50 years of USTER® yarn clearers for automatic winders

The story of textile quality, as told by some of the pioneers

At the push of a button, spinners today can set up automatic yarn clearing with the latest USTER® QUANTUM 3. This amazing feature is the legacy of 50 years’ continuous progress in textile quality assurance and mill optimization. It is a history with three vital elements: USTER’s in-house expertise in instrument technology, detailed knowledge of customers’ quality needs, and – most importantly – the commitment and skill of the USTER people behind some of the textile industry’s most significant innovations. Some of these pioneers, true experts in textile quality control, now help to put these developments in context.

Peter Hättenschwiler recalls his early days at USTER, as he was completing his apprenticeship: “My boss told me ‘you can stay with the company if you behave well’ – so that’s what I did.” That was in 1948, and Hättenschwiler went on to devote his entire working life to USTER, playing a key role in many landmark advances. As an apprentice, he assembled the USTER® GGP, the first evenness tester. Later he was in charge of customer service and for many years the head of the Textile Laboratory. Today, at the age of 88, he is still in good shape mentally and physically and can look back on a fulfilling career.

The launch of USTER’s first yarn clearer for automatic winders, in 1965, was a special milestone, says Hättenschwiler: “This was at a time when USTER had an outstanding world-leading position as a machine manufacturer because of two important factors. Firstly, we could successfully combine mechanical and electronic know-how, to produce instruments with unique functions. Secondly, the company knew which quality parameters were important to measure and what the spinners wanted.”

**USTER’s first clearer for automatic winding**

The USTER® AUTOMATIC UAM B1 was the first yarn clearer for automatic winders, introduced to the market exactly 50 years ago. It was initially installed on several of the leading automatic winding machine brands of the day, including the Schlafhorst Autoconer AC 107, Gilbos Cenomatic, Müller Automat, Barber Colman CC, Schweiter CA11 and Leesona Uniconer.

This was actually a further development of the much-earlier USTER ‘slub catcher’, effectively the original yarn clearing system, which had been patented as ‘Yarn Cleaning Device’ as far back as 1952 and launched on to the market in 1955.

The next clearer model for automatic winding, the USTER® AUTOMATIC UAM CI, was launched in 1970. This system added a special ‘thin place adapter’ to eliminate any disturbing thick and thin places remaining in the yarn. Its development prompted this comment from Hans Locher: “The electronic clearer of today is no longer the simple slub-catcher of yesterday – it is, in fact, an extremely complicated measurement and control instrument.” Locher was writing as Senior Executive Vice President of the then Zellweger Uster company in a customer publication in 1974.

**Data systems and microprocessors – the next big steps**

In 1975, data became simply essential. USTER was ready with the new USTER® ACTIVITY RECORDER for its latest yarn clearers. This system registered the cut and downtime history of an USTER® AUTOMATIC clearer installation. As such, it was the first true data system for yarn clearers – the precursor of modern systems now regarded as in-
dispensable in yarn clearing.

The USTER® POLYMATIC UPM 1 was the first of the company’s clearers to be based on microprocessors. Marketed in 1985, a further innovation was its use of the NSLT classification, still important today. Responsible for its development was Kurt Aeppli, today retired and in good health at the age of 75. He says: “The microprocessor technology came from the United States and we were glad to get it as it opened new possibilities for yarn clearing.”

The ability to detect and remove disturbing foreign matter contamination in yarn was a valuable innovation for spinners, and USTER added this feature after taking over the operations of Peyer AG in 1994. The USTER® PEYER CLEARER UPC 200 was the first USTER® yarn clearer able to detect foreign fibers. It had a unique design, based on an optical sensor which could pinpoint disturbing thin places, thick places and foreign fibers simultaneously. “Meeting the needs of the customers was the big driver for my colleagues and me in product development. We were also highly-motivated to share our experience in on-site training sessions,” says Peter Haldemann, who worked as an Application Engineer within USTER for 13 years and who today is retired at the age of 74.

**The USTER® QUANTUM era**

Yarn clearing in the past had largely been based on the ‘class’ approach, in which the customer selected category fields required to be free of defects. USTER® QUANTUM was the first yarn clearer to allow active monitoring of quality parameters at the winder and to introduce the scatter plot method to the process. This revolutionary system, displaying real yarn events (irregularities), was implemented in the first and second generations of the USTER® QUANTUM. Here it is worth noting that a total of 2.2 million USTER® QUANTUM units were sold before the next generation was launched.

Today’s third generation, the USTER® QUANTUM 3, incorporates another revolutionary step forward, with the YARN BODY concept. This is a new visual parameter – effectively presenting a ‘picture’ of the yarn and its quality characteristics. This feature works alongside USTER’s SMART CLEARING TECHNOLOGY – a unique facility which allows users to determine all the required clearer settings at the push of a button. The integral Smart Limit system then suggests optimum clearing limits based on the YARN BODY. “Although the YARN BODY and Smart Limits have been termed visionary and ground-breaking, in reality these innovations are actually built on the ingenious foresight of many USTER experts over the years,” says Sivakumar Narayanan, Head of Product Management within Uster Technologies.

The 50th anniversary

Reviewing 50 years of USTER’s history of yarn clearing for automatic winders is a classic product success story. It demonstrates the continuing and sustainable development of a major product line, and reminds us that important previous stages of development still feature in the current generation of the USTER® QUANTUM 3. In the past 50 years, a total of 15 yarn clearer models were introduced to the market. But it is not only about the innovative features invented over this period, but also the continuing trust shown by spinners, relying on these yarn clearers to safeguard the quality of their entire yarn production – essentially their reputation.

