

Introduction

Author

Mr. Rajat Sarkar



- A Mechanical Engineer with PGDBM in International business
- More than 13 years of experience at Voith Paper at Design engineering, Sales and Application
- Responsible for technical concept & proposal preparation for rebuilds & products for Paper Machine

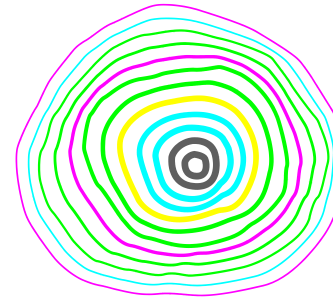
Presenter and Co-author

Mr. Abhijan Chakraborty



- Mechanical Engineer by Profession
- Taking care of Sales & Application (Graphic, Board, Tissue and Specialty Paper Machines) for Voith Paper in India

In the last 150 years we mastered many obstacles



Welcome to the Next 150 Years

Voith went through turbulent times ...

... and successfully managed the last 150 years.

DuoShake™

For improved strength and better sheet stability



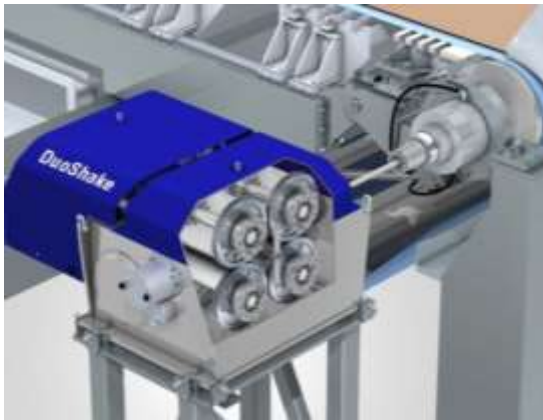
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1. Impact of DuoShake on fiber
2. Improvement in Paper Properties with DuoShake
3. Factors influencing the shaking effect
4. DuoShake : Working Principle
5. Summary : Benefits of DuoShake in Packaging Paper
6. References and Case Study

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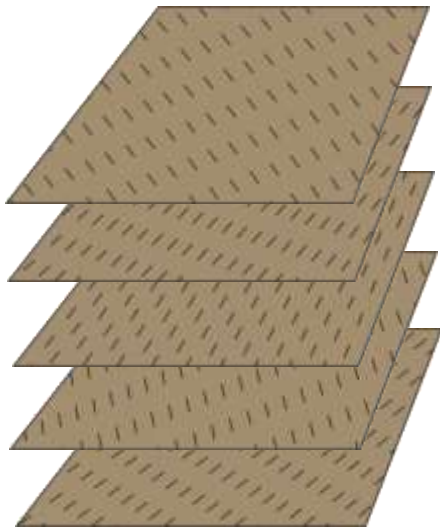
The DuoShake™ Impact on fiber



puts cross direction dynamic shear in the stock suspension up to 10 times before dewatering is completed.

This:

- distributes fibers from MD to CD.
- reduces MD/CD tensile ratio (rule of thumb -0.3 to -0.6).
- creates a layering effect.
- improves formation by breaking up flocs and filling in light spots.
- creates a more uniform sheet.



The DuoShake™
Impact on fiber



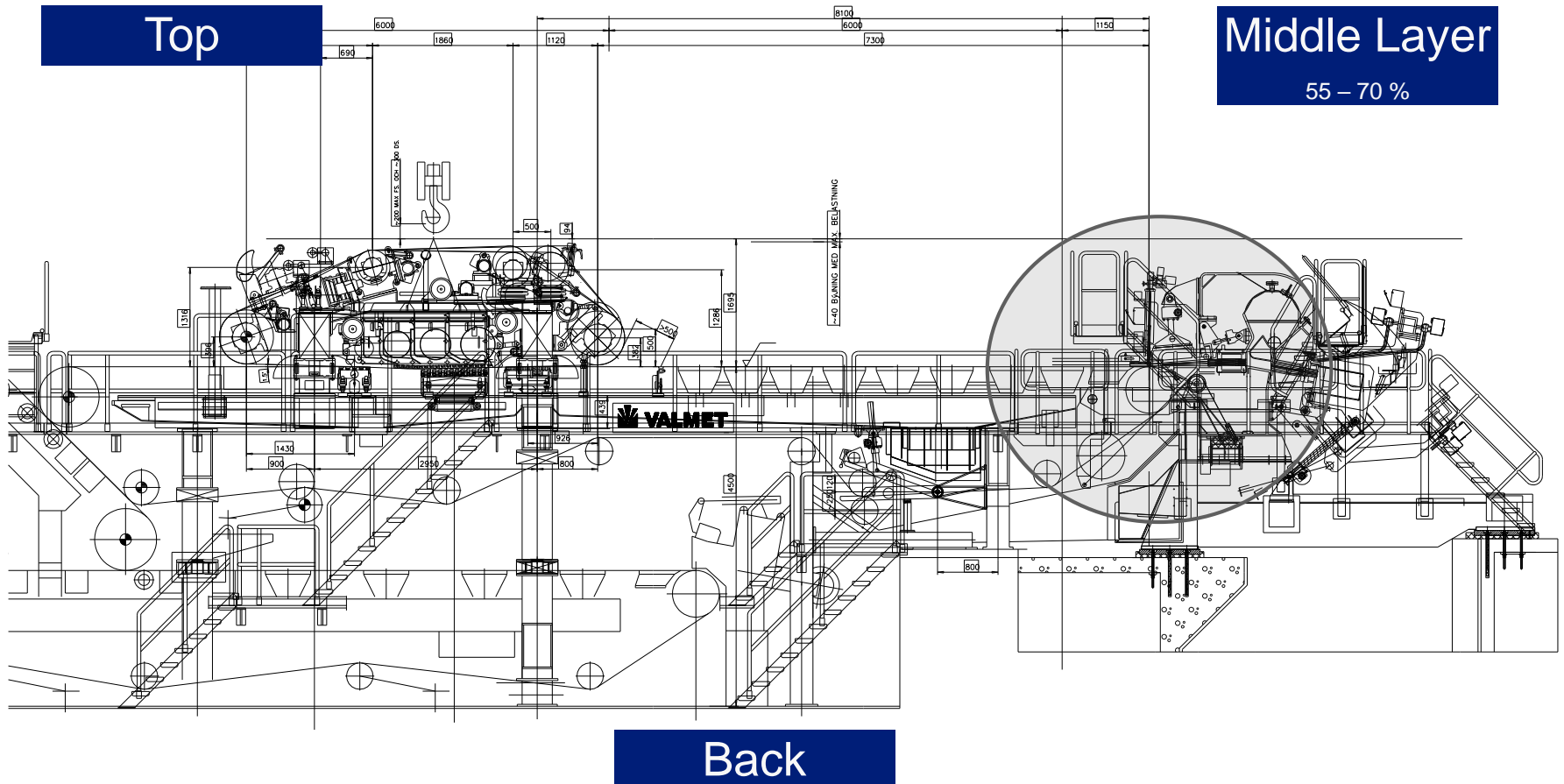
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With and without The DuoShake™ Improvement on the Paper properties



