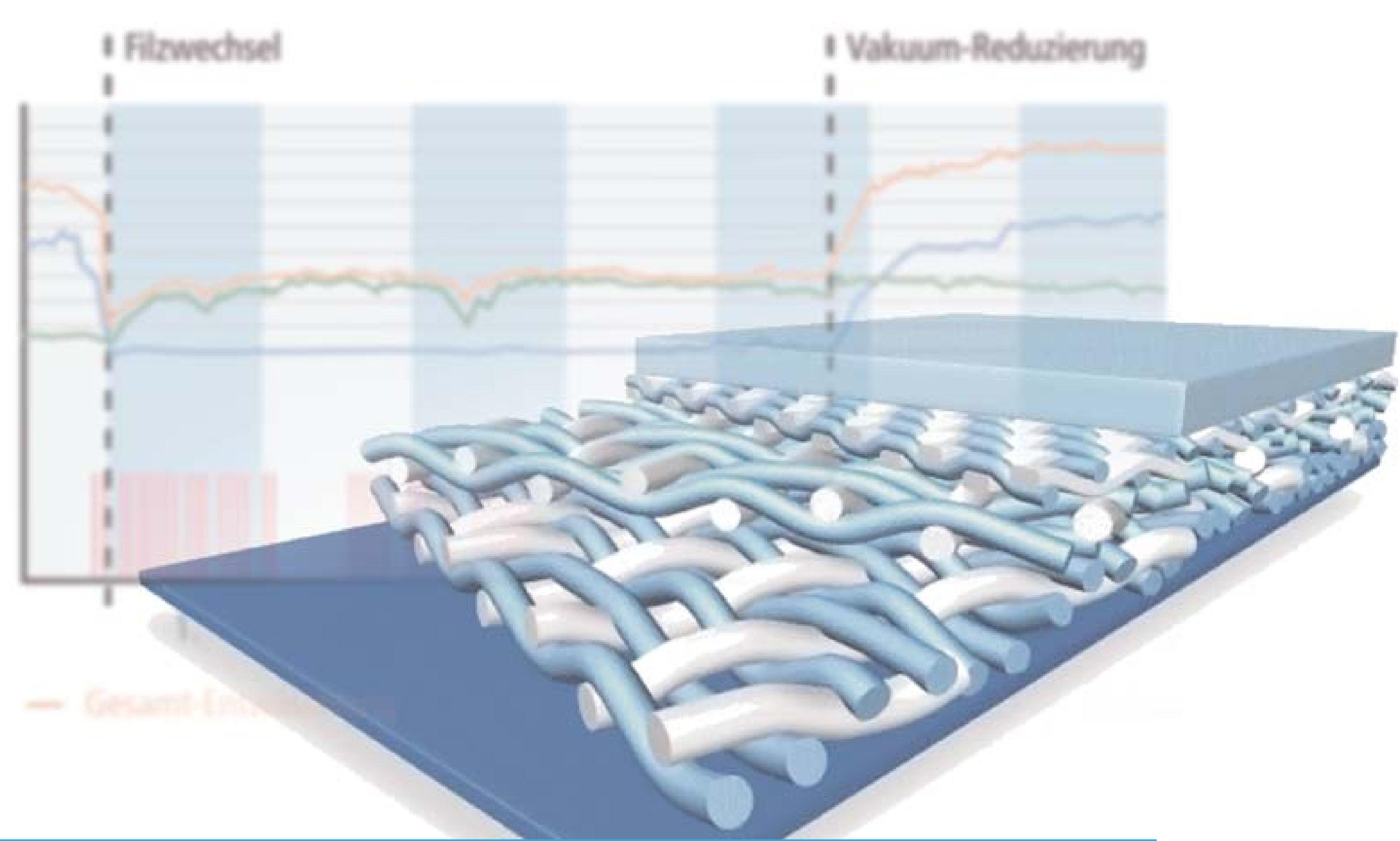

Press Release

Cost reductions on packaging grades by optimised utilisation of fabrics and felts

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Cost reductions on packaging grades by optimised utilisation of fabrics and felts

Trends in the industry

The branch of the industry making Testliner and Fluting is currently undergoing a period of considerable change. A series of new machines is under planning and construction. For example, in 2009 a new unit will be started up in East Germany with a production of 650,000 tonnes per year. Asia is booming and in the next three years new machines will also be going into production in Eastern Europe. Obviously, the pressure on the market from these areas will be increased.

