and "opportunity to ask timely questions, " which you have come up with, to yourself and to the person in charge.
- (5) When the person in charge notices a problem, it becomes naturally possible for him to answer at least the question of the "existence" of "the problem requiring solution or necessary condition."
- (6) "A handhold for possible cost reduction and improvement" for a whole organization can be obtained as long as the minimum information of "existence " is known.

2. Problems at the Manufacturing Site

- (1) The position of workers/person in charge is in general the situation as shown below:

On a manufacturing site, the ceaseless continuation of imposed process work is given the highest priority.

Problems at manufacturing sites are almost always too difficult to be solved by only one person,

In many cases, they are independent of whether the above-mentioned existence of "the problems requiring solution or necessary conditions" for cost reduction or improvement are noticed or not.

As a solution, the organizations of enterprises and government agencies have employed such methods as small group activity and proposal activity. But even in small group activity, it is

still necessary that a proposal be written (on paper or on computer) so that the "requirement and its effect" are understood by a third party.

If they have a rough idea of the above in the small group activity, the problem still remains that the time required for collecting the necessary information and knowledge, exhibiting wisdom, and writing documents can not be sufficiently obtained.

As a result, it is always expected "to solve these problems mentioned above".

3. Detailed Problems at a Manufacturing Site

A lot of time cannot be taken to collect, set and understand the necessary information and benchmarks.

"The viewpoint and the know-how (how to imagine, how to ask, attitude and viewpoint) needed to face up to the reality of the manufacturing site" can not easily be understood.

While some cost reductions or points to be improved are dimly noticed in the mind, these are not expressed clearly.

A proper advisor who can teach how to specifically express the above points can not be found.

Even if the contents could be expressed, there is no time to ask for cooperation or coordination among the superiors or persons in another department to realize the expressed idea.

3. Method for Solving the Above Problems

The important points of one method for the effective, efficient and rapid realization of the "settlement of problem or preparation for it" in the organization of an enterprise or a government agency are described here.

(1) Appointment of a Special Cost Reduction Team

Two people will be assigned by a factory manager or the head of the organization to a special team to carry out improvement and cost reduction at the manufacturing site for a certain period. (This means that everything shall be done by talking with each other.)

The following missions will be given to the team:

- A) The team shall support workers in a friendly manner at the manufacturing site to find a way of thinking and a handhold, which workers require to achieve the viewpoint necessary for arriving at the "problems and necessary conditions for realizing objectives."
 - B) The team shall help the workers in their writing, liaison and coordination, and practical work to realize the "settlement of the problem or necessary conditions for improvement."
- In that time, the team has to "perform the work as a substitute for a person in charge" in

the situations where it is "difficult for a person in charge" or "takes a lot of time", and follow up on the results.

A practical example is that when they can not find suitable tools, a member of the team takes the tools from the warehouse.

- C) The Special Cost Reduction Team:
- a. cannot give orders to the line;
 - b. can coordinate line functions;
 - c. if required, can deputize for the shop workers who have problems and for the need to request counter-actions from another shop or department.

4. Special Cost Reduction Team Tasks

- (1) First make a PMD of the matters which the Special Team has to do.
- (2) On the basis of the above PMD, make terms of the questionnaire as shown in Fig. 1, Sample Questionnaire, and get it answered.

The following items must at least be collected:

The place where there is a problem or facts to be improved (the content of the problem is not needed).

(The minimum requirement is to answer the existence of a problem in an individual questionnaire.) It is appreciated if the contents of the problem or improvement are written down.

- (1) If the place and person having the problem are known, a member of the team goes there and looks at the site, listens to the people there, and then arranges the contents of the action and procedures for it.

There are two other methods:

To start by extracting only the theme/idea to be considered and the instructions for the procedures to cope with it.

To take photographs at the scene of the problem or the scene requiring improvement, write down a possible counter-measure on the photograph and then make the proper counter action possible. (Because a cartoon includes both figure and letters, it creates a scene where both the right and left cerebrums work together and so, it is easy to understand.) We utilize this principle here and call it "improvement method with cartoon."

A "Theme/Idea Sheet" or an "Improvement Implementation Format" is used for this purpose. Fig. 3 and Fig. 4 are examples of completed forms.

- (1) When this form is used, its contents shall include the assignment of a counter-action and the procedures that the concerned line/person in charge shall carry out. The process of this action is written in a chain connected by arrows at the top of a sheet.
- (2) After the assignment of this counter action, timely acceleration and coordination shall be performed by the special team.

The "Action Promotion Sheet" shown in Fig. 5 is used as a Promotion Item List in this case, in which the action column for each "theme/idea" is filled with contents which are written in a chain-style connected by arrows at the top of the form shown in paragraph (4).