With and without The DuoShake™ Case Study | FBB

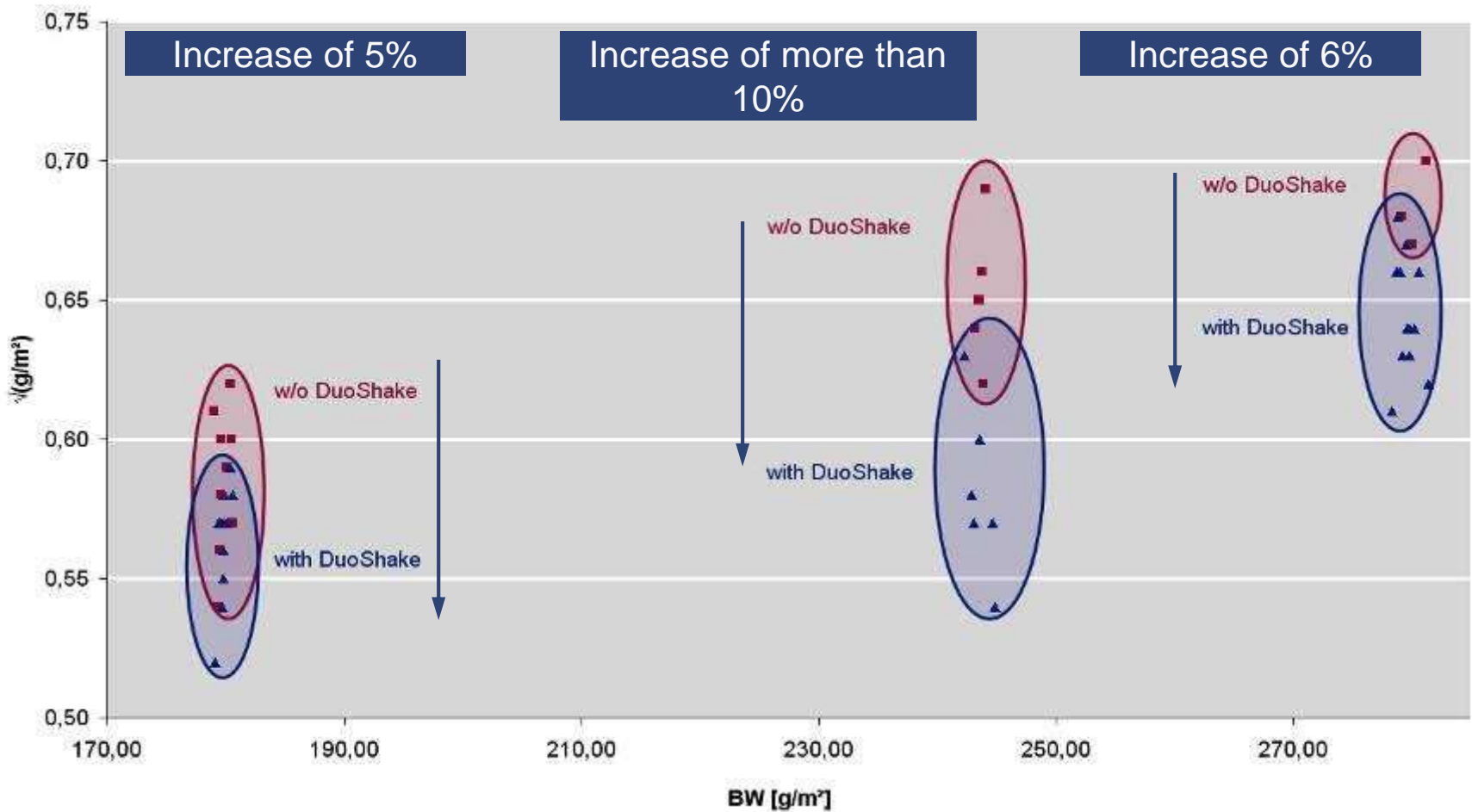


With and without The DuoShake™

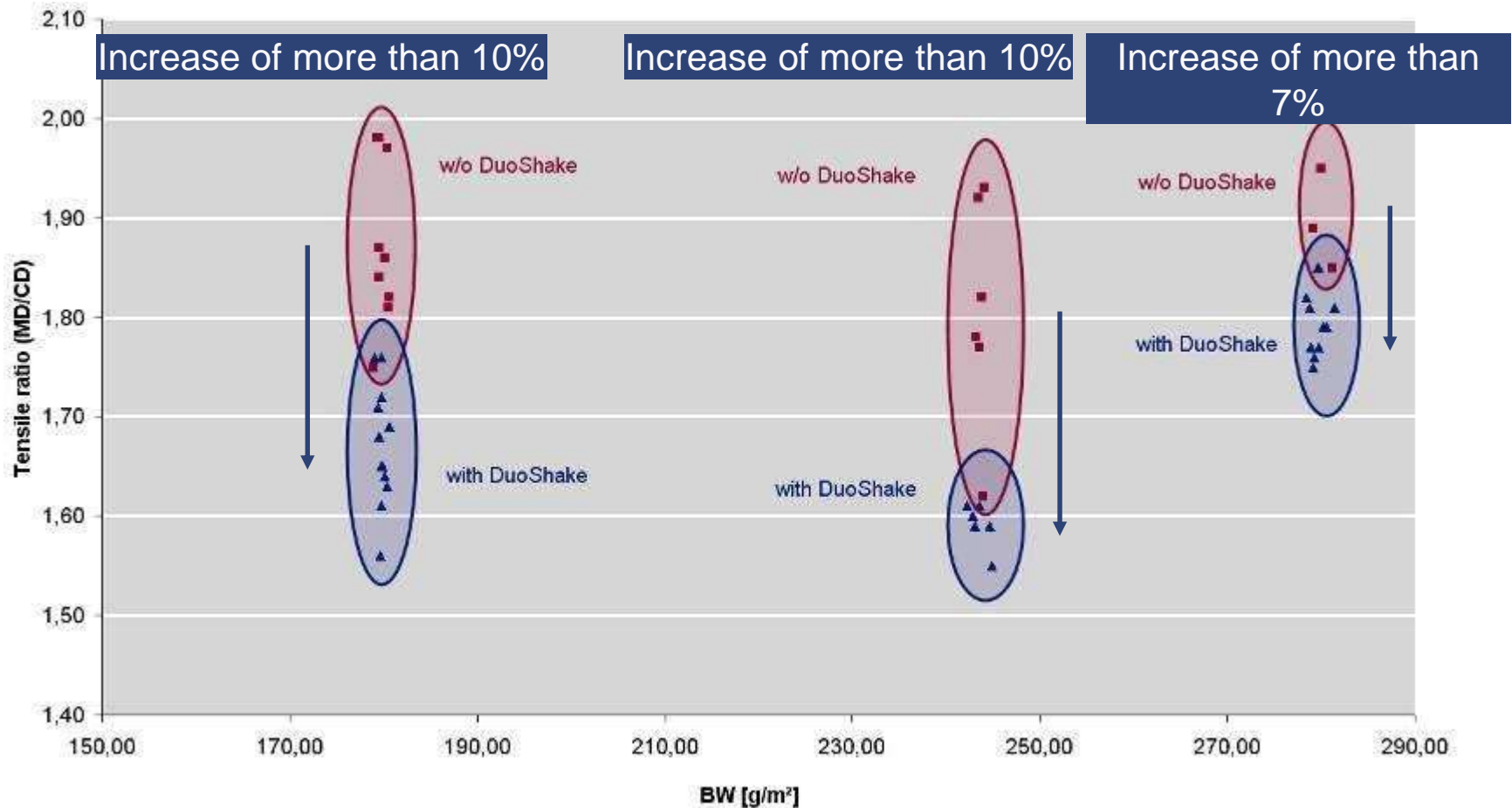
DuoShake Trial Plan

Basis weight [g/m ²]	Tambour #	Wire Speed [m/min]	DuoShake [Yes / No]	Stroke [mm]	SKZ	Date
180	498	395	No	0	0	21.05.2008
180	499	395	No	0	0	21.05.2008
180	502	395	Yes	20	4.000	21.05.2008
180	503	395	Yes	20	4.000	21.05.2008
180	504	395	Yes	20	6.500	21.05.2008
