International DATALYZER
Partners in Continuous Improvement

Keeping operators involved in SPC with automatic import

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1. Keeping operators involved in SPC with automatic import

INTRODUCTION

To get maximum results from SPC you need to apply SPC real-time. Without direct involvement of the operators and starting the out-of-control action plan (OCAP), a control chart can still be useful to acquire more knowledge about the process, but you will have a lot more difficulty finding the root cause and preventing defects during the process.

Various methods are implemented in DataLyzer to make sure the out-of-control plan is properly executed:

- Cause and action note entries can be forced
- Data entry can be blocked if an OCAP is not executed
- A dashboard indicates if an OCAP is escalated to another level
- Sign off procedures are implemented to guarantee an OCAP is properly executed

All these procedures work nicely if a measurement is initiated by the operator. But when a measurement is done fully automatically, we cannot block a next measurement. Some examples of fully automatic measurements are:

- Measurements done by a CMM like Zeiss, Mitutoyo, PC DMIS, Faro etc.
- Camera inspection
- Automatic inspection using a sensor or gage like for example weight control
- Automatic import from an external source like csv, a database or a PLC

The number of characteristics can be high and the frequency of measurements as well so the real time status like shown in figure 1 is not always providing the operator with enough information on what has happened.

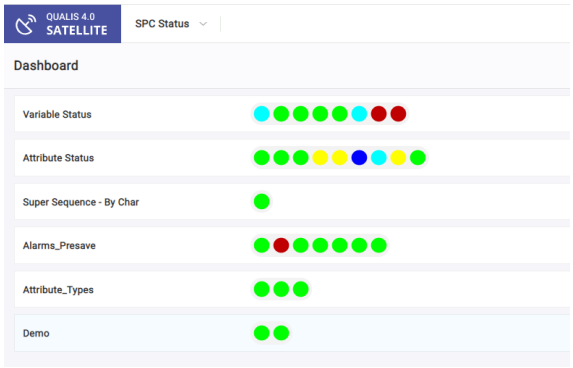

Figure 1: Real time status control charts on shop floor Satellite

The status screen in figure 1 is showing the operator the status of the last measurement for each control chart but it doesn't tell if there have been any out of controls during the shift which where no out of control actions have been done.

So, for automatic imports we need additional information to make sure all out of controls are noticed by the operator and are taken care off.

2. Out of control management

Datalyzer supports various ways to inform the operator or engineers that an out of control has happened.

Email alerts

The first option is Email alerts. For every individual out of control an Email alert can be sent to a specific user. This provides an option to signal employees that an action is required. For example if the process characteristics of incoming material in an injection moulding plant are out of control the maintenance department is alerted.

Recent measurement page

The number of characteristics on a dashboard can be large. So DataLyzer provides an option that only products which were measured recently are visible on a page. During the configuration you can establish what the time period is you want to use for the recent status page. This screen will for example only show the measurements done in the last 30 minutes.

*** Updates in the last: 30 minutes ***

Options Data Help Recent

Sequence/Characteristic		Date/Time	Last Avg	Last Rng	LSL	Target	USL	PPK	CPK	Average	Range
Inmation alarms											
Alarm test		22/03/21 13:04:43	1.00						-11.09	12.09	

Figure 2: Display of automatic measurements done in last 30 minutes

Andon light

DataLyzer offers an option to activate an Andon light for a station on the shop floor where SPC is applied. The Andon light will turn red if there is any out of control during the current shift and which is not taken care of in the out-of-control action plan.

If for all out of controls notes and actions are entered the Andon light will turn green again
OOC management screen

The options above will be sufficient in most situations but if the number of out of controls is high a screen is required which shows all subgroups with an out of control during a specific period for example the last 8 hours.

Sequence/Characteristics	Date/Time	Average	Range	LSL	Target	USL	PPK	CPK
Variable_SPC Status								
Test1	3/9/2021 11:01:57	11.8336	1.5160	7.00	11.00	15.00	0.3600	0.79
Test 2	3/9/2020 09:18:45	7.0822	0.0422	7.00	11.00	15.00	-0.8600	0.73
Test 2	3/9/2020 09:27:42	7.1539	108.4795	7.00	11.00	15.00	-0.6200	0.00
Test 2	3/9/2020 09:34:55	7.1262	0.3796	7.00	11.00	15.00	1.9100	2.43
Test7	3/9/2020 10:05:59	7.0152	0.0113	7.00	11.00	15.00	0.4900	0.51
Test 10	11/30/2020 12:04:29	32.2300	48.6071	7.00	11.00	15.00	-0.7998	-0.13
Test11	3/2/2020 13:53:31	7.0083	0.0183	7.00	11.00	15.00	-0.9200	0.17
Test 12	3/2/2020 13:56:14	6.0125	0.0250	5.00	7.50	10.00	-0.9200	15.23

Figure 3: OOC management screen (list view)

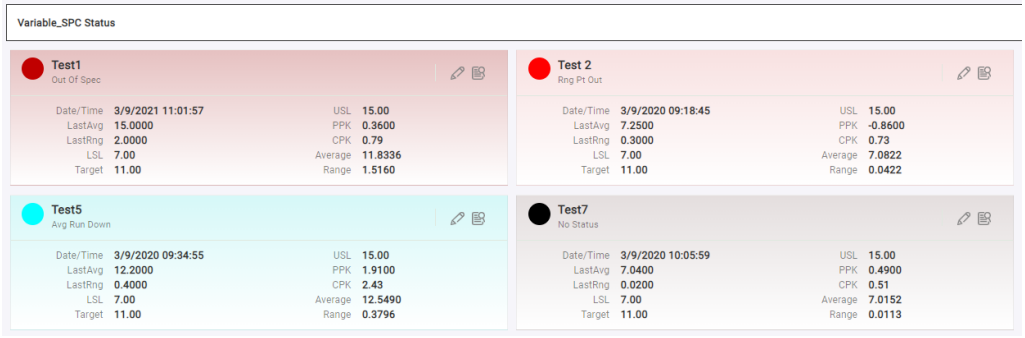

Figure 4: OCAP management screen (tile view)

In this OCAP management screen you will see all out of controls in the shift which do not have a note or cause, or action entered. To make sure the number of out of controls are not too high you can filter: You can for example only show out of controls average and range and not the trends and runs. You can also filter that out of controls were Ppk > a threshold value is not shown or you can limit this screen to only the critical characteristics.

If you see a larger number of out of controls related to the same problem you have an option to handle all subgroups for a chart or part in one time and provide them all with the same cause and action note. For example, a sensor was dirty and that has caused a number of measurements to be out of control. Then it is possible to select a chart or sequence and automatically assign the same notification to all subgroups or even automatically exclude all subgroups from calculations because it is an incorrect measurement.

To make handling of out of controls faster you can acknowledge an out of control without taking action indicating you have seen it but will not take action. The acknowledge note is entered and the subgroup is taken of the list.

This way out of controls are always noticed, the SPC data stays reliable and reports stay meaningful even in case of automatic data collection.

3 Contact

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