The authority of promotion and coordination are as follows:

- a. Promotion and coordination is first performed up to the level of the person or section chief in charge.

If it is not successful, promotion and coordination are moved one rank higher, for example manager level, accompanied with the comment "lower level failed to coordinate."

If there is a point which could not be coordinated at that manager level, the promotion and coordination are sent to a manager one rank higher again.

The highest coordination level may be the head of the organization (president level). (If necessary, an outside organization may be included.)

- b. Use the Method for Effective and Proper Expediting.

5. Supplementary Explanation

With a Special Cost Reduction Team, you can specifically understand the situation at the manufacturing site and the quick and proper method for understanding and coordinating the conditions necessary for achieving the goal and solution of problem.

The special team shall therefore be composed of the people who will carry the organization on their shoulders in the future. It can also be used as an opportunity to find and groom such people.

Attached Samples:

Fig. 1 Sample Questionnaire

Fig. 2 Improvement Implementation Format (Theme/Idea Sheet can be used with this format.)

Fig. 3 Example of written improvement implementation sheet (1)

Fig. 4 Example of written improvement sheet (2)

Fig. 1 Sample Questionnaire

Questionnaire for clues in cost reduction

The purpose of the company is to provide support for you and your family.

To this end, we have decided to develop and market a new low-cost ZZ. We must therefore cut costs in our existing ZZ and raise funds for the development of the new version. Also, we need new themes and ideas to incorporate cost reduction in the new ZZ.

To lower the cost of the existing ZZ, we only need to do our work within a shorter time, with less labor, and in a tidy manner.

Please tell us how that can be done (or its clue) "if we do it this way," "if we have such a tool", or "if we modify a tool this way" by writing it down on this sheet.

Since clues are already helpful, We will appreciate you if you only write "The problem is exist"(No need to write detail). So, we will visit you to hear the detail of the problem. If this sheet is too small, please write just underneath the question , or use another sheet.

Please hand in the sheet by (month)(day)(year) to the secretary for cost reduction.

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1. Should an existing tool be modified, or should such a tool be obtained?
 2. Should an existing facility be modified, or should such and such a facility be introduced?
 3. Should an existing rule be modified, or should such and such a rule be introduced?
(work site rules, management rules, and other rules)
 4. Are there tools or facilities which allow work to be done without or by one person, work presently done by two or more people?
 5. What are the parts or purchased parts which always cause problems? Do you have any ideas for improvement? (shortages of parts included)
 6. Are there assembly sequences, work divisions and combinations which should be reexamined?
 7. Are there any problems with the assembly process or combination of parts?
 8. Are there any problem with part fabrication in assembly line ? e.g. location change of machine ?
 9. Would work be greatly speeded up if the design department could do such and such a thing?
 10. Is there something that could be done to guarantee quality?
 11. Any improvements regarding in-house parts?
 12. Any improvements regarding outside products?
 13. Any improvements regarding purchased items?
 14. Any improvements regarding outsourcing?
 15. Are there aspects which are overdue or should be improved in the worksite improvement guided by manager AA ?
 16. Anything else?

Fig. 2 Improvement Implementation Format (Theme/Idea Sheet can be used with this format.)

ACTION

<u>Improvement implementation</u>				REG. No				CALENDAR DAY			MFG DAY		How many days it takes				
				Name				Date									
				Approved by				Finishing date									
Model		P/N		Name		SEG		Assembly	Sheet metal	Heat treat	Bonding	Paint	Surface treat	Machining	NC machining		
(Problem) Install the eye bolt to sling the heavy index mount.								KEY WORD									
								Necessary conditions									
								Requested serial No.				Applied effective serial No.					
Present method								New method									
Material																	
JIG																	
Tool																	
Facility																	
Cost down value																	
Cost comparison		M/H/ Q'ty	Unit price	Cost/ AC	Total A/C		Q'ty M/H	Unit cost	Cost/ AC.	Total A/C		Per A/C		Life cycle			
					M/H	Cost				M/H	Cost	M/H	Cost	M/H	Cost		
		Material															
		JIG material															
		JIG M/H															
		Fabrication															
		Tool															
	Facility																
	Total																

Fig. 3 Example of written improvement implementation sheet (1)