180	505	395	Yes	20	6.500	21.05.2008
180	506	395	No	0	0	21.05.2008
280	534	325	No	0	0	22.05.2008
280	535	325	Yes	14	8.100	22.05.2008
280	536	325	Yes	14	8.100	22.05.2008
280	537	325	Yes	14	5.500	22.05.2008
280	539	325	Yes	14	5.500	22.05.2008
245	572	373	Yes	20	6.900	23.05.2008
245	573	373	No	0	0	23.05.2008
245	574	373	No	0	0	23.05.2008
245	575	373	Yes	20	2.200	23.05.2008

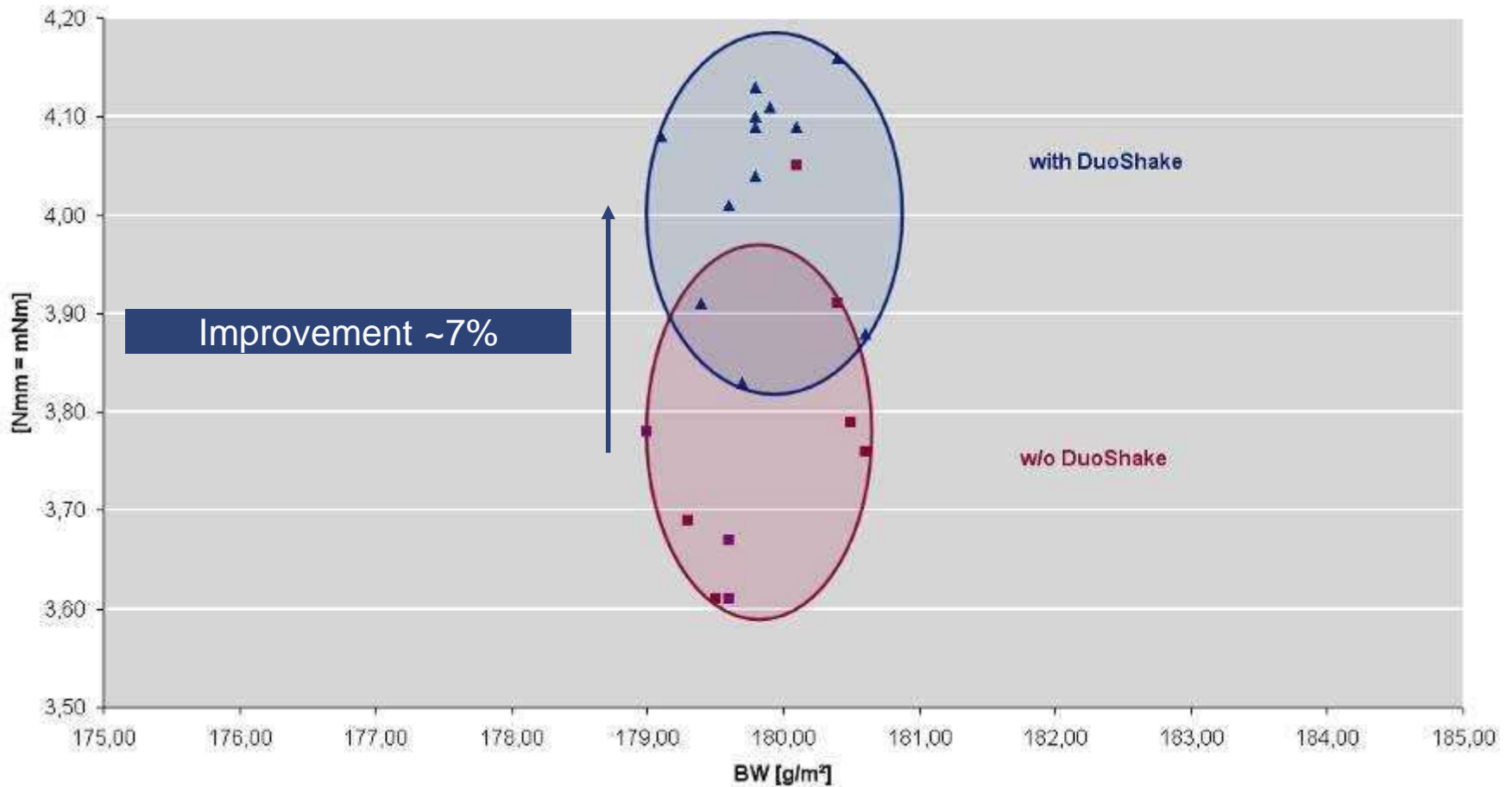
With and without The DuoShake™ Formation in Ambertec



