



New cleaning system pays off

On the high-speed, web-fed production lines of the modern day packaging industry, conventional vacuum extraction systems are stretched to the limit. Fine paper dust is left clinging to the surface and causes errors during printing. In view of this, a North American manufacturer has equipped his packaging lines with sword brush technology developed by the Wandres Company (Stegen, Germany). Reject rates and machine downtime have since been reduced to such an extent that the investment was already recouped within the first six months

High-end paper and cartonboard webs should ideally feature a perfectly smooth and clean surface. To achieve this, a solution of starch is applied to the surface in the size press. All the same, abrasive contact with deflection rollers in the nip of a web transport system may still cause weakly bonded paper fibres or filler particles to detach from the surface during downstream processing. This effect is referred to in the industry as “dusting”. During slitting and cross-cutting of the web, large quantities of contaminating particles

frequently occur. Avoiding the build-up of dust on unbound edges and surfaces is simply impossible. Sharp, well-set knives are crucial in minimising the generation of debris and preventing even larger fibres from being deposited at the edges in addition to fine dust.

Frequent wash-ups equal costly downtime

Contamination can cause serious production problems during subsequent processing. Loose particles settle on rollers or

adhere to printing blankets and result in the formation of flaws in the print image (known as ‘hickeys’, see Fig. 2). Possible corrective measures to rectify this type of error include shortening the intervals between washes and replacing the printing blankets. From an economic point of view, this is a far from satisfactory solution. The downtime involved mounts up to several weeks a year and inflates production costs. Flaws in the print image increase the reject rate and, in addition, tons of material are scrapped during print acceleration and deceleration phases.



Fig. 1: Paper dust accumulation results in higher costs

Some manufacturers attempt to alleviate the situation by cleaning the web using vacuum airflow. However, this still leaves large quantities of fine dust particles clinging to the surface.

Sword brush technology from the Black Forest

The company Wandres GmbH micro-cleaning, based in the Southern Black Forest, has developed an alternative cleaning procedure. The aptly named Sword Brush, with fine brush filaments made of polyamide, wipes crosswise to the direction of transport across the surface of the fast moving web. The filaments are evenly moistened with a minimal amount of Ingromat cleaning and antistatic fluid, thus binding even the finest dust optimally to the brushes. The clean surface remains completely dry and can proceed immediately to downstream processing.

The closed brush belt circulates around a sword-shaped guiding element (see Fig. 3). The contact area of the linear brush is flexibly mounted on a pressure buffer and can compensate for variations in material thickness of up to 2mm. At the brush deviation, particles which have been absorbed are detached from the filaments by two air jets and a rotating rack and propelled towards a suction system. The continuous self-cleaning feature secures reproducible results and makes the Ingromat system an extremely reliable and economically viable solution, in particular for 24/7 industrial production.

