OCAP: Out of Control Action Plan

The following has been pulled from: "Statistical Applications in Process Control" edited by J. Bert Keats, Couglas C. Montgomery, pgs 96-99

The Out-of-Control Action Plan

Since 1986, Philips Semiconductors, headquartered in Eindhoven, The Netherlands, has been using a tool called the out-of-control action plan (OCAP) to react to out-of-control situations. An OCAP is a flowchart that guides the point plotter (at Philips, this is usually the operator) through a defined and repeatable response to any out-of-control condition. Philips actually plans for out-of-control situations before using a control chart. A control chart is never implemented unless it has an accompanying OCAP.

The OCAP has three main parts: activators, checkpoints, and terminators (see Figure 1). The activators define the conditions that signal when the OCAP must be followed. The control chart provides ideal activators because of its ability to accurately signal when a process has gone astray. A typical set of initial activators for a control chart can include out-of-control single average and range points, multiple point trends, and consecutive points on one side of the target value. Modified alternate schemes, such as zone control charts, can be used to provide simplified activator recognition (Jaehn, 1987). The first few decisions boxed in an OCAP are used to define the activators.

Once the activators are defined, the next step is to begin investigating assignable causes. The checkpoints instruct the point plotter to investigate specific items as possible assignable causes for the out-of-control condition. The point plotter determines whether the item is indeed the assignable cause or whether the investigation should continue to the next checkpoint. Depending on the number of activators and the complexity of the process, an OCAP might have dozens of checkpoints. Initial OCAP applications, however, should have fewer than a dozen checkpoints.

Once a checkpoint has identified a probable assignable cause, the OCAP will flow into a terminator, where the trip through the OCAP ends for the out-of-control sample. The terminator contains the action that the point plotter will take to resolve the out-of-control condition. Here, the point plotter

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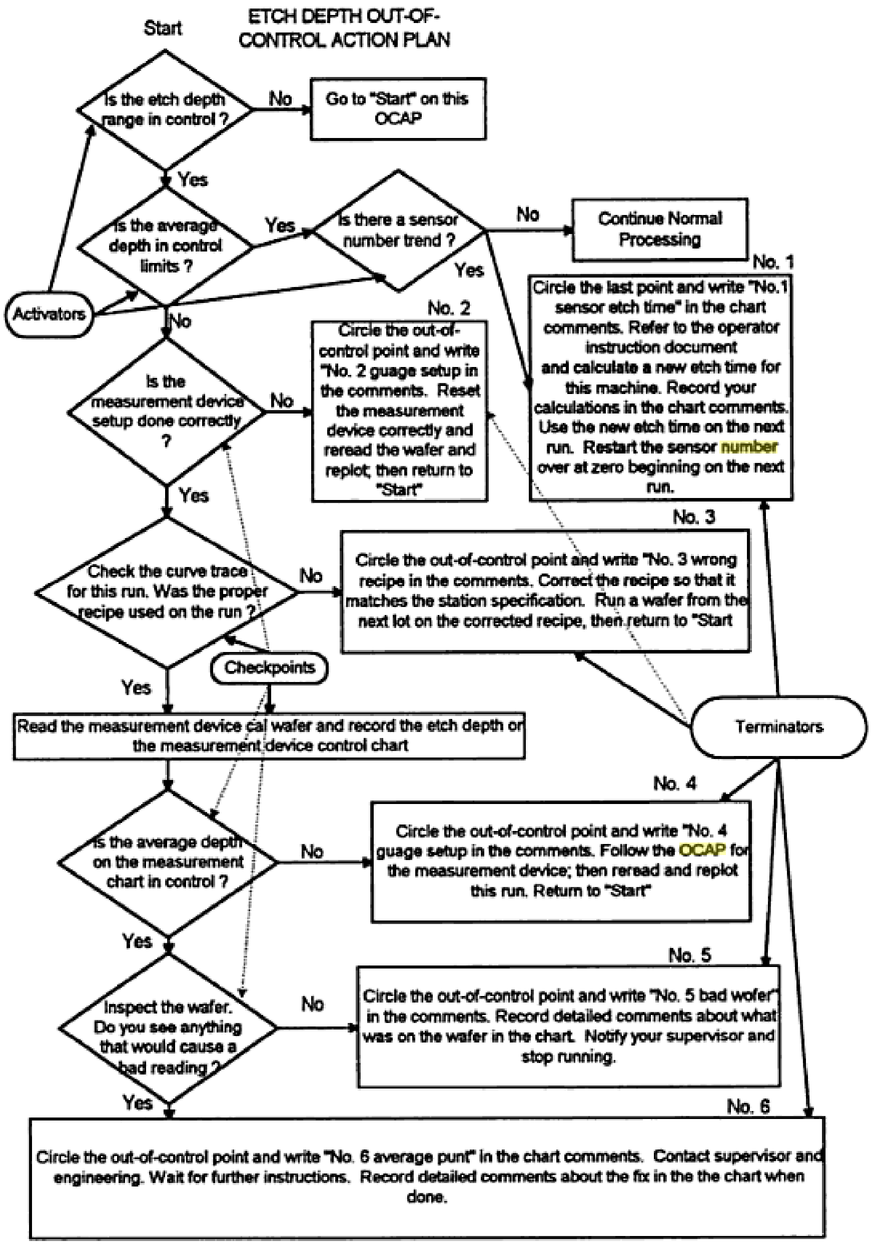

Figure 1. The OCAP.