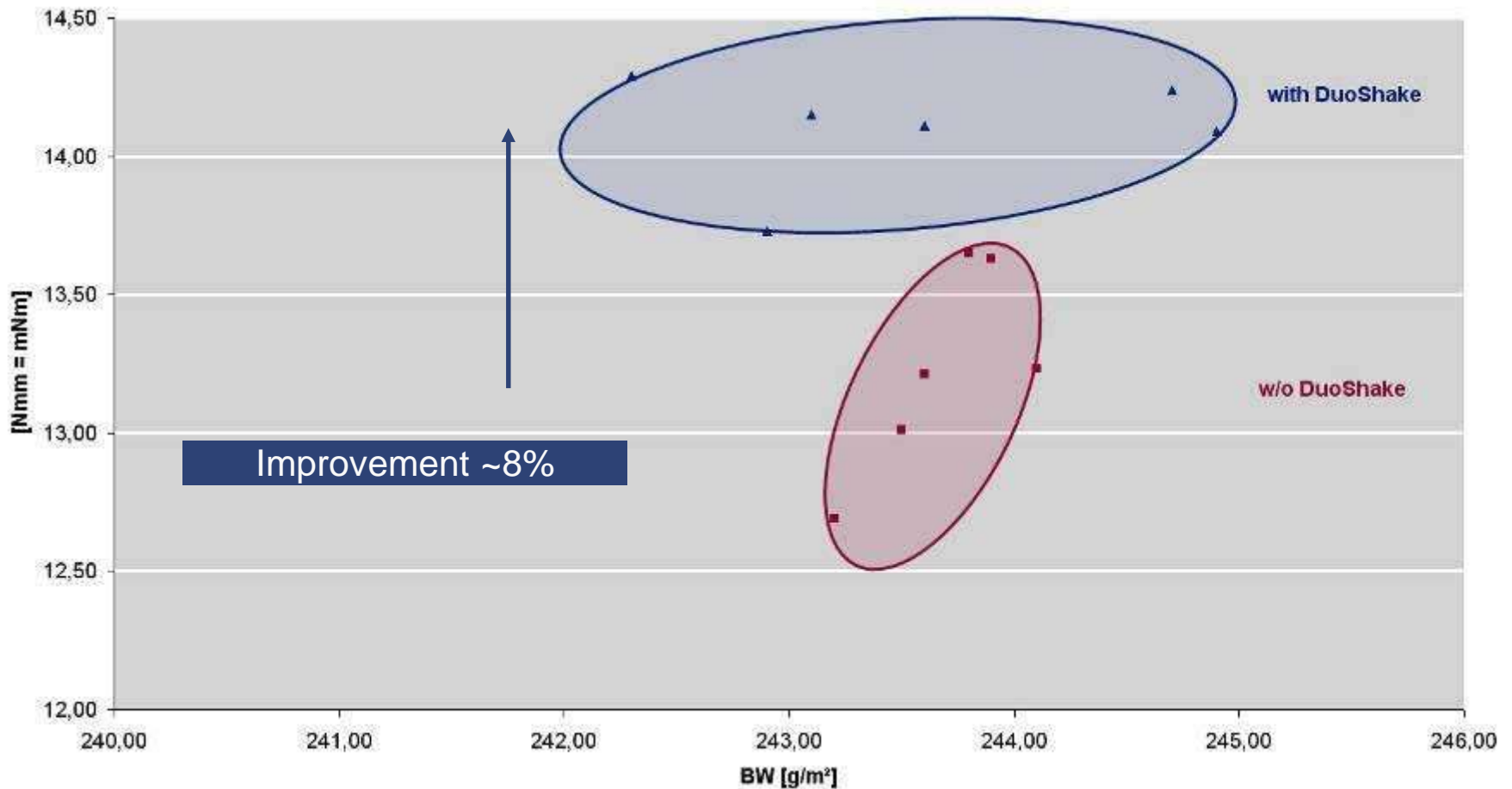
With and without The DuoShake™ Tensile Ratio



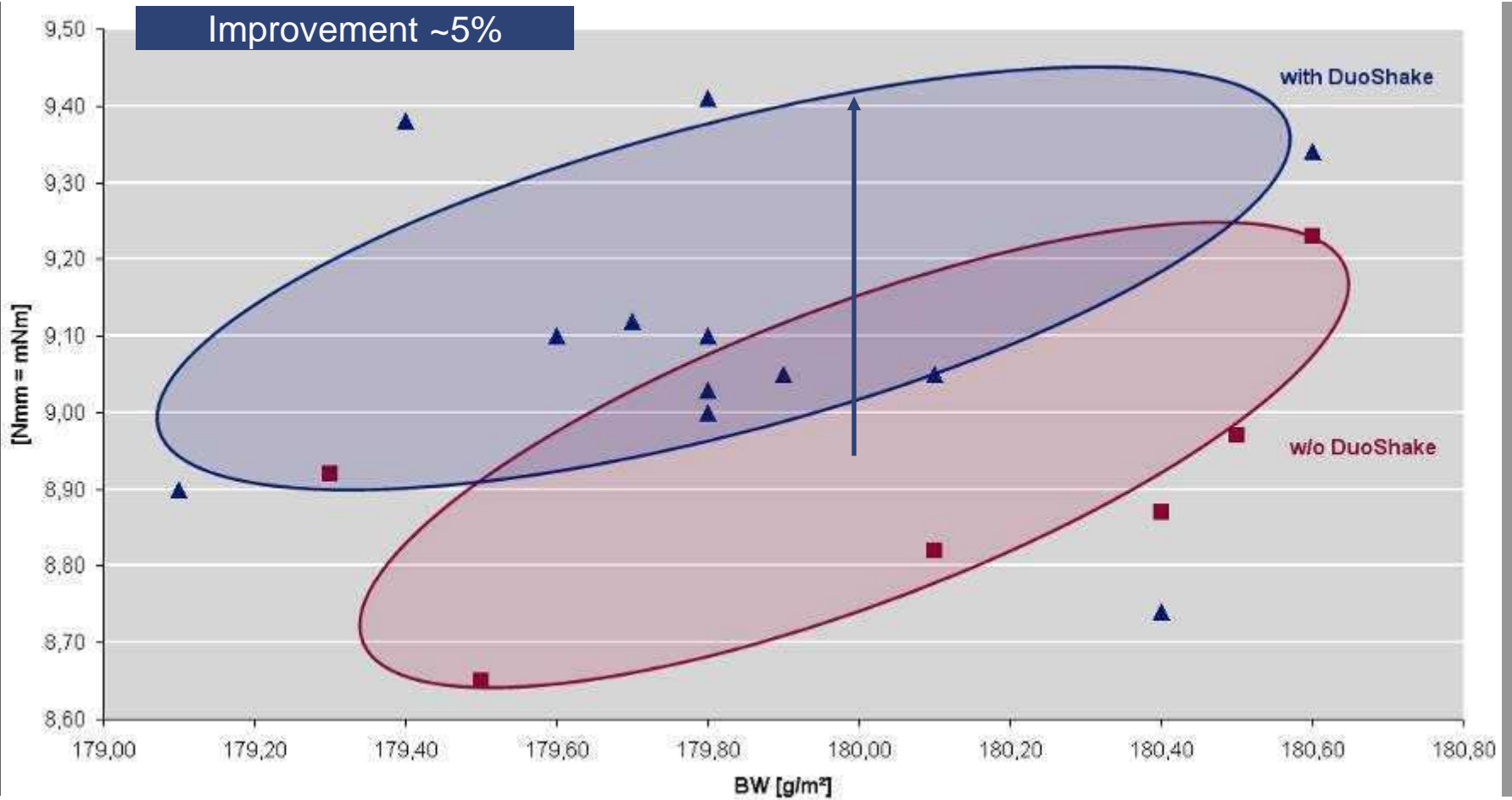
With and without The DuoShake™ Spec. Bending Stiffness CD