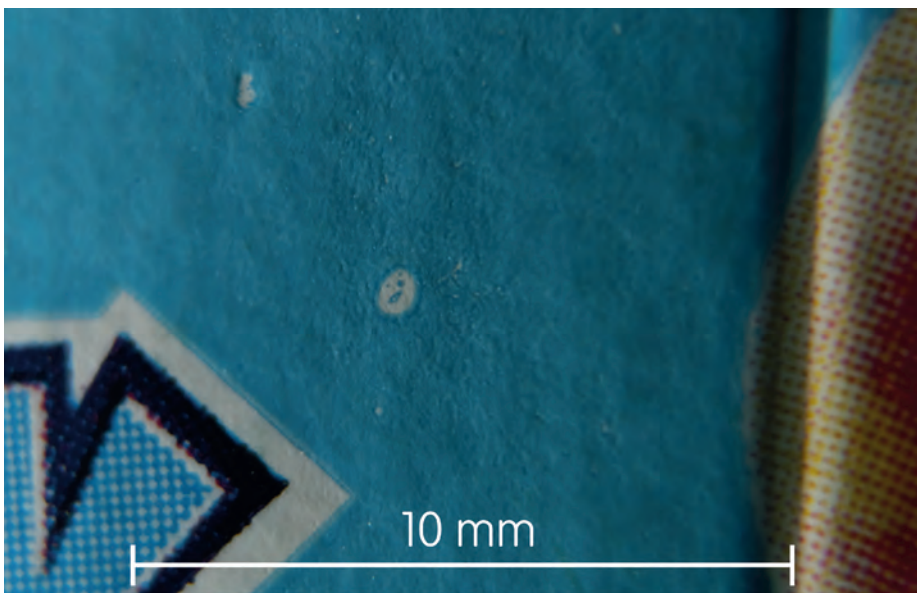


Fig. 2: The formation of so-called 'hickeys', a typical flaw caused by paper dust

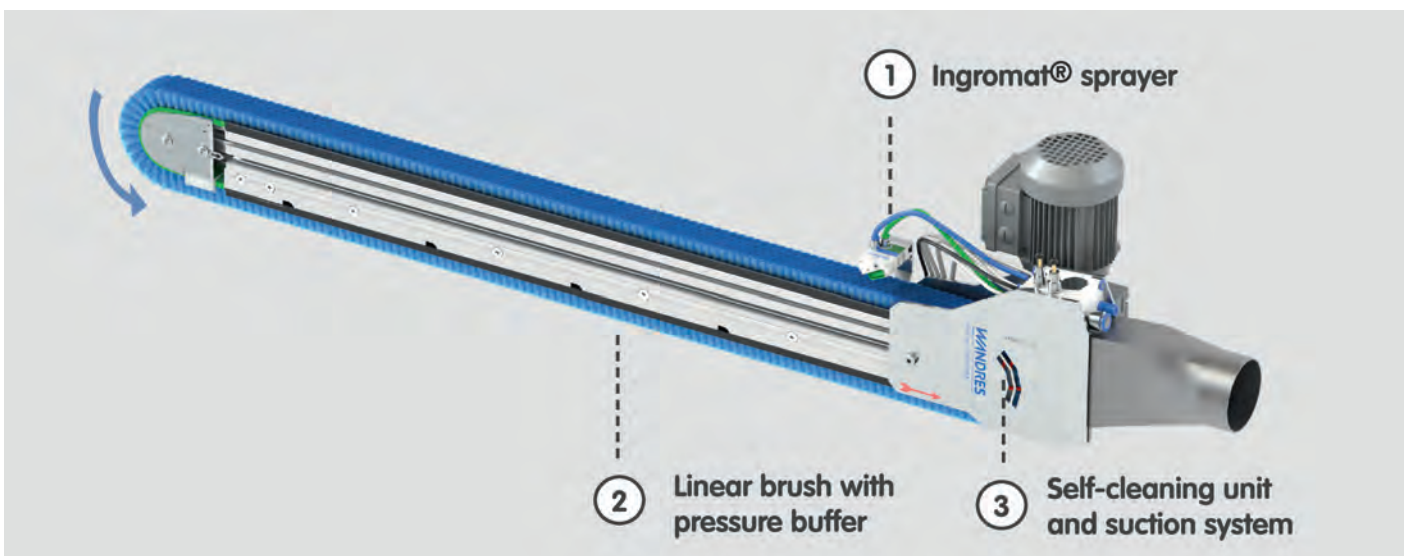


Fig. 3: Sword brushes clean in three steps: 1. Micro-moistening of the brushes, 2. Cleaning of the surface, 3. Self-cleaning and vacuum extraction

Cleaning of paper, cartonboard, plastic film and foil webs

The Web Sword Brush Una H-WB 146 was developed for cleaning web-fed materials with a width of up to 3m and speeds of up to 600m/min. The upper and lower surfaces of the web are each cleaned by two linear brushes. To protect delicate materials, the brushes are raised upon approaching the edge of the web (see Fig. 4). Surfaces are still cleaned seamlessly due to the combined effect of offset positioning and opposite wiping directions of the brushes.

During run-up or when replacing the reel, the brushes are swiftly removed from the surface with the aid of a pneumatic cylinder. Particularly large amounts of dust and remnants of fibre can be removed using air technology by positioning an additional module, the TKL 46, at the infeed.