The demand for lighter weight packaging papers (eg. 75 g/m^2 Microflute) is growing continuously – created amongst other causes by Internet trade. Now the question arises: Will there be even lighter grades? Where does this development stop? At 65 g/m^2 perhaps?

A serious problem is the apparently unstoppable growth in energy costs. Although the prices for Testliner have recently improved, somewhat compensating the energy costs, how long can they be held at this level? A further aspect is the increasing deterioration in the waste paper quality. The ash content 10 years ago was at approx. 10% - today figures of 15-17% are not uncommon.

Many are asking how the packaging branch should react. The answers to increasing competitiveness are to be found in "Performance". Better paper quality and better surfaces are demanded. In addition it can be assumed that also the demand for white-lined liner will be increasing in the near future. The efficiency of paper machines must be further improved. One of the features of this will be specialisation of machines for specific products or product lines.

In the past packaging machines were required to produce both Liner and Fluting covering a basis weight range from 90 to 170 g/m^2. Nowadays 75-90 g/m^2 Fluting would be produced on one machine and the heavier Testliner weights on another.

Another reason for machine specialisation is runnability. New stock preparation methods and sorting concepts remove disturbance factors in advance. Higher dry contents after the forming and press section permit higher speeds to be achieved and closed sheet transfer reduces the break rate. (In this context we refer to Heimbach TASK Info Press Section No. 12: "The Optimisation of Sheet Transfer from the Forming Section into the Dryer Section" which can be downloaded from the Internet under: www.heimbach.com or requested by telephone in hard copy direct from Heimbach).

This degree of specialisation can also be recognised in the clothing. To some extent forming fabric, felt and dryer fabric designs are comparable with the clothing used on high speed machines for graphic papers.

One of the most important themes in the present situation is cost reduction, particularly energy costs, but also other processing costs. What possibilities are there, and how can these reductions be realised?

Cost reductions

Here there are a variety of starting points. In some mills Process Engineers/ Energy Managers are employed to operate on this theme in all areas of the paper mill.

A major factor in cost reduction is in the reduction of break frequency. With appropriate forming fabric design higher dry contents can already be achieved in the forming section. This is shown in the practical installation of the SSB fabric PRIMOBOND from Heimbach (Ill. 1) which, in addition to a fast start, results in many cases in a significant reduction in the break frequency (Ill. 2). In the press section draw-free sheet control provides the opportunity for reduced breaks (again reference TASK Info Press Section No. 12 from Heimbach). A further aspect is nip-dewatering, which permits energy savings to be made in vacuum production and which can also

