

PACKAGING GRADES: CASE STUDIES OF ENERGY SAVINGS IN THE PRESS SECTION

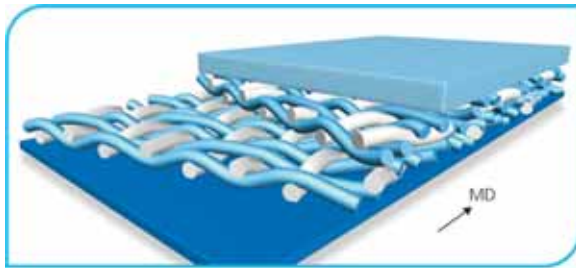
By A. Hüttner, Strategic Product Manager Pressing, Heimbach GmbH & Co. KG
andre.huettner@heimbach.com

INTRODUCTION

The following paper is intended primarily to highlight energy related facts in the fields of press dewatering and press clothing. In addition to obvious energy saving possibilities, a range of indirect collateral factors are examined.

The multi-axial press felt range from Heimbach

Its special feature lies in the wide range of variable constructions. ATROMAXX press felts are built on a modular basis. Their base units are composed of either woven and/or compound modules which are aligned multi-axially to one another.



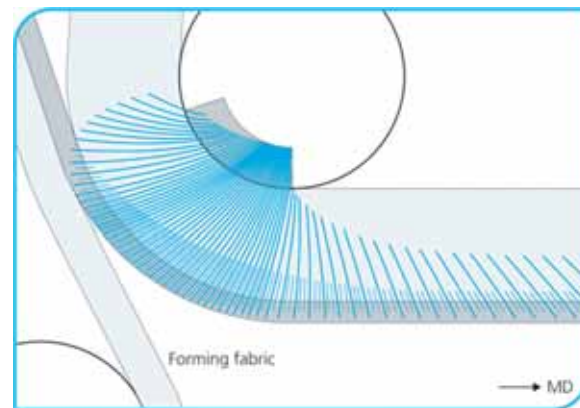
III.1 ATROMAXX.M

The design of the individual base, surface batt modules and their combinations with one another (III.1,2) create the variety of performance characteristics of the whole felt: The degree of batt and base capillarity and thereby the initiation of water flow from the sheet (III.3), the amount of void volume, the level of permeability and also the amount of compressibility of batt and/or base to provide resilience. Consequently, ATROMAXX can truly be described as multi-talented.



III.2 ATROMAXX

Example of basis weight and speed change: For the retention of a high dewatering efficiency in such a case it may be necessary to make a significant adjustment in the relationship between Uhle-box and nip dewatering. By establishing the required characteristics in advance a multi-axial felt from



III.3 ATROMAXX: Initial water flow sheet - pick-up felt

Heimbach can be made to perform both for predominantly Uhle-box dewatering and also for predominantly nip dewatering.

Has the “Dogma of Maximum Felt Utilisation” unlimited validity?

Here is a case for calculation.

Clearly, the life of felts is important. It is initially at least the best way of keeping down costs. But is it really worth while to run a felt life to its absolute limits – or even beyond? In most cases it is not. Towards the end of felt life the break frequency increases as the felt is often worn down to the base weave. With reducing dewatering efficiency the sheet leaves the press with a lower dry content, the risk of breaks increases dramatically and steam consumption rises excessively.

Case study A:

Testliner Machine at 8 m width and speed of 1250 m/min:

The press felts remain to their limit in the machine and are changed every 8 weeks. Costs for the clothing and necessary shuts amount to 1 million Euro per

year. With an average break rate of 60 per month (= approx. 700 per year, each break 15 min at 10,000 Euro per hour downtime) about 1.75 million Euro per year must be added. The total costs for felts, felt changing and downtime through breaks are 2.75 million Euro per year (III.4A).

Production: Testliner, width 8 m, 1250 m/min	
Press felt life: Status quo	8 weeks
Cost of felts / changes / shuts per year	1.00 million EUR
Number of breaks per year	700
Downtime costs per year	1.75 million EUR
Total costs per year	2.75 million EUR
III.4A	
Life reduction to	6 weeks
Cost of felts / changes / shuts per year	1.33 million EUR
Reduction in breaks per year to	580
Reduction in downtime costs per year to	1.45 million EUR
Total costs per year	2.78 million EUR
Additional costs per year	30,000 EUR
III.4B	

III.4 Cost comparison: Life reduction

Production: Testliner, width 8 m, 1250 m/min	
Reduced press felt life	6 weeks
Additional gains:	
Reduced breaks per year	120
Production time gain (15 min/break)	30 hours
Increased production per year	690,000 EUR
Installation of Heimbach ATROMAXX:	
Start-up speed plus	50 m/min
Increased production per year	210,000 EUR
Energy vacuum, steam reduction per year	30,000 EUR
Total cost saving production plus per year	930,000 EUR
less additional felt costs / changes	30,000 EUR
Total increased profit per year	900,000 EUR

III.5 Planned life reduction: Lower costs, increased profit

If we now consider the situation where the life of a set of felts is reduced to 6 weeks, more felts and felt changes will be necessary (about 1.33 million Euro per year). However, in this case the break frequency will be reduced from about 60 to only about 50 per month for instance – by installing multi-axial “specialist” felts from Heimbach for way of example, obtaining a higher dry content by increased nip dewatering.