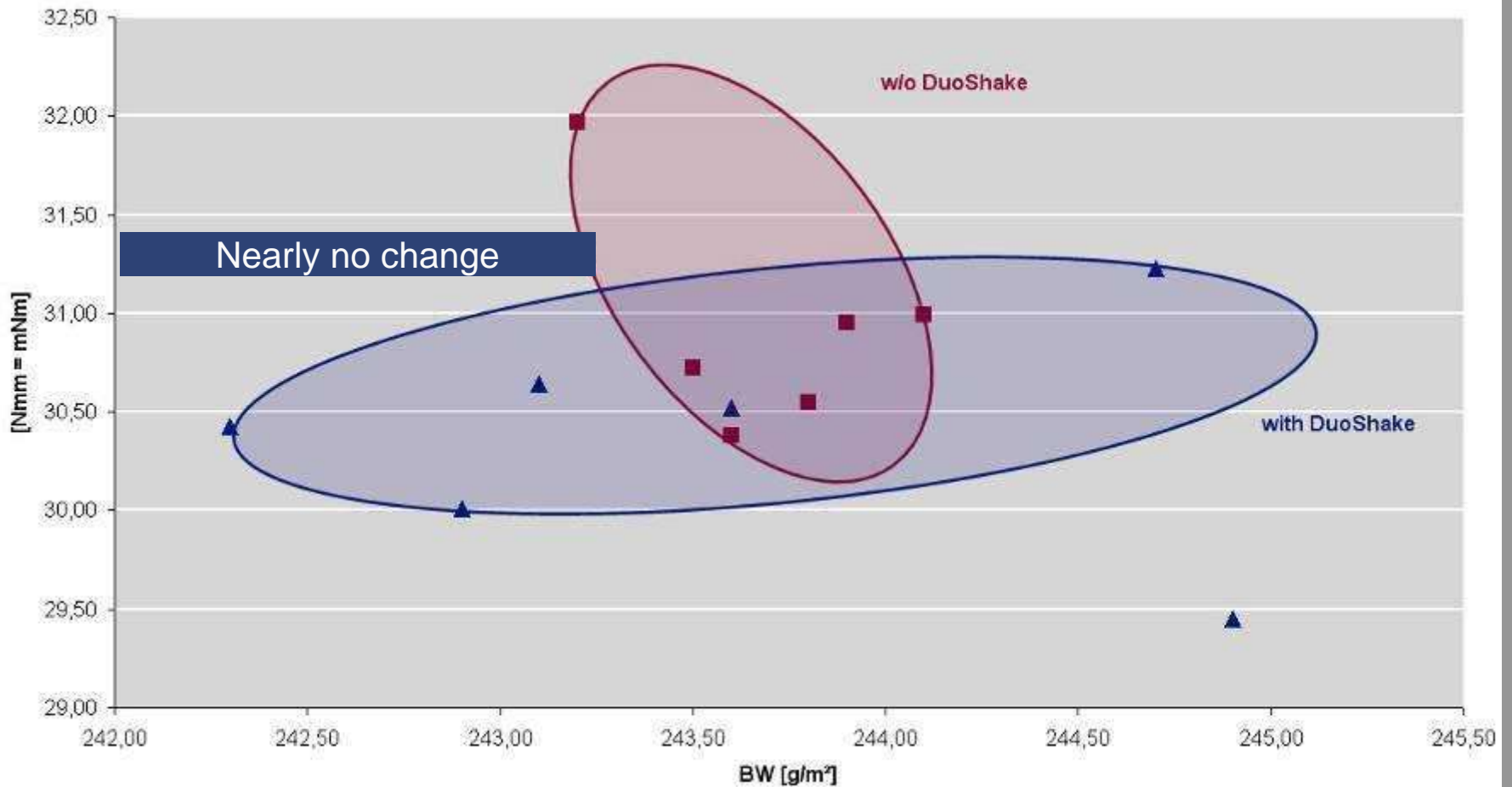
With and without The DuoShake™ Spec. Bending Stiffness CD



With and without The DuoShake™ Spec. Bending Stiffness MD




With and without The DuoShake™ Spec. Bending Stiffness MD



With The DuoShake™ ...

Typical results:

 CD RCT +3 to +8%

 TSI CD +15 to +25%

TSI MD = usually unchanged

 MD/CD TSI ratio -0.3 to -0.6

 Basis weight reduction at same CD strength -3% to -10%

 Formation +10%, % dependent on test method

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The DuoShake™

The Influence of Shaking Potential

$$\text{Shake \#} = \frac{n^2 \times s}{v} = \frac{\text{Freq}^2 \times \text{stroke}}{\text{machine speed}}$$

	Frequency	Stroke	Wire Speed
Symbol	n	s	v
Unit	min ⁻¹	mm	m/min

The DuoShake™

The Influence of Shaking Potential

Conventional Shaking units

DuoShake

$f =$	200	min ⁻¹	$f =$	200	min ⁻¹	$f =$	600	min ⁻¹
$S =$	14	mm	$S =$	14	mm	$S =$	14	mm
$V =$	300	m/min	$V =$	1000	m/min	$V =$	1000	m/min
SKZ	1867		SKZ	560		SKZ	5040	

