

LECTURE CEMTEC SUPPLIER DAY IIBCC 2022

Problems:

- Global warming through CO2 Emmission
- Energy prices rising

- **Why consuming > 1000 KW/h of energy if < 100 KW/h is possible.**
- **and why generate thousand of tons of CO₂ emmissions when there are ways to reduce them to only a few tons**

- **Why using pumps and stores for the watercircuit upto 1000 m³ water for processing, when we can reuse it continuously and reducing it to < 200 m³ per Hours**

**Cemtec has the
solutions**

Our Engineering/Consulting services

- 1. Soft Dewatering and Felt Cleaning**
- 2. Stabilization preparation, water and material circuit**
- 3. Reduction of the Standard thickness deviations**
- 4. New manufacturing technology and concept for the production of PVA-free fibre cement panels**
- 5. Applications, training, and testing know-how. Test equipment selection**

Consulting service package 1

- **The aim is to optimize the entire dewatering process so that it works more constantly and consumes less energy. This increases quality and at the same time makes production more efficient, reduces energy costs and CO2 emissions**



**Troubles which can ben eliminated
with Soft dewatering**



Questionnaire full filled from a Producer in China

With a smooth dewatering, the process will turn more efficient with an impact in improving quality and cost reduction.
To estimate roughly the potential in you dewatering process, please fill up the data sheet below.

Basis data production line

Flow On Line	no		1.step	2.step	
Hatschek Line	yes				
If Hatschek, sieve cylinder quantity, 3,4,5 or 6	6	number			
Single or double width machine	single				
Width of the fleece at the machine	1450	mm			
Product flat or corrugated	flat				
Pressed or unpressed sheet	booth				
Felt speed new - old Felt: from / to	75.00	m/min			90
Layer thickness	1.00	mm			
Felt life in days: from / to	10.00	Days			
<i>Basis dewatering</i>					
Water content of the fleece before the maker roll after vacuum boxes - new old felt from / to	38-45	% wet base			
Water content after maker roll - of the sheet going out of the machine new - old Felt: from / to	28-32	% wet base			
<i>Energy consumption for dewatering process</i>					
Demand respectively the consumption of maker roll (main drive) new - old felt	90.00	kW	45		
Demand of vacuum pumps in kW for felt cleaning boxes new - old Felt: from / to	45.00	kW	10		
Demand all vacuum pumps for keep and dry the fleece on the felt - new / old Felt: from / to	210.00	kW	15		
Demand of all back water pumps	90.00	kW	20		
Demand of felt cleaning water pumps	37.00	kW	10		
Demand of sieve cylinder spray water pump	55.00	kW	10		
<i>Energy cost - locally</i>	527.00	kW	110		
Cost per kW hour in your factory		Euro, \$, others			
Output in m ₂ 5 mm per hour brutto		m ₂ 5 mm			
Output in m ₂ 5 mm per Felt		m ₂			
Energy per 100 m ₂ 5 mm		kW/100 m ₂ 5mm			
Stop in hours for small cleaning between the felt lifetime		hours			
Interval in day to clean the machine		days			
Start up time after small cleaning to reach full capacity		hours			

Consulting service package 1

Felt cleaning and dewatering

Today's used vacuum pump has the wrong characteristics to cover demand in fibre cement process. Oversizing makes production very difficult



Substitute oversized vacuum pumps by blowers

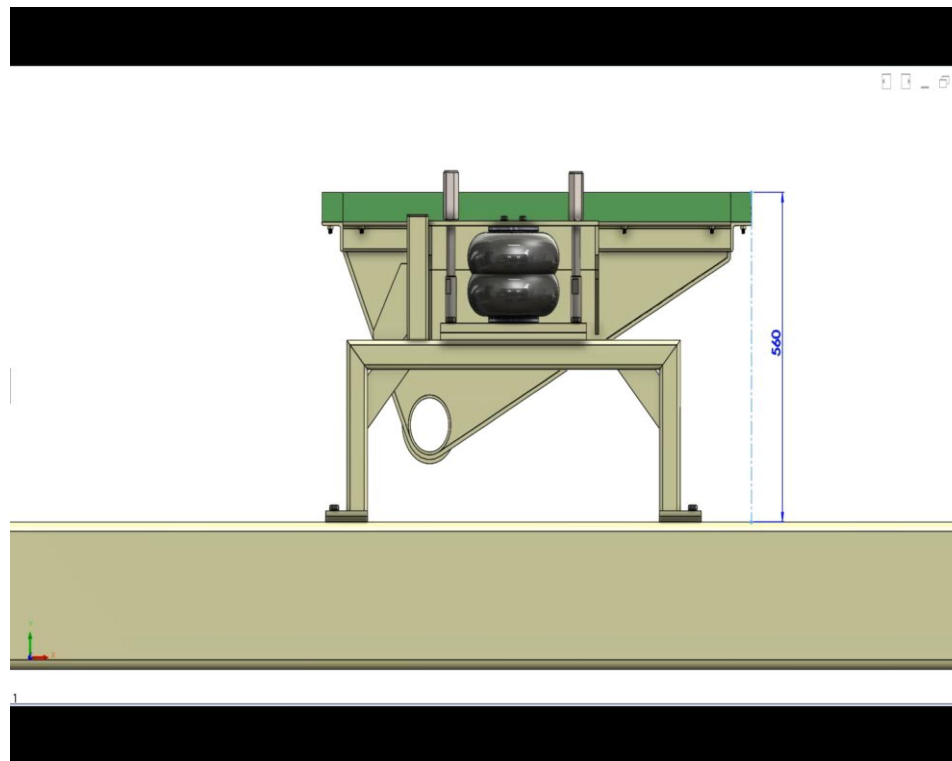
Side channel blowers have the optimum characteristics for demand in pressure and volume for fibre-cement process