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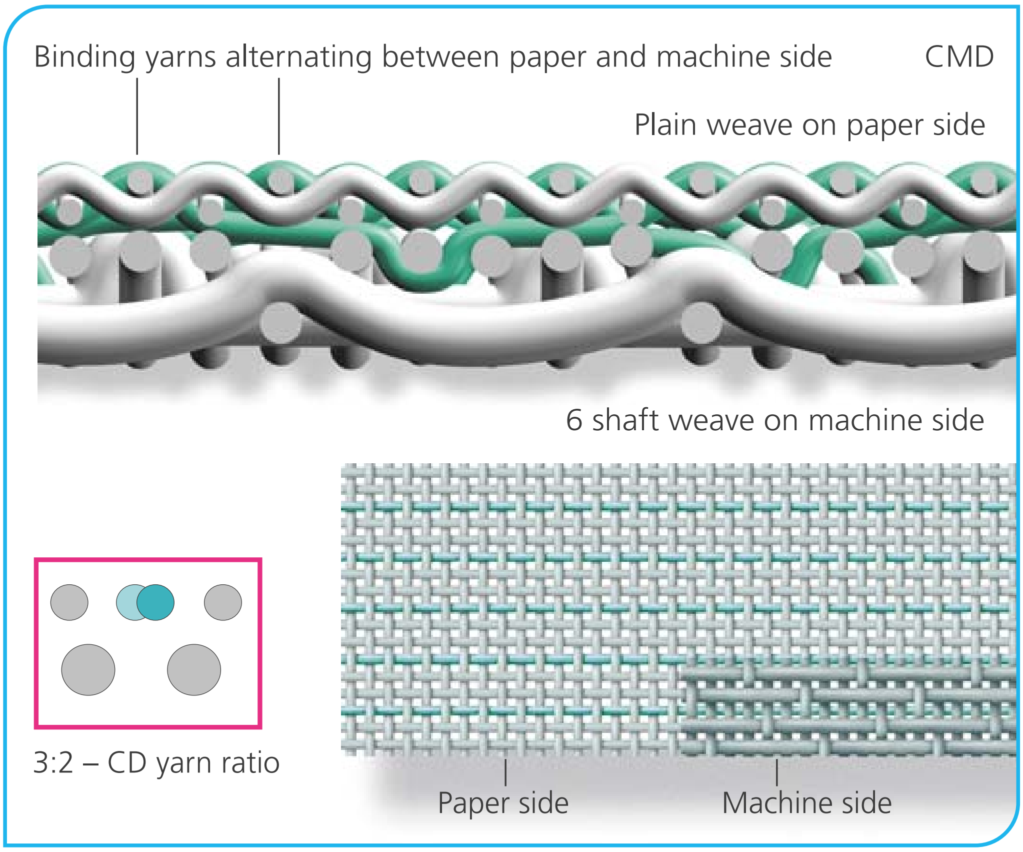
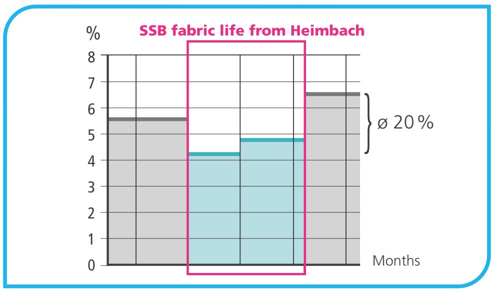
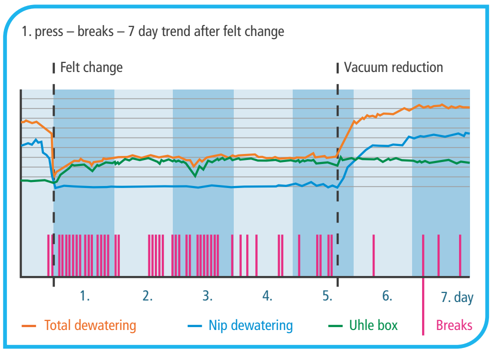


