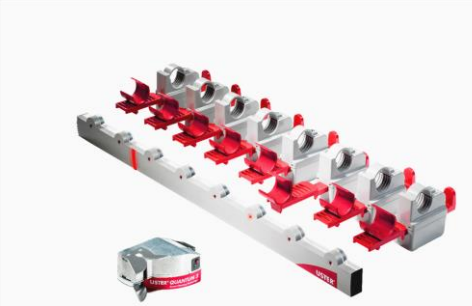
PRACTICAL CASE

How a spinner found three major benefits from USTER® *RSO 3D*

Rapid identification of potentially damaging faults – and pinpointing the root causes – resulted in significant gains in productivity and quality control for this spinner.



Yarn clearing is an efficient way of removing defects – but it would be much better to find the root cause of faults and correct the problems at source. That was the request from this mid-sized and future-oriented spinner. The challenge was to find a way to integrate quality control within the yarn production processes.

USTER solution

The spinner invested in the USTER® *RSO 3D* as an opportunity to automate the prevention of quality claims and reduce waste in ring spinning. In practice, the spinner managed to:-

- Stop faulty cops being wound in the final packages
- Stop the production of poor quality by effectively having 'clearers on ring frames'
- Create a quality mapping of individual spindles

USTER® *RSO 3D* was installed in a section of the mill where the ring spinning machines are linked to Muratec QPRO EX with Spin Inspector. The mill has 40,000 spindles in total.

Result #1 – stop the faulty cops early

The mill produces Ne 25 combed cotton yarn. USTER® *SENTINEL*, based on its built-in intelligence and various measurements, labeled spindle 336 as "off-standard".

The number of the affected spindle was passed to the winding machine. The Muratec QPRO EX winder is equipped with Spin Inspector and bobbin exchanger, so the machine was able to identify the affected cop during doffing. The cop was removed from the process at the winding machine entry, while the other cops were transported by conveyor belt to the winding positions. The rejected cop was later tested in the laboratory on an USTER® *TESTER 6*, with the following results:-

USTER® *TESTER 6*	**Machine average**	**Cop spindle 336**
CVm (%)	12.7	15.1
Total IPI standard (/km)	73	360

If this cop had been transported and processed by the winder, there would have been a severe impact on the overall cut level per 100 km, as well as on the efficiency of the machine. It would also have brought a high risk of causing an expensive quality claim because of too many joints and variations in the yarn structure. These factors confirmed that labeling the cop as "off-standard" and ejecting it was justified.

After receiving the results from the laboratory, a service technician checked spinning position 336 and discovered that the roving was misguided, going above the pin bar spacer instead of underneath (Fig. 1).

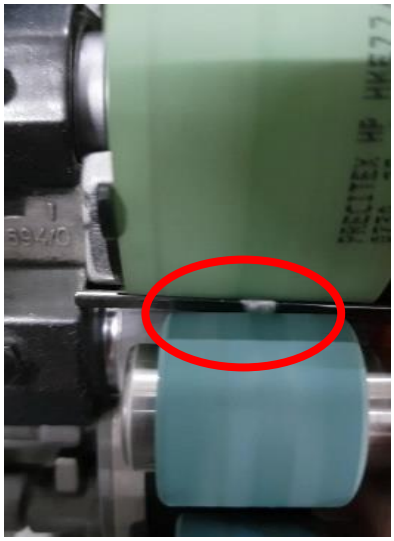


Fig. 1: The roving was misguided, going above the pin bar spacer instead of underneath.

Finding such problematic spinning positions without additional help or indication would be either too late or a matter of luck. In both cases, the cost would be very high.
According to the spinner's own calculation, every month the mill would lose the ability to produce 23 kg of yarn from just this one faulty spindle! (This was based on 12 doffs per day at 65 gm per cop).

Result #2 – stopping the production of poor quality

As part of the assessment, USTER® *QUANTUM 3* raised a CV alarm on one particular spinning position after two consecutive doffs of the Ne 25 combed cotton yarn. The alarm appeared on the CCU above the machine display, indicating that spindle 721 was the root cause of the problem (Fig. 2).

