

## ***Klingele Papierwerke in Germany reveal their positive experiences and significant cost savings with the innovative AOKI dryer fabric “Cleaner”***

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### ***The Background***

In 2012, Klingele Papierwerke in Weener, Germany, embarked on a new investment and an innovative approach in dryer fabric cleaning. They purchased the very first AOKI Cleaner to be delivered into Europe and thus led the way with a fresh approach to the time-old problem of how to keep dryer fabrics clean, efficient and effective throughout their useful life.

Typically in recent years the choice of cleaner has been from a number of well-known, traversing, “spot-cleaners”, using high-pressure water / air to force contaminants out of the fabric and maintain a working permeability. The apparatus is sophisticated and improvements in the systems available on the market have been made, yet many issues still remain with this methodology.

Firstly, the jets operate on only a very small portion of the fabric at a time, meaning the interval before the same area is once again cleaned can be as much as twenty minutes or so. Further, the use of high

pressure jets is not ideal on any fabric and mills report premature damage to the integrity of the fabrics and even to the fabric rolls and framework, which have to be cleaned from corrosion. In addition, foreign material is often forced deeper into the fabric, ultimately degrading the yarn interstices, reducing fabric life.

Critically, there is a high cost associated with running the water and air systems, maintaining the equipment and regularly assessing the cleaner is operating effectively. As with all fabrics, if they become contaminated to any depth they may only be “resuscitated” with a time-consuming, expensive and typically, “off-machine” clean.

### ***The AOKI Approach***

In 2004, Aoki of Japan made a breakthrough in dryer cleaning technology, due to the innovative talents of chief designer, Mitsuo Aoki. He determined that effective fabric cleaning should have two main features. First, it should apply to the full width of the fabric and be in continuous mode. Second, the principle should be to

prevent contaminants achieving significant ingress in to the fabric. In short, cleaning must be gentle, consistent and continuous.

Earlier mechanical methods such as brushes and wire nets could be effective, yet were brutal to the integrity of the fabric structure. The latter, utilising ever more sophisticated materials and yarn profiles, are naturally susceptible to damage. Hence the AOKI approach was to develop a new mechanical arrangement that was kind to the fabrics yet avoided the need for high energy impact cleaning and its associated high maintenance and running costs.

### **The AOKI Cleaner**

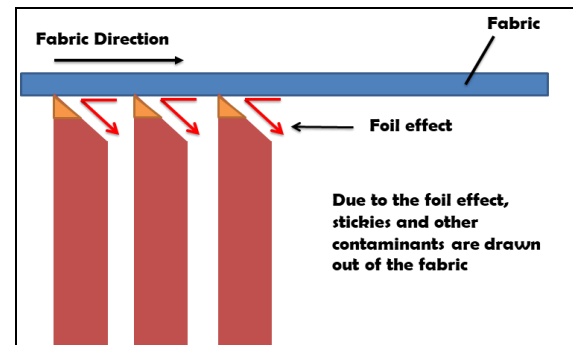
The outcome of an intense two-year development program was the AOKI Cleaner : a purely mechanical system that is now commonplace in Japan on a range of furnish and speeds. It services brown grades and fine papers alike and can be run up to 2000m/min.



**Fig. 1 The AOKI Cleaner**

Interestingly, the principle of the AOKI Cleaner (Fig.2) is well-known to papermakers, utilising a foil effect that induces the surface contaminants to gather onto a cleaning blade and are thus gently coaxed from the fabric surface. The blade oscillates slowly sideways to assist this function and the foils are made for a material specially designed by AOKI to do

no damage to the fabric yarns, be they round, flat, “spiral” or even twisted multifilament.



**Fig 2. The AOKI Cleaner principle**

The Cleaner may have up to six foils, depending on the nature and extent of the contamination, machine speed and fabric design. Typical applications use three or four foils which guide contaminants into a specially designed saveall, easily cleaned at shuts.

The real difference to the papermaker is visible on close inspection at shutdown. Below is a typical example from a Japanese mill, running a 5m. deckle width at some 600m/min. Figures 3 and 4 show the same fabric before and after the installation of the AOKI Cleaner and the benefits are evident.



**Fig. 3 before installation of the AOKI Cleaner**



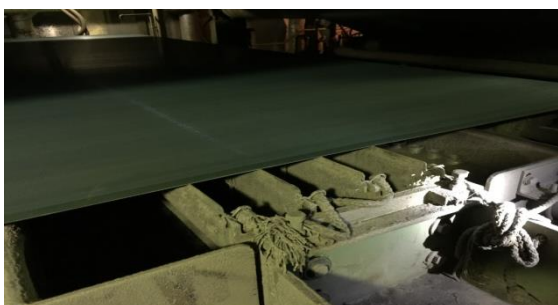
**Fig. 4 one month after installation**

## The Klingele Experience

The Weener mill purchased their first AOKI Cleaner in 2012 for their 250,000 tpy, 5.00m. wide, PM2 corrugating medium line. For years they had suffered from less than ideal 1<sup>st</sup> Top dryer fabric lives and serious sheet moisture profile variation. They had utilised “spot cleaners” and off line washes as standard, yet were not satisfied with their running and maintenance costs and the detrimental effect of stickies on sheet profiles and hence paper quality.