Ill.1 PRIMOBOND from Heimbach



Ill.2 Fewer breaks

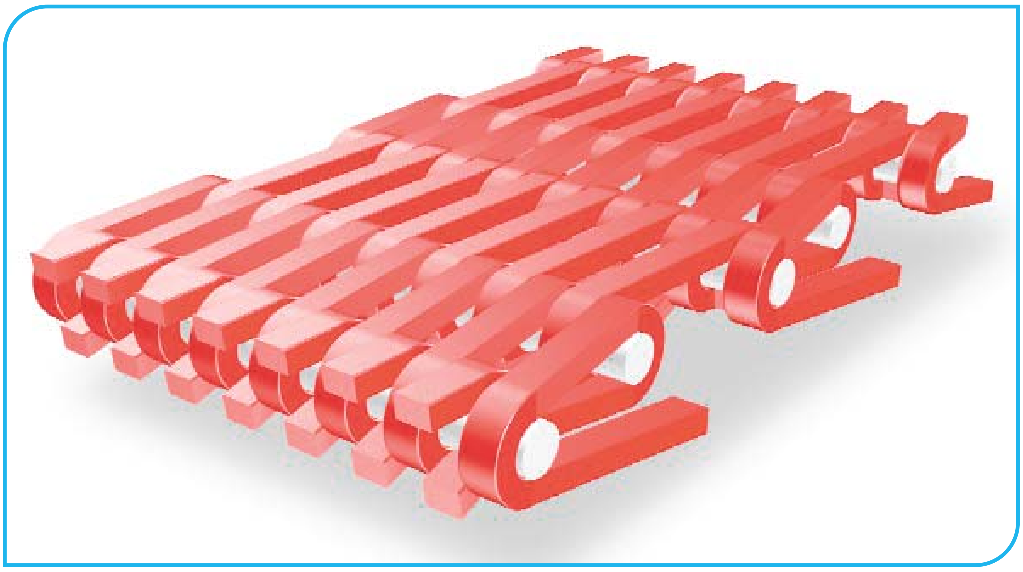


Ill.3 Influence of nip-dewatering on break frequency

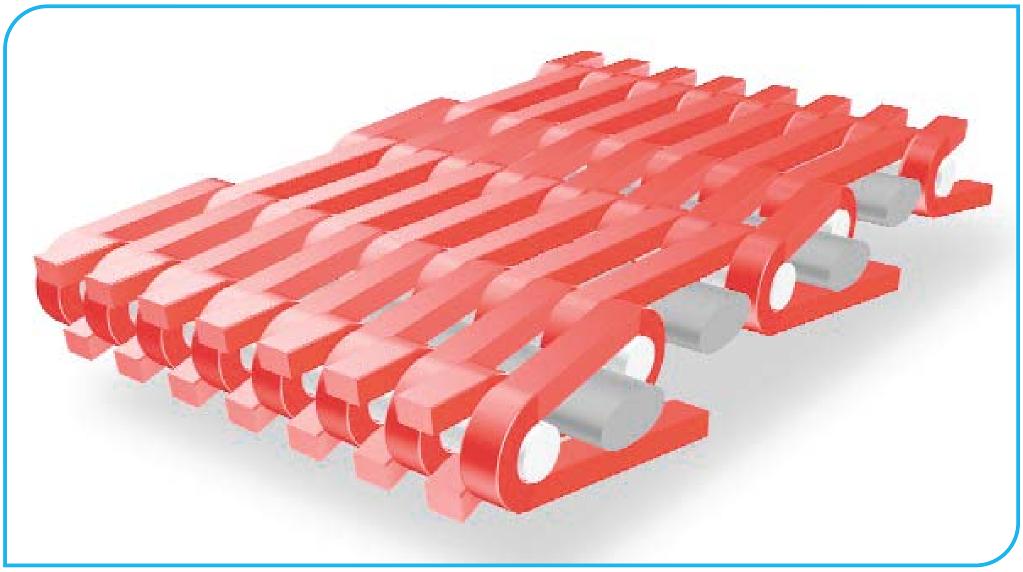
enable higher dry contents to be achieved. Not only in the production of graphic papers are efforts made to run with severely reduced or even no vacuum as large water volumes are no longer handled primarily by the Uhle Boxes. Vacuum reduction can even improve nip-dewatering and the resulting higher dry content significantly reduces the risk of breaks (Ill. 3) – subject to the appropriate felt construction being used.

The current press section concepts can meet these demands in full. These include the DuoCentri Nipcoflex from Voith and the Optipress (Tandem Shoe Press) from Metso. An further new technology is from PMT where an additional transfer belt is installed in the top position of the shoe press, in order to meet the increased demands on surface quality.