Return on investment in just three months is possible

Five years ago, a well-known packaging manufacturer began trialling a Web Sword Brush ordered via the Wandres Corporation (USA). A significant improvement became apparent immediately after commissioning. For the very first time, repeatable and consistent results in the print image could be guaranteed. Prior to the integration of the Wandres cleaning system, a much more frequent wash-up of the printing unit was required per cycle. The resultant losses through machine stoppage and scrapped webs was reduced by an average of 75% so that the investment could be recouped within three to six months. Meanwhile, the manufacturer in North America is running a number of cleaning systems developed by the Wandres Company and is already planning the integration of new machines.

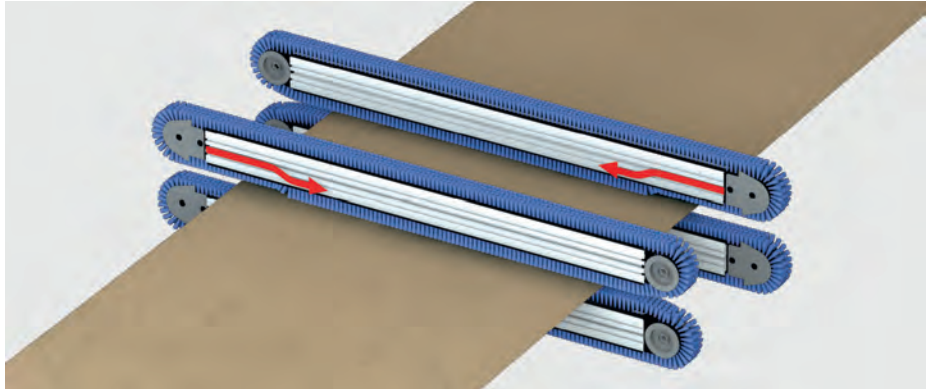


Fig. 4: The brushes are lifted towards the edge of the web

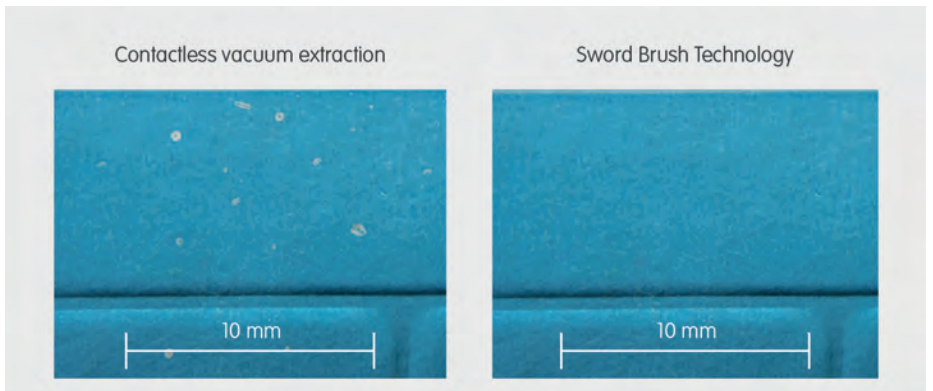


Fig. 5: Results in the print image after different cleaning procedures

A kilogramme of dust in 24 hours

In a production line for folding boxboard, the extraction filters were examined after the first three shifts. The production manager was astonished by the result seeing as about a kilogramme of dust had been removed from the surface of the web in this space of time alone. The cleaning procedure which had been in use previously had collected less than a hundred grammes. Justin Elsley, VP of the Wandres Corporation (USA), has the explanation: "The cleaning systems used in web printing have been adapted to the width of industrial webs but quickly reach their limits when

confronted with the fast moving installations of the modern day packaging industry. Our systems have been developed specifically for the cleaning of extremely wide and heavily soiled webs running at the highest possible speeds."

Thanks to the new cleaning system, the manufacturer is now in a position to achieve repeatable results in printing, gluing and coating processes even when the web-fed materials are heavily contaminated. Consequently, the highest quality standards for packaging can be met on a long term basis. ■

Image sources: Wandres