

SPC Demonstration Tips

Key Points to Cover When Demonstrating Ignition SPC Downtime

In general, the SPC Module is designed with a great level of flexibility to support a wide variety of production environments. This allows you as an integrator to provide exactly what the customer is asking for. However, it can also make a demo more complicated and care should be taken to understand the customer's requirements and desires in advance and focus on key features they need.

Have a demo agenda so that the potential customer has an idea of the sections you are going to demo.

Rehearse and test just before your demo to make sure the system is working correctly and you have good data to show in control charts and reports.

The SPC Module is more than just a LIMS (Lab Information Management System) or displaying SCADA data in control charts. It can span from the lab to the plant floor and has sample scheduling, automatic sampling, automatic SPC rule evaluation features and much more to efficiently and smoothly track quality within your organization.

Show Sample Definition Screen

The Sample Definition screen provides users the ability to define samples to be taken. This allows the quality department to define samples and attributes on the fly without the need to use the designer. This applies only to manually entered samples because automatic sample collection is tied to tags and instruments which requires configuration that is done in the designer.

• Dynamic Sample Entry - Talking Points:

- Define number of measurements per sample. Also known as sample size.
- When sample measurements are recorded, they can be automatically or manually approved.
- Define attributes (values) to collect for each sample. This includes the attribute data type, default value, minimum value and maximum value.
- Define locations appropriate to take the sample.
- Define control limits and signals (rules) to evaluate each time a sample is recorded and approved.
- Mark attributes as not required, allowing the user entering in sample measurements the option to skip a value for the attribute.
- Mark attributes as disabled to stop collecting measurement values without losing the historically collected measurements. In fact, attributes can be enabled and disabled multiple times at any time and still maintain the history.
- Notes can be entered at the time samples are recorded or approved, then they are shown on the control charts.

Show Sample Entry Screens

The sample entry screens of the demo show the variety of different types of sample entry scenarios that can be created using the SPC Module. This scratches the surface of sample entry screens because of the number of combinations that are possible, but the SPC Module can accommodate the customer's requirements to minimize the impact on the end user.

- **Basic Sample Entry with Instructions** - Talking Points:
 - This demonstrates the user initiating new samples. They are not scheduled and it is up to the user to know when to take a sample.
 - Instructions provide a more consistent sampling approach and help with training.
- **Dynamic Sample Entry** - Talking Points:
 - This demonstrates how the user can select a location and a sample type for which to enter measurements.
 - This is good for labs or test stations that record samples for multiple locations.
- **Sample Entry with Instrument Interface** - Talking Points:
 - This demonstrates reading sample measurement data from an instrument (using the Instrument Interface Module which comes with the SPC Module) and reviewing measurements before recording a sample.
 - Sample measurement values can be read from any combinations of manual entry, calculated values, serial devices, files, tcp, etc.

Show Sample Monitoring Screens

The sample monitoring screens demonstrate two types of monitoring that the SPC Module does without human intervention. This is something that most SPC software packages don't do.

- **Scheduled Samples** - Talking Points:
 - Ensure sample collection is being done at the correct time instead of relying on the memory of operators or lab technicians.
 - Receive notifications when samples are coming due, due, overdue or waiting for approval.
 - Samples can be scheduled using one of the built-in intervals or a custom interval to accommodate the production flow. This allows samples to be scheduled or collected only during actual production times or other criteria.
 - This will free up quality staff to do other tasks and only be notified when sample collection is falling short.
- **SPC Signal (Rule) Violation Monitoring** - Talking Points:
 - Without human intervention, SPC signals (rules) are evaluated every time new sample measurements are approved. This includes both manually or automatically entered sample measurements.
 - The Rule Monitoring screen demonstrates detecting Nelson Rule 3 violation that even though the SPC data falls within the control limits, a pattern of six consecutive points are increasing. This can be a trend that quality will be a problem if the trend continues.
 - The SPC Module has built-in industry standard rules but custom rules can be defined in the designer.

- This will free up quality staff to do other tasks and only be notified when SPC results need attention.
- Any number of rules can be evaluated for a given sample definition.

Show SPC Control Chart Screens

The control chart screens allow viewing and analyzing SPC sample data in one of the industry standard control charts.