In fact, the real credit for this success belongs not to the company, but to the people behind these ground-breaking developments. “The remarkable history of the yarn clearers, as well as of the company, is strongly related to the total dedication of the staff, in the past and still today, and particularly to the unique ability of our engineers to combine both evolutionary developments and revolutionary innovations,” says Dr. Geoffrey Scott, CEO of Uster Technologies. “From Peter Hättenschwiler’s ‘good behaviour’ as an apprentice, and the commitment of many others over the years, USTER has built its position as a global leader for quality testing and monitoring systems.”
Clear vision in the drive for perfect yarn

Customer needs continue to motivate USTER’s development in quality control for winding

Yarn clearing technology has come a long way in the 50 years since the first system for automatic winding was marketed by USTER. The needs of spinners – and their customers downstream – remain the key driving force as the technology progresses. But the scope of yarn clearers has steadily broadened, taking in more fault-detecting options and better data utilization. The latest USTER® QUANTUM 3 clearers represent the summit of current potential, with a range of innovative features helping mills to produce the right yarn quality with optimum productive efficiency and profitability.

Even with all today’s sophisticated technology, spinners still can’t produce the ‘perfect’ yarn. Some faults are inevitable, and the winding process after spinning is where these can be removed – to create a yarn that may not be actually flawless, but will give customers the consistent quality standards they need.

Quality has always been a big issue for both spinners and fabric manufacturers, but it was not until the early years of the 20th century that the first steps were taken towards automatic control of yarn quality during production. The motivation came from a group of spinning mills located along a small Swiss river, the Aabach, not far from Zurich. This area had become noted for the success of its yarn and fabric producers, with as many as 30 mills originally using the river to provide power for their machines. So profitable were these enterprises, that the Aabach was dubbed the Millionaire River by locals.

The Aabach spinners were anxious to find a solution to recurring thick places in their yarns, which were causing complaints from customers. They began discussing the problem with a company in the nearby city of Uster: the then Zellweger Uster, the forerunner of the company which became Uster Technologies in 2003. Those talks were the start of the history of the process now known as yarn clearing.

The initial result, in 1952, was a patent filing for a ‘Thread Cleaning Device’ by the Uster company. This was a mechanical system for detecting thick places on manual winding machines, across a limited range of yarns. Launched as a Slub Catcher in 1955, this device was the first USTER® yarn clearer.

Spinners and weavers continued to press for better and more versatile solutions, seeking improved control of thick places and then removal of thin places and neps. USTER responded with new yarn clearer models with more advanced features.

New technology, new demands

The first yarn clearers were for manual winders only. The advent of the more efficient automatic winding systems presented new demands for clearer developers, and in 1965 USTER launched its first system for this process. The USTER® AUTOMATIC UAM B1 – celebrating its 50th anniversary this year – was installed on several of the leading automatic winding machine brands. It was still limited to clearing only thick places, until the next model, the UAM C1 appeared with the capability to eliminate thin places as well.

New technology, new potential

Even with these developments, by the 1970s yarns were still suf-
ferring from quality issues, with weavers continually complaining about the time and cost taken in mending defective fabrics. But this was the beginning of the Information Age, and it brought important new potential for improvements in textile quality control.

USTER realized that data about clearer cuts at the winder and machine standstill times could be a valuable aid to mill efficiency. In 1975, the company launched the USTER® ACTIVITY RECORDER for its yarn clearers. This was the first true data system for yarn clearing, the ancestor of the technology spinners now regard as essential in the modern winding room.

The next major step was the spread of microprocessor technology, which took yarn clearing beyond just detection of thick and thin places. From then on, neps and eventually foreign matter could be eradicated – leaving little cause for complaint along the Millionaire River, and the rest of the world, where USTER yarn clearers have been exported ever since.

Premium Swiss-made yarns remained successful until the new millennium, by which time emerging markets were able to match their quality at lower cost. At the time of this shift, it was the beginning of a new chapter in USTER yarn clearing: the QUANTUM era…

The QUANTUM leap – beyond all expectations

The final hurdle in defect removal was the detection of polypropylene – and this was overcome with the first generation of USTER® QUANTUM yarn clearer in 1999. By this time, yarn clearing was already acknowledged as essential for quality monitoring to avoid costly claims, but its benefits in enhancing production efficiency were also becoming significant. The USTER® QUANTUM 2, with its Central Control Unit (CCU) display of key data on spinning and winding, progressed this trend.

R&D goals for the USTER® QUANTUM 3 focused on a clear vision: to allow spinners to create the ‘perfect’ yarn for their customers at the lowest possible cost. Advanced sensor technology and USTER’s expertise in data generation led to a series of genuine innovations in fulfilling this vision.

Smart Clearing Technology, based on built-in knowledge, guaranteed optimum results for each yarn application. The YARN BODY concept provided an instant visualization of yarn quality parameters and variations. And the Smart Limit feature allowed users to customize clearer settings at the push of a button.

These developments break new ground in terms of detection capabilities, intelligent operation and user-friendliness – making USTER® QUANTUM 3 the biggest single leap forward over the entire five decades of yarn clearing technology.

What’s next? Technology knows no boundaries…

Developments at USTER already aim at wider issues, on the theme of ‘managing a spinning mill with quality in mind’. Yarn clearing is still about quality for the customer, but the emphasis is also on production efficiency and optimized profitability for the spinning mill – a focus which is sure to continue.

Who knows what possibilities will come in future, as sensor technology and data application are developed in the light of the next Uster Technologies vision?

“If the spinners and weavers in the past could see the fine white shirts we wear today, it would seem like pure perfection to them. But that doesn’t mean we should be satisfied with our current ambitions in yarn clearing development. It’s sure that customer demands, new technologies and technical changes in spinning won’t let us rest on our achievements,” says Sivakumar Narayanan, Head of Product Management within Uster Technologies.