ACTION

<u>Improvement implementation</u>				REG. No		CALENDAR DAY		MFG DAY				How many days it takes			
				Name		Date									
				Approved by		Finishing date									
Model		P/N		Name		SEG		Assembly	Sheet metal	Heat treat	Bonding	Paint	Surface treat	Machining	NC machining
<p><u>(Problem)</u> Right now, it takes too much time to exchange the beads for shot peening. If improve this, the work of 4 hour per day will be reduced 2 hour per day.</p>								KEY WORD				Necessary conditions			
								Requested serial No.		Applied effective serial No.					
Present method				New method											
<p>1. Because of the small exit width of the pit it is necessary to lift the small bead bracket through the small pit space many times.</p> <p>2. A hand fork-lift is used to return different size of bead to each size box.</p> <p>Write the idea how to improve, on the picture directly. So, it become easy to let a person understand the idea to remodel</p>				<p>Provide a pulley to the upper side of the pit, so it is easy to pull the bead bracket out from the narrow pit space.</p> <p>Extend a flexible hose to each bead size box.</p> <p>Write the idea how to improve, on the picture directly. So, it become easy to let a person understand the idea to remodel</p>											
															
Material				Q'ty				M value							
JIG				M/H				Life cycle							
Tool								M/H							
Facility								Cost							
Cost comparison	Ma														
	JIG m														
	JIG														
	Fabr														
	T														
Fa															
T															

Fig.4 Example of written improvement sheet (2)

ACTION

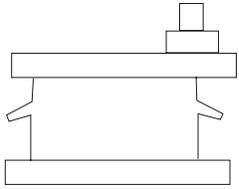
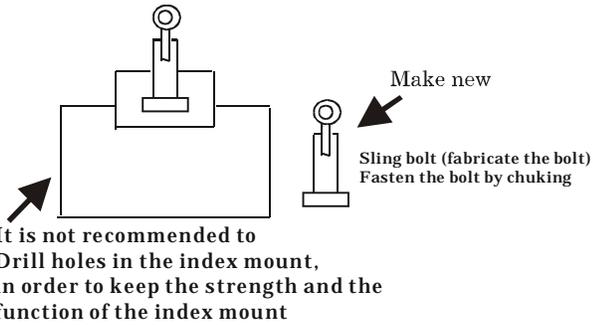
<u>Improvement implementation</u>				REG. No		CALENDAR DAY		MFG DAY		How many days it takes					
				Name		Date									
				Approved by		Finishing date									
Model		P/N		Name		SEG		Assembly	Sheet metal	Heat treat	Bonding	Paint	Surface treat	Machining	NC machining
<p>(Problem) Install the eye bolt to sling the heavy index mount.</p>								KEY WORD							
								Necessary conditions							
				Requested serial No.		Applied effective serial No.									
Present method						New method									
<p>Good example (See below) Fasten the bolt by chuking and sling the index mount</p> 						<p>Fasten the bolt by chuking and sling the index mount</p>  <p>It is not recommended to Drill holes in the index mount, in order to keep the strength and the function of the index mount</p>									
Material						Material									
JIG						JIG									
Tool						Tool									
Facility						Facility									
Cost comparison	Good example						Bad example								
															
	y						y								
	H						H								
	Unit cost						Unit cost								
	Total						Total								

Fig. 5 Example of Completed Action Promotion Chart

Expedition sheet

ITEM NO.	Cont. No.	Class	Item or Part No.	Orig. Date	Original Date Revised	Serial	Note and Conditions	Action/Process	Need Date	EST. Comp. Date
1	B1	A	DTC OF PANEL	12/85	1/86	01	ADVANCE MATERIAL ORDER	<p>MAKE THE STARTED PROCESS IN YELLOW FELT PEN MAKE THE FINISHED PROCESS IN RED FELT PEN</p> <p>DELETE BY CROSS LINE IN EACH CHANGED SCHEDULE</p> <p>12/85 1/86 3/86 REGU- (JOHN) → BASIC (STEVE) → IDEA (TERRY) → MATER (STEVE) →</p> <p>3/86 MAKE DTC COMPARISON (JIM) → ASSY (MARY) → ESTI. (ALICE) → GUYLO (MIC) → ESTIM. (MARY) →</p> <p>3/86 REQUEST MILQUAT (DICK) - ESTIM (ERIC)</p>		
2	B1-1		MATERIAL ESTIMATION (1ST TIME)					<p>RESULT OF DTC TRADE (JOHN) → DESIGN (JOHN) → PLAN (LARRY) → MEETING (LARRY) → MAKE (NICE) → PING (LARRY) →</p>		
3	B1-1'		MATERIAL ORDER				ADVANCE ORDER	<p>3/86 FIND THIS REG (DICK) → OBTAIN QUANTITAM (DICK) → TIRE/ORDER (DICK) → NEW (DICK) →</p>		
4	B1-2		JIG ORDER				ADVANCE ORDER	<p>3/86 DESIGN JIG (TERRY) → MAKE (RED) → JIG (TERRY) →</p>		
5	B1-1		CONTING					<p>3/86 START (ALICE) → ASSY (ERIC)</p> <p>THIS DIFFERENCE IS THE BIGGER, THE BIGGER THE NEED IS STRANGER</p>		
Summary	P-1	12A	ESAP1							