The break costs now reduce (ca. 580 breaks per year, each 15 min at 10,000 Euro per hour

downtime) to about 1.45 million Euro per year. This means that with a life of only 6 weeks per set of felts the total costs for felts, felt changes and downtime for breaks amount to 2.78 million Euro per year. Therefore the additional cost of a 6 week rather than an 8 week life per set of felts is “only” 30,000 Euro per year (III.4B).

However, these additional costs are significantly more than compensated by a number of additional positive factors:

Because of the shorter felt lives the downtime for 120 breaks per year is eliminated. The result is increased production time of 30 hours per year. The sales value of the increased production provides a plus of about 690,000 Euro per year (III.5).

With the installation of Heimbach multi-axial felts, which as a rule provide better start-up characteristics, further additional production can be achieved. For example, an increased start-up speed of 50 m/min for one day following every felt change has a value of approx. 210,000 Euro per year.

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Furthermore a figure of 30,000 Euro per year can be added for the energy saved – as a result of lower Uhle-box vacuum – combined with reduced steam consumption resulting from higher total dewatering and the higher dry content after the 3. press.

The final result – after subtracting the 30,000 Euro additional cost of changing from 8 week felt life to 6 week felt life (Ill.4B) – is an increased profit of about 900,000 Euro per year (Ill.5) – less material and operational cost of the increased production.

To return to the starting question of “maximum felt utilisation – or not”: Despite the planned reduction of felt life from 8 to 6 weeks, process optimisation with the help of high performance multi-axial felts from Heimbach – and additionally both a reduction in costs and an increase in production with significant increase in profit per year – can be obtained.

Advantages for the Energy Balance:

Production time gained = 30 hours per year more energy utilisation of heated dryer cylinders, increased production worth 690,000 Euro per year, plus each start-up at 50 m/min faster for one day = annual increased production worth 210,000 Euro plus full year reduction of vacuum and steam consumption = approx. 30,000 Euro.

Case study B

Position: 3. Press Bottom Felt (Shoe Press). The requirement was for energy saving whilst retaining the effectiveness of the machine.

Under measurement supervision from Heimbach during a short break both bottom felt Uhle-boxes were lowered. A multi-axial felt from Heimbach was already running in this position. As a result of measurements taken after lowering the boxes and further measurements a week later the decision was taken to operate without the boxes as standard.

With further ATROMAXX.M bottom felts (Ill.1)

the machine since that time for the remaining 217 days of the year ran uninterrupted without the two Uhle boxes. At a normal power consumption of the pump of 190 kW a substantial saving of energy and energy costs could be made – quantified in Ill.6 – without any deterioration in machine performance or paper quality. Runnability without Uhle boxes in this 3. Press could be maintained over the whole life without any diminution of the dewatering performance. This was only possible because the multi-axial felts were able by increasing nip dewatering to more than compensate for their removal.

A further advantage of Uhle-box removal was the elimination of the braking effect on the felts over the Uhle-box slots. This brought with it an additional, if lower and in this paper not quantified energy saving to the roll drives.


Advantages for the Energy Balance:

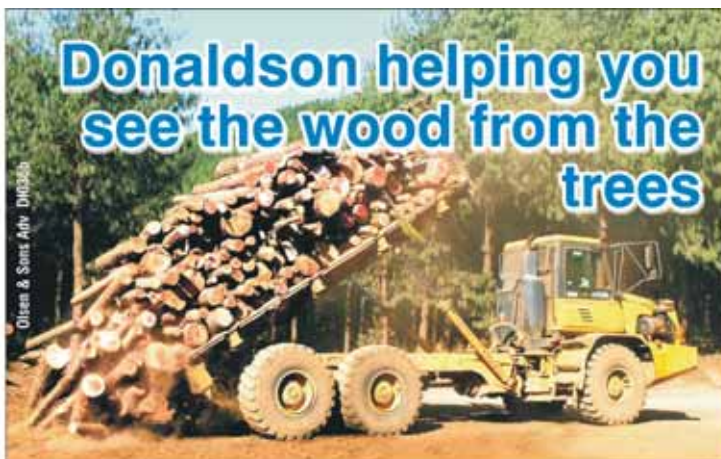
Removal of 2 Uhle-boxes – offset by increased nip dewatering = energy saving from pump of 989,520 kWh = 39,580 Euro in 217 days, according to a saving of about 65,000 Euro per year.

Summary

The cases described here indicate the high level of complexity of the energy theme. In addition to the individual comments on energy saving this paper highlights two significant results:

First: On the basis of great variability the differing characteristics of the modules of Heimbach multi-axial felts create the required behavioural unity for each solely position: the “individually balanced dewatering”.

Second: Positive answers to questions of reducing energy consumption basically initiated in the press section are substantially determined by the machine clothing – and by the optimisation of dewatering systems the clothing makes possible. 



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