The particularly smooth paper side of the SECOLINK dryer fabric from Heimbach with its high contact area (Ill. 4 and 5) can contribute to an effective



Ill.4 SECOLINK.F from Heimbach – unfilled



Ill.5 SECOLINK.SF from Heimbach – filled

improvement in the paper surface. Additionally, extension of Slalom operation possibly as far as the penultimate dryer section can also provide a further possibility of reducing breaks.

Rethinking clothing operation

Clearly the life of felts is very important. It is the most obvious way to keep costs down. However, is it really worthwhile to extend felt life to its absolute limit – or even beyond? In most cases it is not. Towards the end of felt life breaks increase when the felt is often worn down to its base. As a result of disappearing dewatering efficiency the sheet leaves the press with a lower dry content, the risk of breaks increases dramatically and steam consumption rises excessively.

The following example is calculated on an 8m wide Testliner machine running at 1250 m/min on which the press felts were changed every 8 weeks. The clothing and downtime costs required for changing amounted to approx. 1 million Euro per year. With an average break frequency of 60 per month (=

approx. 700 breaks per year, each break 15 minutes at 10,000 Euro per hour downtime) comes to roughly an additional1.75 million Euro per year. This gives a total cost for felts, felt changes and break downtime of 2.75 million Euro per year.

If we now consider the situation where the life of a set of felts is only 6 weeks, then an increased number of felts and felt changes would be needed (costing approx. 1.33 million Euro per year).

Against this the break rate reduces from 60 to, for example, only about 50 per month – by installing, for example, the multi-axial "Specialists" from Heimbach which can achieve higher dry contents through increased nip dewatering.

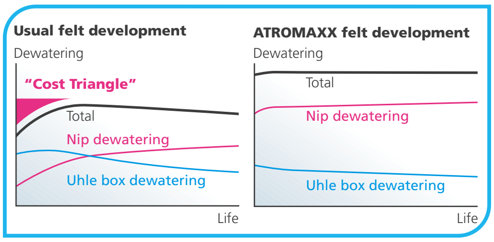
Thereby the break costs per year (approx. 500 breaks per year, each break 15 minutes at 10,000 Euro per hour downtime) come to about 1.45 million Euro per year.

This means that with a life of only 6 weeks for a set of felts a total cost for felts, felt changing and for break downtime of 2.78 Euro per year results.

Therefore the additional costs for a 6 week life compared with an 8 week life per set of felts is "only" 30,000 Euro per year.

However, this additional cost is more than compensated by some additional positive factors: Because of the shorter life per set of felts the downtime for breaks is reduced by 30 hours per year. Looked at from the point of view of the increased production and its value, this gives a plus of about 690,000 Euro per year.

Where Heimbach felts with their generally better start-up characteristics are installed (Ill. 6), there will be further additional production. For example I day's increased start-up speed of 50 m/min after every felt change would add a value of about 210,000 Euro per year.



Ill.6 Comparison: "Cost Triangle"

Finally, a figure of approx. 30,000 Euro per year can be added for energy savings from lower vacuum and reduced steam consumption resulting from higher dry contents after the 3. press.

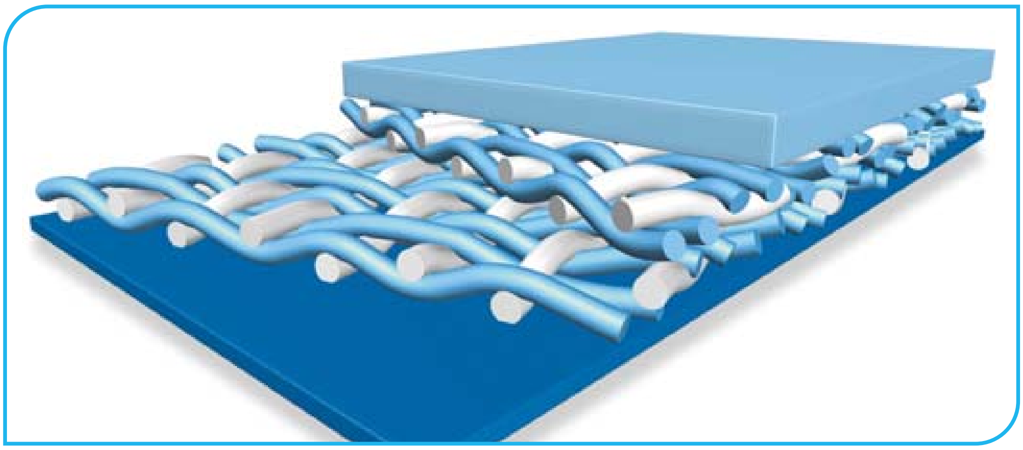
Therefore there is a total gain of around 900,000 Euro per year – less the material and operating costs for the additional production.