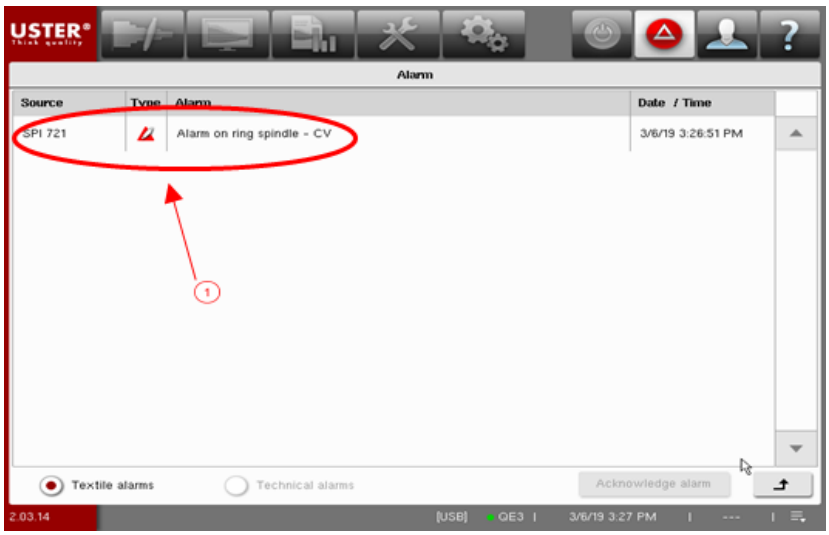


Fig. 2: USTER® *QUANTUM 3* showing a CV alarm indicating that spindle 721 was the root cause of the problem.

The CCU sent this alarm to USTER® *SENTINEL,* where the spinning position was signalized and stopped, since the Roving Stop option was installed.

The cop was then removed and checked on the USTER® *TESTER 6*.

USTER® *TESTER 6*	**Machine average**	**Cop spindle 721**
CVm (%)	12.7	14.1
Total IPI standard (/km)	73	145
Total IPI sensitive (/km)	473	1061

The service technician checked spinning position 721 to find the root cause of the defect. He found that the bottom apron was missing at this spinning position (Fig. 3).

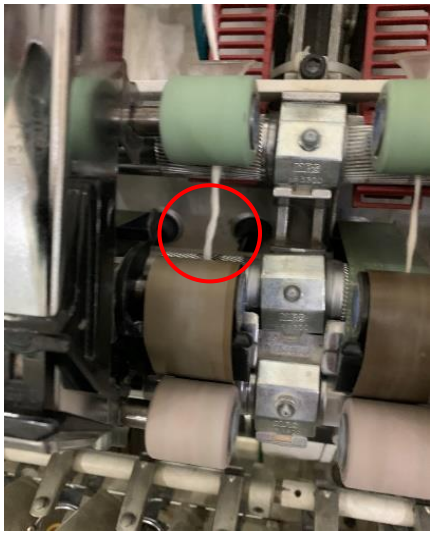


Fig. 3: Bottom apron was missing at the spinning position 721.

As with the previous example, identifying such problems is quite difficult. But the costs are ongoing until the problem is rectified.
For this spindle, the potential production loss was calculated as similar to the previous example. This means that because of these two faults alone, the spinner would lose 45 kg of yarn per month.
When the spinner extrapolated these findings across the whole operation, it was concluded that – with only 0.001% of spindles (statistically) prone to produce exceptions – the business would lose around 95 metric tons of yarn over a year!

Result #3 – quality mapping and influences on machine sections

At another machine, the mill faced a very high level of PF (periodic faults) cuts. In addition to the yarn fault overview, the spinner considered the quality map on the CCU, which appears immediately after a doff has been processed on the Muratec QPRO EX.
Focusing on periodic faults, selecting PF on the quality map showed it was not the entire spinning machine being affected – just two particular sections on the right-hand side of the machine. All positions in this area were affected, as revealed by clicking on the sections (Fig. 4).

Fig. 4: PF on the quality map, showing only two particular sections on the right-hand side of the machine affected.

Equipped with this information, the service technician began observing area indicated. Immediately he found that dust and fluffy fiber bundles were falling on to the machine from a defective flap above it.

Fig. 5: Defective flap above the machine, causing dust and fluffy fiber bundles to fall on to the machine.

In this example, the quality problem created by a defective flap might have been overlooked if it was not linked to a very specific yarn problem, such as periodic faults.

The importance of the ring quality map is that it can easily relate problems such as cuts, imperfections, CV and Hairiness deviations with actual issues in the ring spinning machine or spinning environment, which can be easily identified and fixed. Therefore, it can be used by operators and technicians without requiring a high degree of textile expertise.

Conclusion and Summary

The fact that USTER® *RSO 3D* was easily accepted and used by the mill personnel here resulted in a reduction of blocked cops in winding by 90 % after a period of 1 month.

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