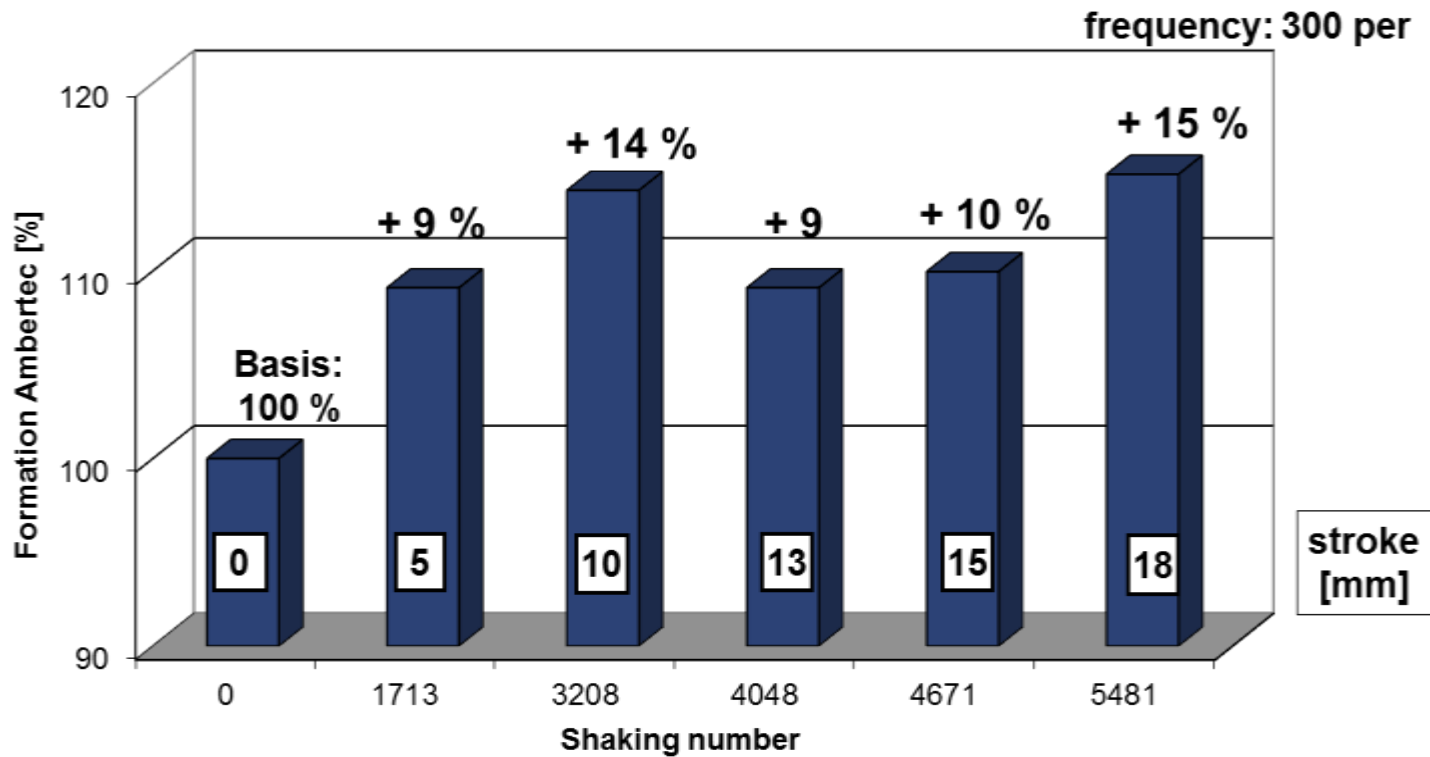
If shaking stroke and frequency are alike
 increasing wire speed means decreasing shaking data !

The DuoShake™

The Influence of Shaking Potential

Improvement of formation

Testliner: BW=200 g/m², v_{wire}=289 m/min, (DuoShake on back ply only)



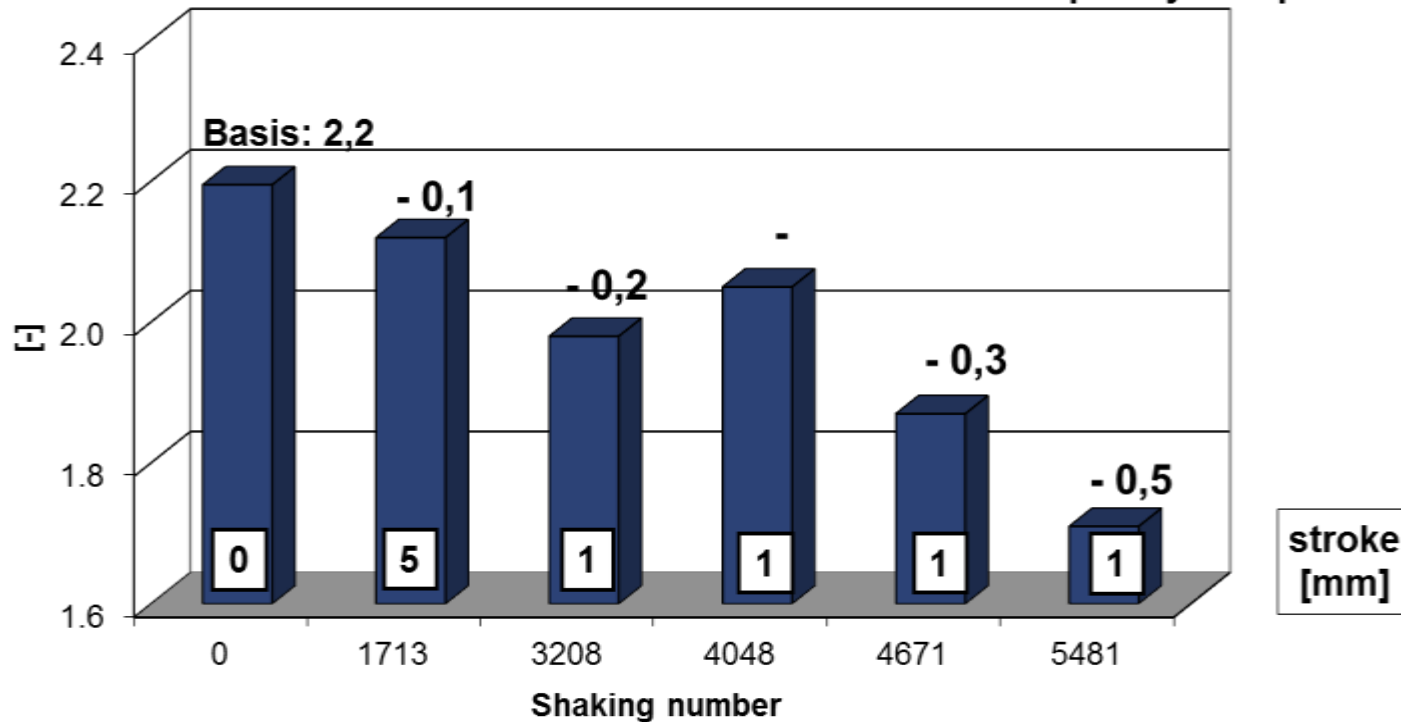
The DuoShake™

The Influence of Shaking Potential

Reduction of tensile strength ratio (MD/CD)

Testliner: BW=200 g/m², v_{wire}=289 m/min, (DuoShake on back ply only)