Returning to the starting point of this example "Maximise life – or not?" Despite the (intended) reduction of life from 8 weeks to 6 weeks per set of felts, the result of press optimisation – including the contribution of high performance Heimbach felts – brought an increase in annual production profitability of about 900,000 Euro.

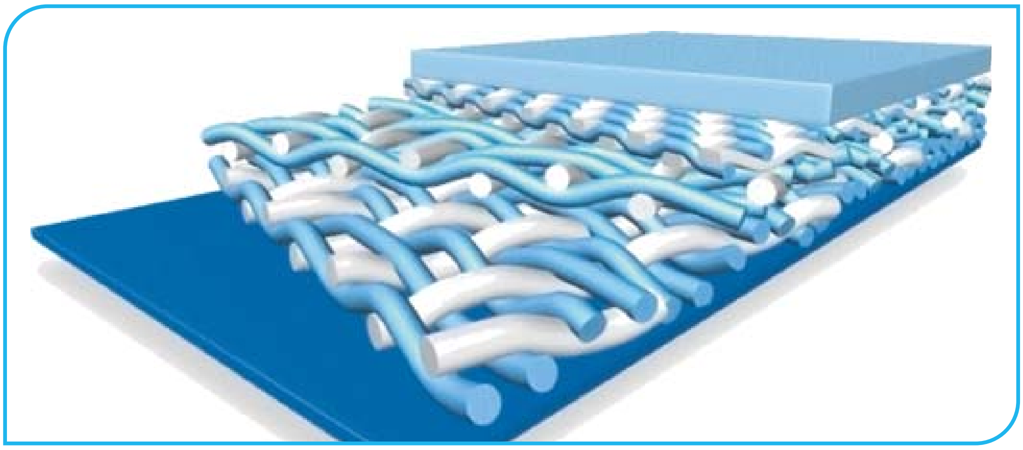
Clothing for efficiency increases

In order to minimise the conflict of aims between maximum life and maximum efficiency, the Heimbach Group has developed a range of "Specialists" which incorporate the features of fast start-up, high nip-dewatering and long life (Ill. 7 and 8).

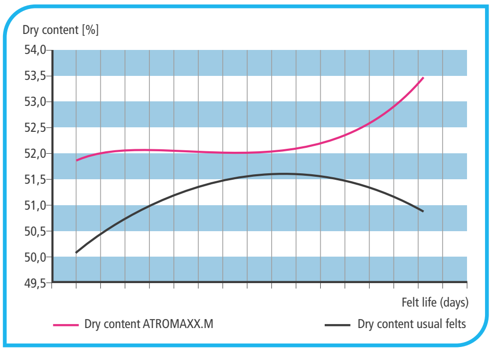
These "Specialists" are composed of multi-axial base layers in pure monofilaments which provide a very incompressible structure. The incompressibility ensures sufficient void volume and open dewatering channels necessary to overcome the high water volumes present on packaging machines.
These "Specialists" of the ATROMAXX generation have already proved in many trial installations that as a result of multi-axial construction they can achieve increased nip dewatering and higher dry contents (Ill. 9) together with longer life. Appropriate



Ill.7 ATROMAXX.M



Ill.8 ATROMAXX.XF – top base layer with flat monofilaments



Ill.9 Dry content after a 3. press (Shoe Press)

batt surfaces achieve in addition particularly good start-up characteristics.