New box design, new materials, devices and self-cleaning effect are used for felt cleaning and dewatering system

box gaps can kept open over long time

new positioning of felt cleaning and dewatering boxes



Benefits of our Service Packages 1

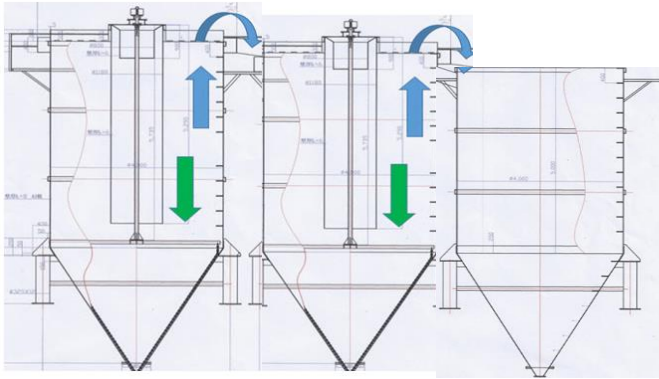
- **Saving energy only: 150-700 Kw/h per line depending on the oversized pumps Cost savings of 0.1 US\$/kWh in US: 110'000-700'000 US\$ line/year**
- **and ~ 3000 t CO2 reduction**
- **Felt savings/line and per year 5-25 pc**
- **Savings in cleaning hours due to shorter start up times and less Cleaning intervals:
up to 900 hours/year/line**

Service Package 2

- **Stabilization preparation, water and material circuit, cement compliant technology (adjustment of pre-hydration) and optimization of material flows.
Reduces waste to 0.... %**
- **Reduces downtime and cleaning hours by up to 900 hours**

48 YEARS AGO, 1974

FLOW ON HATSCHEK/MACHINE WITH 1 CONE BESIDE MACHINE
FELT SPEED 104 M/MIN RESPECIVE 100 M/M FO WITH 1 MM/TURN
RAW MATERIALS KEPT IN PRIMARY CIRCUIT, CONTROLLED PROCESS



48 YEARS LATER, 2022

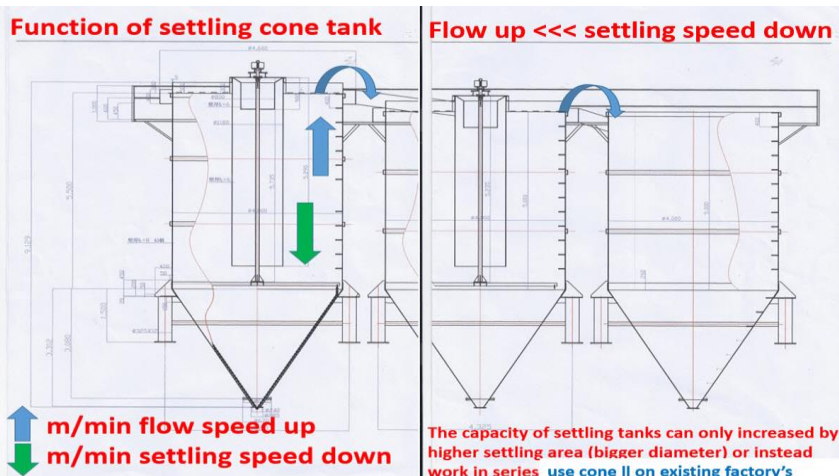
UP TU 4 SETTING CONES OUTSIDE 20-70 M AWAY
FELT SPEED AND OUTPUT MOST REDUCED
EXESIVE CLEANING TIME / RAW MATERIAL LOSS



Service Pack 2



- **Pre hydration**
The Cement starts hydration after first contact with water and influence sheet forming process at all positions.
- **The quality can be improved with dominated pre hydration.**





Benefits of the Service Package 2

- Saving > 100'000 US\$ raw material costs through waste reduction**
- Capacity gain due to reducing downtimes of at least 20 %**

Service Package 3:

Reduction of the Standard thickness deviations



All thickness measurement systems on the market are insufficient because there is no feedback from the hardened panels.