frequency: 300 per min



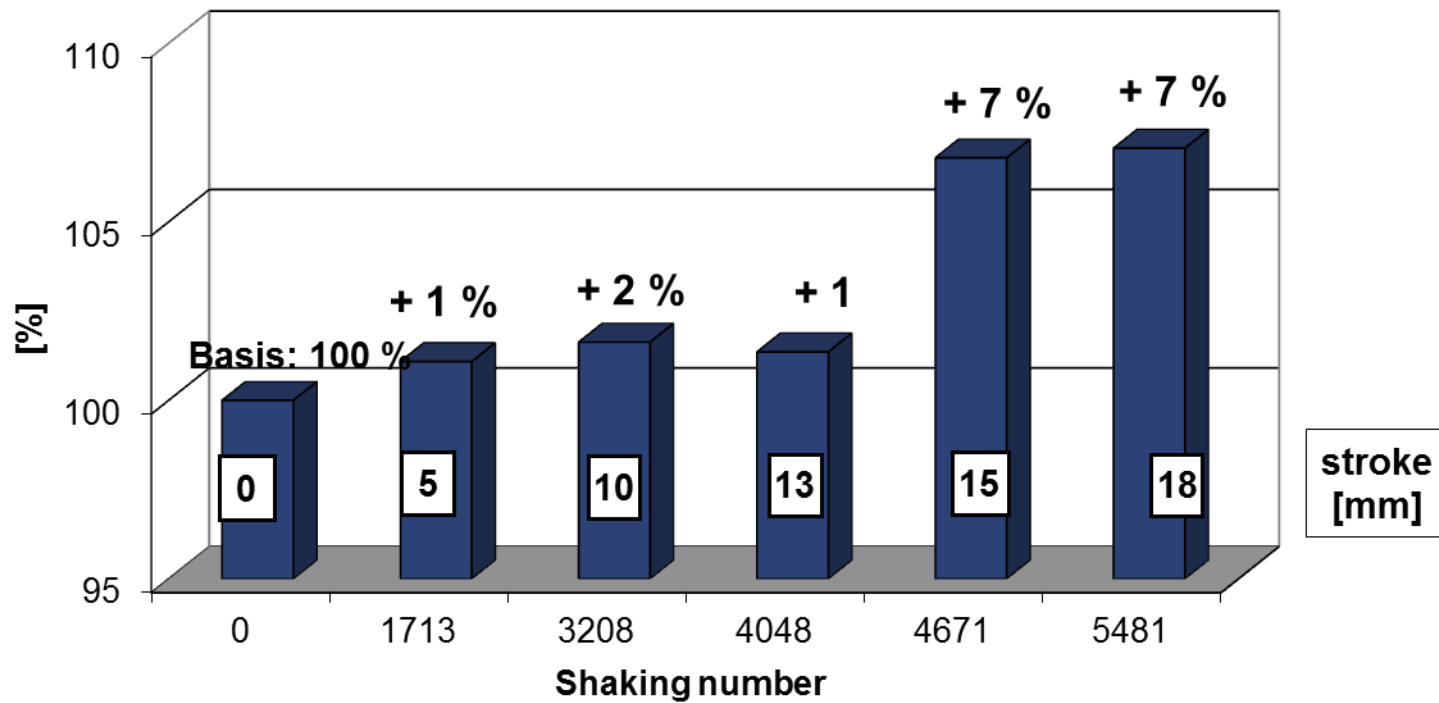
The DuoShake™

The Influence of Shaking Potential

Improvement of tensile strength (geom. mean)

Testliner: BW=200 g/m², v_{wire}=289 m/min, (DuoShake on back ply only)

frequency: 300 per

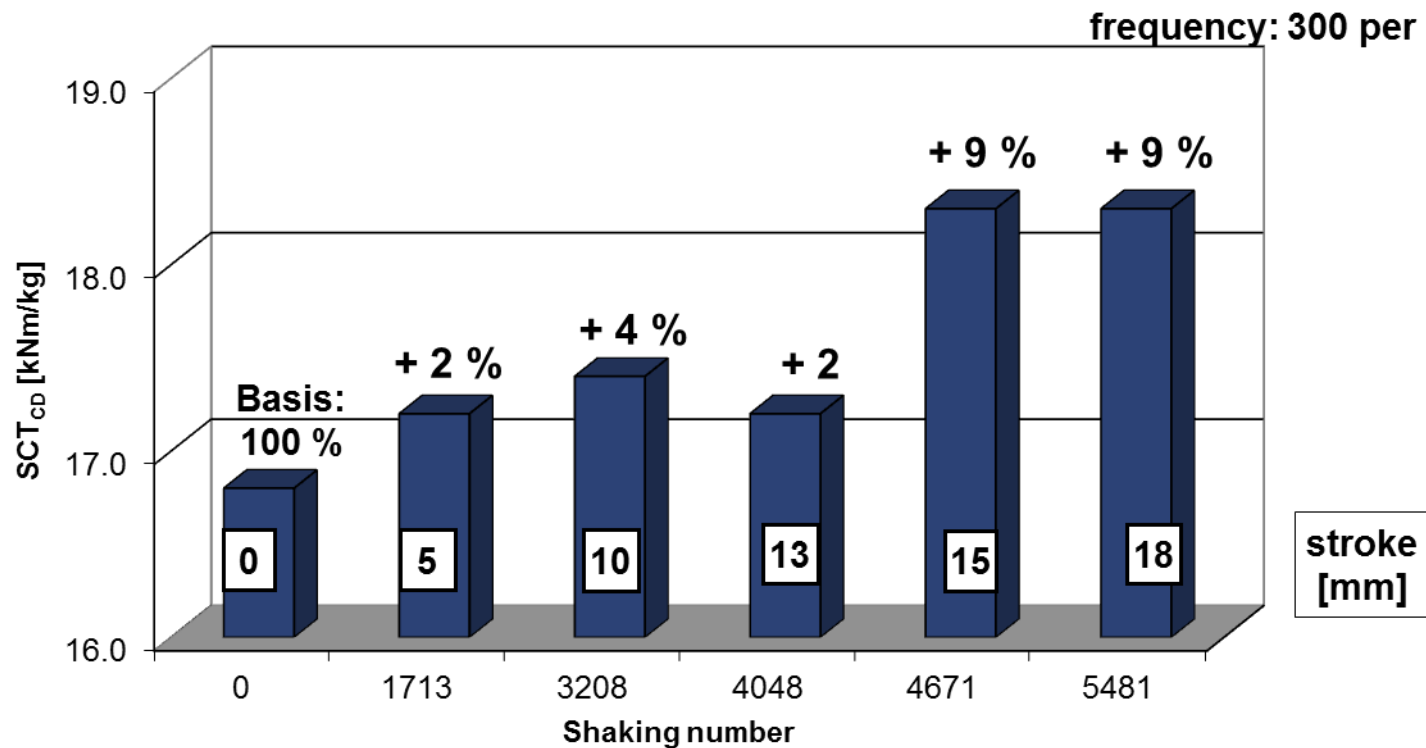


The DuoShake™

The Influence of Shaking Potential

Improvement of SCT_{CD} -index

Testliner: BW=200 g/m², v_{wire}=289 m/min, (DuoShake on back ply only)



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The DuoShake™ : Breast Roll Shake

Working Principle



- Two rotating pairs of unbalance masses
- Arranged on the hydrostatically supported carriage of the DuoShake.
- Due to the rotation, forces are created which are transmitted with a shake rod to the breast roll.
- the system vibrating freely in horizontal direction
- Without transmits any dynamic load to the foundation.

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The DuoShake™ can lead to:



Enhanced Quality / Performance...

increased CD strength

better sheet stability

improved formation / appearance



Raw Material...

reduction of basis weight at same strength level

reduction of strength generating chemicals

flexibility in the furnish mix ratio or fiber substitutions

The DuoShake™ can lead to:



Efficiencies...

- reduction in breaks due to stronger, more dimensionally stable sheet
- wider sheet at reel due to less shrinkage
- speed increase



Energy...