Such sophisticated press clothing requires attentive handling. At start-up (before commencing production) the felts should be adequately and evenly wetted out (swelling/extension of the monofilaments) – dry streaks and/or dry edges hide the risk of fibre breakage. Also the monofilaments can react "sensitively" if the felts are run too dry.

The "Sponge Principle"

The felts function best in their optimal saturation range. This is at about 50% of the felt basis weight. This means that, for example, a felt of 1600 g/m^2 must carry about 800 g/m^2 water to operate efficiently. However this applies only to felts from approx. 1200 g/m^2 up to 1750 g/m^2. Heavier felts in most cases create too much rewetting. Such heavy felts generally carry very high water volumes and are usually over-saturated in their cross-section at the point of contact with the sheet.

Attentive running and control of felts requires optimal results over the whole felt life. Obviously during the life mechanical wear is taking place. Therefore the Uhle box vacuum should be regularly checked and appropriately adjusted. Suitable systems for monitoring the felt performance are Ecoflow and Feltview.

The following example shows that simply by adjusting Uhle box vacuum the dry content can be increased by 5%.

A Testliner machine was unable to achieve the guaranteed dry content after a rebuild. It was down by 5%. The production speed, basis weight and other relevant parameters were stabilised and only the Uhle box vacuum levels were adjusted. The first step was to bring the bottom felt to its optimal saturation level. The outcome was a slight increase in the dry content after the 2. press. Then the pick-up felt was optimised in several stages so that finally the missing 5% was obtained after the 3. press.

When the 3. press was then bought to its optimal saturation level the result was reversed with a loss of 2%. The reason for this was a too heavy 3. press felt which caused severe rewetting.

This example shows clearly that with optimal running conditions a higher dry content and a respectable energy saving can be achieved. The fact that the reduced vacuum brings with it a lower degree of felt wear has a positive effect on felt life.

Conditioning and problem areas

A further contribution to optimisation and general cost reduction can be found in effective felt conditioning. Too much does not help! High pressure showers at 35 or even 50 bar should belong to the past (Ill. 10). On the basis of their experience Heimbach recommend to start with only 3-5 bar. Then the pressure can be continuously increased. The maximum pressure advisable is 15 bar. The Uhle box vacuum should not exceed 0.4 bar.

Ill.10 Excessive shower pressure

Naturally, there are always paper machines with special conditions. In such cases high pressure showers and Uhle boxes can be operated for short periods at higher pressures or vacuum levels. However for normal operation the felts should be brought carefully to their optimal performance levels and just as carefully held at these levels.

From time to time certain changes in the felts may occur, wet streaks for example, which initially might indicate blocked low pressure or high pressure shower nozzles. If despite cleaning the nozzles the streaks remain, a possible cause – in addition to blocked nozzles – could be broken belt grooves or blinded roll grooves or drillings which may not be obvious at first sight.

Appropriate cleaning and constant doctoring are absolutely necessary. An inadequately or irregularly adjusted doctor can also create vibrations – which could be – attributed to another location.

A further cause of streaks in the felt could be the blinding of a zig-zag slotted Uhle box (Ill. 11). The contamination can collect in the leading angles

Ill.11 Blinded Uhle box slot

and cause irregular dewatering or cleaning of the felt surface. Such streaks can easily be confused with an incorrectly traversing high pressure shower.

Conclusion

The achievement of a permanent reduction in costs is always of interest. Therefore this paper attempts to show how by a variety of optimisation actions process costs can be significantly reduced. This applies particularly to those areas of the production process that are seen as technologically subordinate and are therefore not recognised for their saving potential.

The examples calculated here highlight the financial relationship of the clothing costs to the potential for cost reduction through a thorough and maintained optimisation of the technical process.

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