Service Package 3:



These thickness differences can not be eliminated by thickness control system. It can only be eliminated by adjustments at the machines

Benefits Service Package 3:

• CONCLUSION

- With the fluctuation in thickness, you allocate up to 4 % raw material, which accounts for at least 4 US\$/t.
- For a line with 230 t/24 hours your losses are ~ 1000 US/Day or 330'000 US\$/Year

Service Package 4: New asbestos-free cement technology (NT)

- **In this Service Pack we focus on the new development and/or improvement of existing recipes for any kind of non-asbestos cement manufacturing line.**
- **Development of new concepts for facade panels for indoor and outdoor use.**

Service Package 4 the most important points:

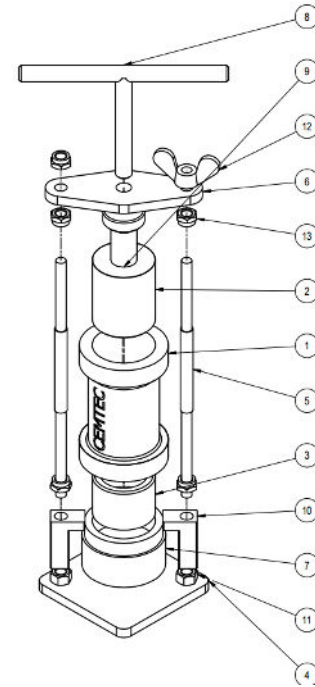
- **Air cured in special insulated chambers for using the heat of hydration to dry the panels.**
- **Use of suitable micro silicate to protect the cellulose for outdoor panels.**
- **Adapt the processing parameters to the cement and raw materials used.**
- **Process and product control and use of data to evaluate quality.**

CemTec Consulting GmbH

Christoph Häring, Ing. HTL



Together with CemTec Consulting GmbH we offer testing devices for the fiber cement industry



Higher efficiency through raw material intake control
More reliable production
Better quality!

used by:



Laboratory-scale fiber cement sample maker device with heavy duty mixer and utilities. Equipment to produce lab-scale testing blocks for assessment of mechanical values of raw materials with high accuracy > 97 %. Suitable for new recipe development and carbon output reduction. The Device is supplied with a very sophisticated calculation Software program

Green stuff + water	135.79			Hydrate	Tot mix	358.49	RM + water
Volume raw material			59.0	gain gram	97.0	160.55	Vol mix dry
Air pore dry hard 28d			1.8	-5.6	3.0	airpore vol	
Concrete 28d, incl. Air			60.8	94.43	100.0		currency
Characteristic of matrix green / hard			m³-Cost			324.23	CHF
Density green, after prod (kg/dm ³)		2.233	Stuff cost per ton			197.18	CHF
Density dry (28 day, kg/dm ³)		1.739	Water in fresh stuff (dm ³ /m ³)			391.35	
Cement content (kg/m ³)		1398	Water content, moisture (%)			17.54	
Binder content (kg/m ³)		1398	Hydration rate (28 day, %)			22	
WC-Wat/Cem WB-Wat/Binder	0.280	0.280	Bound water (litre hdr/m ³)			58.70	
Pore volume green, after Production (%)		42.2	Bound water %			20	
Expected Pore volume (28 day, %)		36.3	Litre binder /m ³ (Binder.+ H ₂ O)			842.6	
Expected relat E-Modul (28 day, N/mm ²)		9880	Preparation water tot			550.4	
Sample weight dry not hydrated		g 42.24	Moisture wet base			17.52	
Sample weight with hydr. gain	94.43	39.89	moisture dry base			21.24	
Average 7 samples after dewatering		g 51.21					
Spring back total in %		-2.63					
Sample mm calculatory estimate		8.12	Sample No.			7	
Sample mm in trial final thickness mm		11.90	Weight tot for dewater g			905.25	
Hydration gain estimated by calculation %		-5.57	Sample weight to balance g			129.32	g dry RM
Hydration gain by real trial		% -2.98	Mix dry hydrated			gram 279.21	295.68

Benefits with the application of our Package 4

- **Recipe development and new PVA free concept, replace autoclave by micro silica air cured and drying, Saving potential of 80 Kcal/Kg FC Sheet.**
- **With 230 t/day output a total of 18,4 Mio. Kcal or 21'385 KW/day Energy savings**
- **and a reduction of CO2 Emission of 9,6 to 16 t/day**
- **Saving potential for a single width/double length line (230 t/day) output**
 - > 2.0 Mio US\$**

Service Package 5:

- **Applications, training, and testing know-how.
Test equipment selection**
- **With this service package, we offer a wide range of knowledge, test methods, test devices to improve the product behaviour economically, technically and service wise.**

Additional services

- **Support in the pre-investment phase to optimize plant layout,**
- **machinery details, technology, and investment cost.**
- **Support in improving existing plant layout**

SUMMARY & CONCLUSION

- **Each fibre cement board manufacturer could save 9 Mio.KW/Year/line.**
- **Cost reduction of > 4000 US\$/Day/line,**
- **money you all have to pay as no one has his own Power plant**

SUMMARY & CONCLUSION

We think it should not be a big issue for a success-oriented intelligent entrepreneur to make an immediate decision for such an investments with a ROI between 3 to 6 month/Package

SUMMARY & CONCLUSION

- **18 billion kW/year savings with a possible worldwide introduction and conversion of 2000 lines**
- **This amount of electricity roughly corresponds to the entire energy production Switzerland**

END

Creativity is intelligence, having fun

Albert Einstein