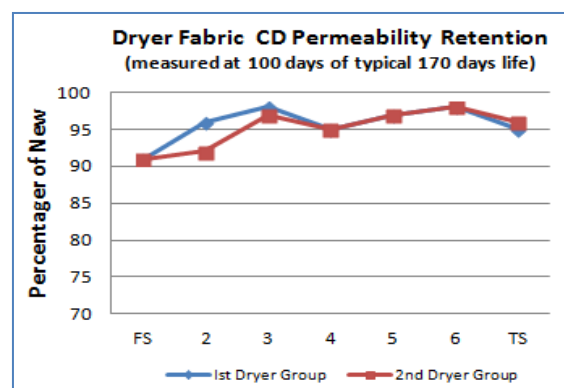
Mill manager, Thomas Wischeropp explains: “We had a decision to make. Should we persist with the standard cleaning systems, with their high demand on utilities and manpower or try the AOKI system which promised to minimise effort and downtime and maintain a quality sheet, saleable at premium price?”. “Maybe the answer is obvious now, yet systems common in the marketplace had been improved and the AOKI product was an unknown entity”.

Nevertheless, buoyed by the feedback from some fifty Japanese installations, the mill installed their first unit on PM2, 1<sup>st</sup> Top position, and saw immediate payback: “Right from the start, we saw far greater consistency in sheet profiles (see Fig.6) and it was evident the Cleaner prevented any significant ingress of contaminants into the fabric. Our first fabric stayed on the machine for nine months compared to the average of three and paid for the new equipment in one go!”.



**Fig. 5 Aoki Cleaner operating at Weener**

“We were also impressed by the other benefits the AOKI Cleaner brought us. We recorded fewer paper breaks attributable to the dryer section and improved paper quality. In 2014 we had a significant reduction in complaints of sheet contamination and since we installed the two additional Cleaners we have had no more breaks caused by sticky contamination with claims reduced from 17 to just 6 per year and unrelated to stickies”.



**Fig. 6 Weener CD Sheet Profiles - mid-life**

Generally the AOKI Cleaner gives further benefits - reducing downtime and maintenance. Off-line fabric cleaning is unnecessary and fabric rolls require limited attention as shown at a Japanese mill (below).



**Fig. 7 Fabric rolls before Cleaner installation**



**Fig. 8 Fabric rolls 6 months after cleaning**

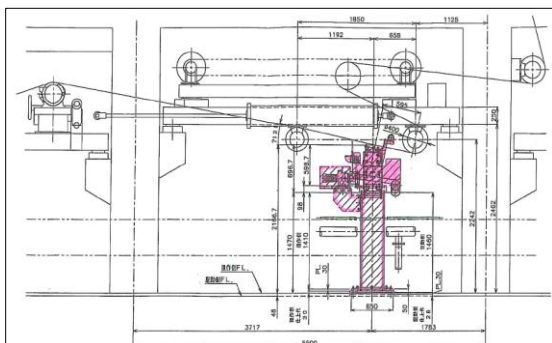
## **The Environmental Bonus**

“In an era when we are striving to improve the environment as well as minimise cost, the AOKI Cleaner has one big advantage.” continues Thomas Wischeropp, “We have no need for dryer fabric cleaning chemicals and have thus maintained a safe working environment for our crews. They also gave us very positive feedback that this system was superior to the spot cleaner concept we had utilised before.”

As a result of the initial success, Klingele made investments in two more units – for the 2<sup>nd</sup> Top and 3<sup>rd</sup> Bottom positions on PM2, which runs up to 1000m/min. “This will be an ongoing investment for us. We have already made cost savings that totally outweigh the initial investment and have complete confidence in AOKI as a supplier of this innovative product.”

## **Simple to install, easy to run**

Questioned about the logistics of commissioning the AOKI unit, mill personnel praise the supplier: “Start-up could not have been easier. AOKI supervised the installation and remained on site to ensure the blade settings achieved maximum efficiency. Since then the maintenance has been negligible and we are observing that not only is there no damage to the fabrics, their lifetime actually exceeds our expectations”.



**Fig. 9 Typical AOKI Cleaner configuration**

## **Designed for Life**

The AOKI Cleaner is a tried and tested methodology that is giving papermakers a real, yet simple, alternative to the previous market “standards”. The experiences at Klingele Weener mill are typical of the reaction of its customers and demonstrate that significant cost savings, both in fabric and running costs can be made, independent of machine grade, operating speed or fabric design.

As in most areas of life, simple yet effective design can overcome the “stickiest” of problems, and in this case it comes with the benefit of increased productivity and profitability. Whether acting as a stand-alone unit or supplementing existing spot cleaners, the AOKI Cleaner brings peace of mind and eases the financial burden on the papermaker’s already stretched machine clothing budget.

The AOKI Cleaner’s construction is indeed designed to improve dryer fabric life, yet in so many ways can make the crew’s daily routine more relaxed at the same time!

**To learn more about the AOKI Cleaner and the benefits it can bring to your mill, please contact :**

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