• Individual Chart - Talking Points:

- This demonstrates the control chart typically used to analyze automatically collected sample data from tags.
- In the demo project, selecting the "SQLTag-Line 1 Checkweigher" stored SPC settings shows an example of collecting a weight value from a checkweigher every 100th reading.
- With the Individual Outside signal (rule) selected, you can change the UCL to a fixed value (as opposed to calculating the value) that is below one of the data points. This will show all the points violating the Individual Outside rule in red. Hovering over the points will display more details in a tooltip.
- Notes and assignable causes can be added to any point in the control chart. The note shows in the control chart and can be included in reports.
- Role-based security can be applied to various display and operations of control charts. For example, access to control limits can be limited to specific roles.

• XBar Range Chart - Talking Points:

- This demonstrates the control chart typically used to analyze samples with multiple measurements (also known as sample size) that can come from automatically or manually recorded sample measurements.
- There are multiple control limits. In this case there are the calculated control limits UCL and LCL that represent what boundaries that based on past sample measurements, future sample measurements should fall within.
- The USL and LSL control limits represent fixed specification limits.
- There can be any number of control limits included on a control chart, provided they can fit on the control chart.

• Process Capability Chart - Talking Points:

- This demonstrates the process capability control chart that is used to determine if a process can produce product within given specification limits.
- It can also be used to monitor how well the process is staying within the given specification limits.
- The mean value is calculated from the actual sample measurements and the Target is a manually entered specification target. Comparisons between the mean and target can be analyzed to determine if product is being produced to the left or right of the target.
- The LCL and UCL are the control limits based on 3 standard deviations (also known as sigma) on either side of the mean. Comparisons between the LCL and LSL and the UCL and USL can be analyzed to determine the ability of the process to stay within the specifications.
- cp indicates how much the actual process control limits are within the specification limits. If the UCL equals the USL and the LCL equals the LSL, then cp will be 1.0. If cp is less than 1.0 it indicates the LCL and/or UCL are outside of the USL and LSL.

- cpu represents the relationship between the UCL and USL. If they are equal, then cpu will be 1.0. If the UCL is greater than the USL, then cpu will be less than 1.0. And if the UCL is less than the USL, then cpu will be greater than 1.0.
 - cpl works the same way as cpu except it reflects the lower side of the measurement values.
 - cpk is similar to cp but also takes into account the relationship between the mean and target and will equal the smallest value between the cpu and cpl values.
- **p Chart** - Talking Points:
 - This demonstrates analysis of attribute type sample data. Attribute type sample data includes counts of nonconformities (defects) or nonconforming (defective) items.
 - **Pareto Chart** - Talking Points:
 - This demonstrates analysis of nonconforming or nonconformity attribute type sample data. Attribute type sample data includes counts of nonconformities (defects) or nonconforming (defective) items.
 - It is used to help focus on which nonconforming or nonconformity to focus on to make the biggest improvement of quality.

Show Reports

The Report screen uses the Ignition Reporting Module to show SPC data.

- **Checkweigher Report** - Talking Points:
 - Reports can contain a combination of SPC data along with other types of data that is available within Ignition.
 - The control chart cannot be used in reports, but similar graphs can be used to replicate them.
 - Reports can be printed or saved as PDFs or images.

Designer

- **Production Model** - The designer is where the production model representing your plant is defined. Locations, where samples are performed at, are defined in production areas or production lines that provides granularity within your plant.

Talking Points:

- Defined automatic samples from tags are defined at locations.
- Notifications of samples becoming due, due, overdue or awaiting approval happen by location.
- Notification that out-of-control conditions exists happen by location.
- Sample definitions are assigned appropriate locations.

It is also good to copy a couple of locations from Production OPC server within the OPC browser to the tag browser. Then show the tag **Signal Out of Control**, **Sample Coming Due**, **Sample Due**, **Sample Overdue** and **Sample Waiting Approval** tags for the two different locations. This will help clear up what is tracked by location instead of clumped into one status for the whole plant.

- **Additional Factors** - Additional factors are user defined additional data that is saved along with each sample.

Talking Points:

- Sample data shown in control charts can be filtered by additional factors.
- Any data that can be put into an Ignition tag can be recorded as an additional factor.

- **Build Sample Control Chart Screen** - Show how easy it is to build a screen containing a couple of control charts using the SPC controller.

Talking Points:

- Mention that all of the screens they saw in the client were 100% built using the Ignition Designer and the component that comes with the SPC Module. Show the SPC components and quickly describe a few of them.
- Ignition has role-based security to limit viewing or changing information based on their authentication role.
- Control charts have many properties so the appearance can be to their preference.