- reduction in refining power
- improved dewatering means less vacuum load
- reduction in steam load

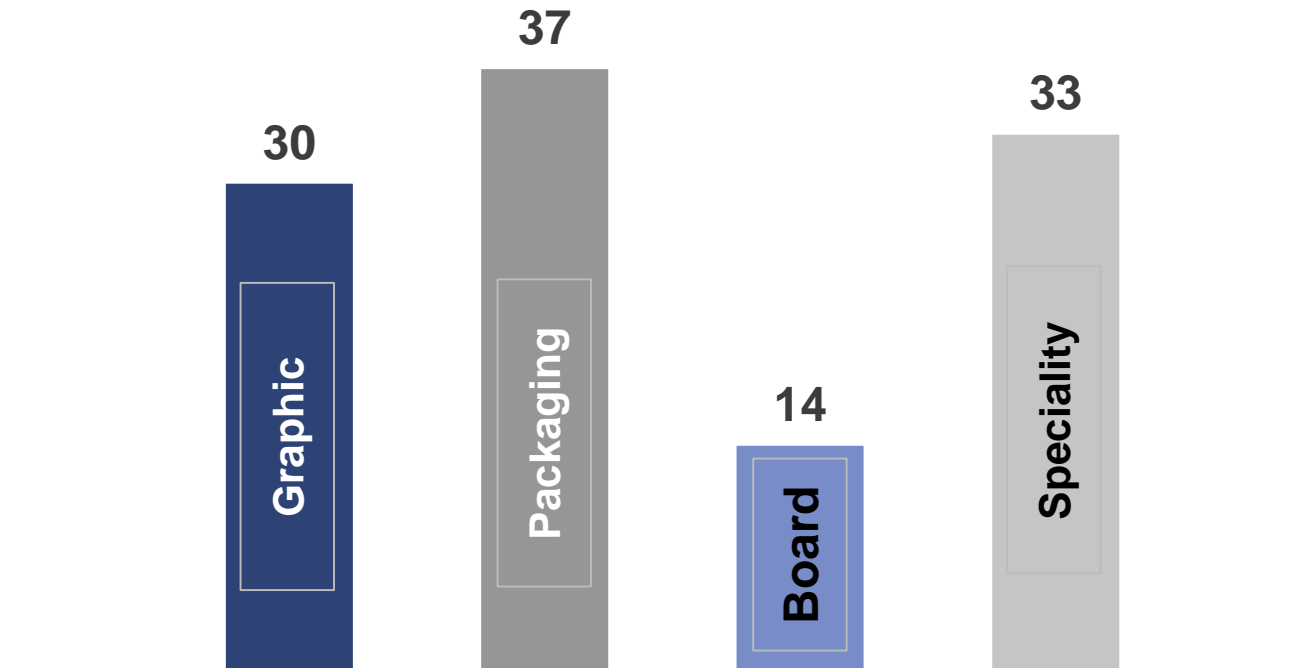
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The DuoShake™

Most reliable unit with unrivaled reference list

More than 250 units successfully operating worldwide



Installation base of last 10 years in various Grades

Success Story, Lee & Man Testliner, DS in bottom layer

Without DuoShake With DuoShake



Formation (Ambertec):

0,941 $\sqrt{g/m^2}$

$\sqrt{g/m^2}$ 0,662

Customer conditions - Technical Data

Wire width	5600 mm
Machine Speed	934m/min
Grade	Testliner
Grammage (Trial with 2 layers) Top 25/m ² , Back 99g/m ²	130g/m ²

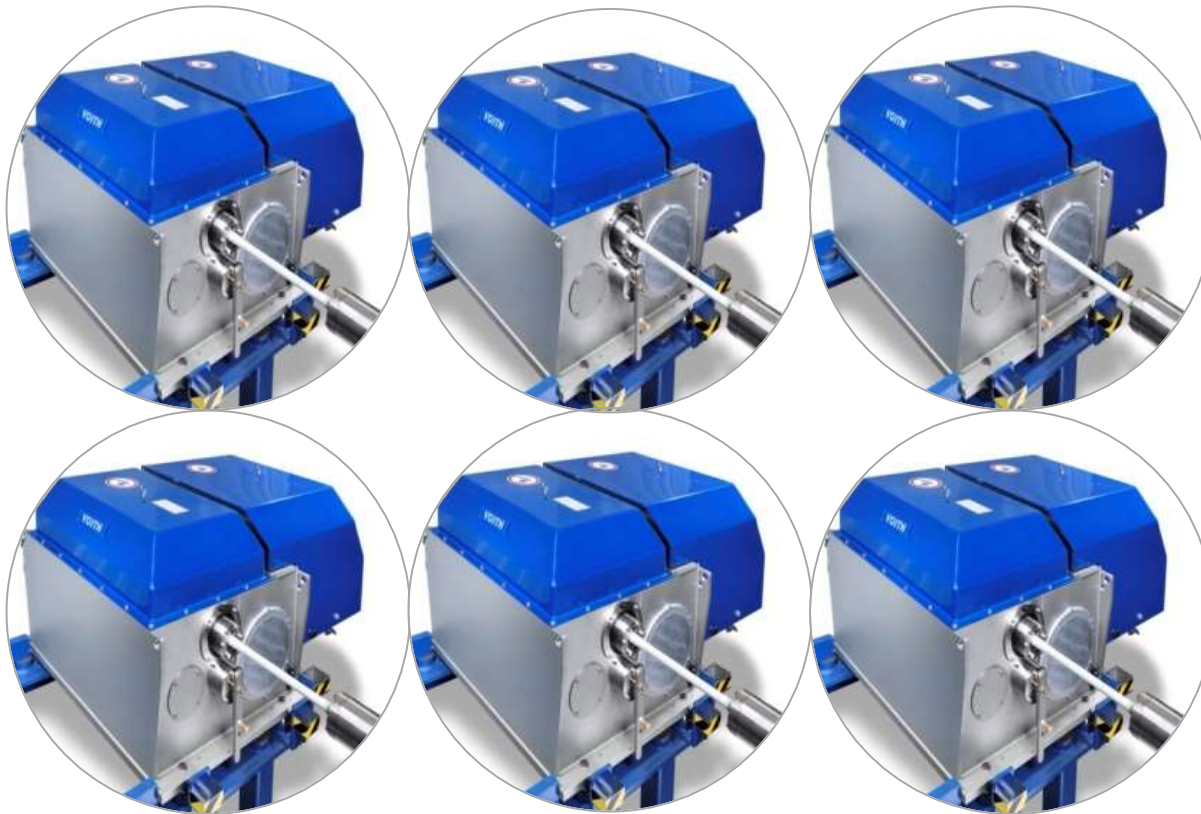
Results and Benefits for Trial with DuoShake

- Formation (Ambertec) 29,6% ↑
- Burst 5% ↑
- RCT-CD index 4% ↑
- MD/CD Tensile Ratio > 19% ↓

Value Added

- > 2% estimated fiber savings (~RMB 7 mio. /Year) with same strength properties
- Better product appearance

Success Story, Lee & Man



Follow up order of 6 DuoShakes, due to extremely impressive results of the first installation

VOITH

Inspiring Technology
for Generations