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manufacturing process remains in an unknown state of control. The PAT attempts to put early in the OCAP those checkpoints that are easily investigated, take little time, or have a high probability of resolving the situation. Conversely, checkpoints that are difficult and time-consuming, that must be investigated by someone other than the point plotter, and that have a lower probability of identifying the cause are relegated to the latter part of the OCAP. In the initial stages of OCAP implementation, this order is based on the PAT members' judgment and experience until data on actual OCAP performance can be analyzed.

Terminators are usually numbered according to the order in which they appear in the OCAP. A terminator will instruct the point plotter to write (in the control cart comments section) the terminator number and a short comment identifying what flow was taken in the OCAP to find the cause. The terminator might also instruct the person to record additional comments that provide more information about the out-of-control occurrence. Once all reasonable checkpoints are included in the OCAP, the PAT will typically add a last terminator, called a punt terminator. A punt terminator signals to the point plotter that all check-points have been investigated and that the assignable cause is still not found. At this point, more obscure assignable causes can be investigated. Punt terminators require the point plotter to provide detailed documentation on the control chart regarding the assignable cause that is eventually discovered.

Other keys to making the OCAP easy to follow include using checkpoint questions that have only two possible answers (typically "yes" or "no"), ensuring that arrows do not cross each other, and providing a unique path to each terminator. Clever design of the control chart can also minimize troubleshooting time once the OCAP is in use (Figure 3). Providing information in the data table of the control chart helps the point plotter answer checkpoint questions and analyze the out-of-control situation.

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records specific information on the terminator in the comments section of the control chart, thereby linking the OCAP and the control chart (see Figure 2).

OCAP Construction and Implementation

The driving force for implementing statistical process control within Philips is the shop-floor team, called the process action team (PAT). Each fabrication facility has 20 to 30 of these cross-functional teams–one for each major piece of equipment or process step. PAT membership usually includes an engineer, at least one operator, a production supervisor, and an equipment maintenance representative. PATs are chartered and empowered to drive continuous improvement at their respective operations, using quality tools. PATs design control charts, calculate control limits, and construct the accompanying OCAPs.

PATs have discovered that focused brainstorming, particularly in conjunction with the cause-and-effect diagram, is effective in starting OCAP construction. Potential OCAP activators are typically used as the effects, and the brainstormed causes are translated into checkpoints in the OCAP flow.

When designing an OCAP, the goal is to make the flow efficient and easy to follow. Efficiency is achieved by the order in which the checkpoints appear in the OCAP. The more checkpoints the point plotter must investigate, the longer he or she stays in the OCAP process and the longer the

Signetics		Form B: Action record for control chart			
Sample No.	Term No.	OCAP terminator comment	Other comments	Badge/ first name	Date

Figure 2. Section in Control Chart for OCAP Terminator Comments.

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The following was extracted from the following website: http://www.whatissixsigma.net/six-sigma-dmaic-control-phase/

If process control involves carrying out of identifying and employing practical actions, Out of Control Action Plan refers to setting the plans in order to take action correctly to “out of control” signs. This can anticipate the course performance. Course changes are handled effectively and steadiness is ensured in the event of new conditions. This also allows early discovery of impending causes or problems before it becomes a problem.

Process Step	Control Item (Input or Output)	Control Methods	Responsibility	Specification Limits/ Requirement	Response Plan

OCAP Table – Out of Control Action Plan Table

The table above is a draft of OCAP. The continuous procedure should be noted under the process step header. Control Item indicates the key course inputs that need to be managed to meet the production requirement. It should also include the key course outputs that need to be observed for signs requiring awareness. Control method should include control chart, metrics, after action reviews, approvals, and trainings. Responsibility notes the group or an individual who owns the job. Specification Limits/Requirements will show the customer measurement limits or requirements of the internal performance. Response plan should note the counteractive actions to solve/contain the problem and reduce losses. The table below shows an example of an OCAP:

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Process Step	Control Item (Input or Output)	Control Methods	Responsibility	Specification Limits/ Requirement	Response Plan
Quality Lead randomly selects calls per agent	Input - system fully functional	Metric	IT	100%	1. Train the Quality Lead and Team Lead on how to escalet system downtime 2. Follow up on the service level agreement between Company A and the Systems provider
TL conducts call monitoring and saves accomplished monitoring form in the system	Output - completed call Observation form	Metric	Quality Lead	Variable - dependent on number of agents	1. Weekly tally of number of call monitored per agent per month 2. Remind Team Leads to complete monitoring within timeline 3. Expectation setting of roles and responsibilities of the Team Leads 4. Include time completion as part of performnace scorecard
TL conducts call monitoring and saves accomplished monitoring form in the system	Input - objectivity by the teamlead when conducting call monitoring	Audit	Quality Lead	20% of total calls monitored	1. Quality assoiates conducts audits of call monitored to include: a) data values with high variances; b)random sampling of team lead monitoring 2. In cases of variances in call monitoring scores between QA and TL, QA and TL to discuss and agree on final score 3. Final scores to be confirmed by Quality Team prior to agent distribution for coaching and submission to client
TL conducts call monitoring and saves accomplished monitoring form in the system	Input - call observation Form current	Audit	Quality Lead	100%	1. In cases when Quality Lead receives informationabout changes, communicate to Operations Team 2. Also, Qulaity Team will be responsible for facilitating correct form uploaded in the system 3. In cases when system upload is delayed, communicate alternate solution - fill out the call monitoring form from client URL

OCAP Table Example

Control plans may include other data than the one presented. The important thing is that they must be available, controlled and trained to.

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