



# Tunnel Oven Belt Issues

or

**Why Are You Using  
Your Present Type Of  
Oven Belt?**

**Invitation to leave the beaten track,  
to move from your position,  
and  
to look at your own situation  
from a new perspective!**

## # 1 - Thoughts about the decision process

Question:

? What is the reason why you are using that type of belt in that tunnel oven ?

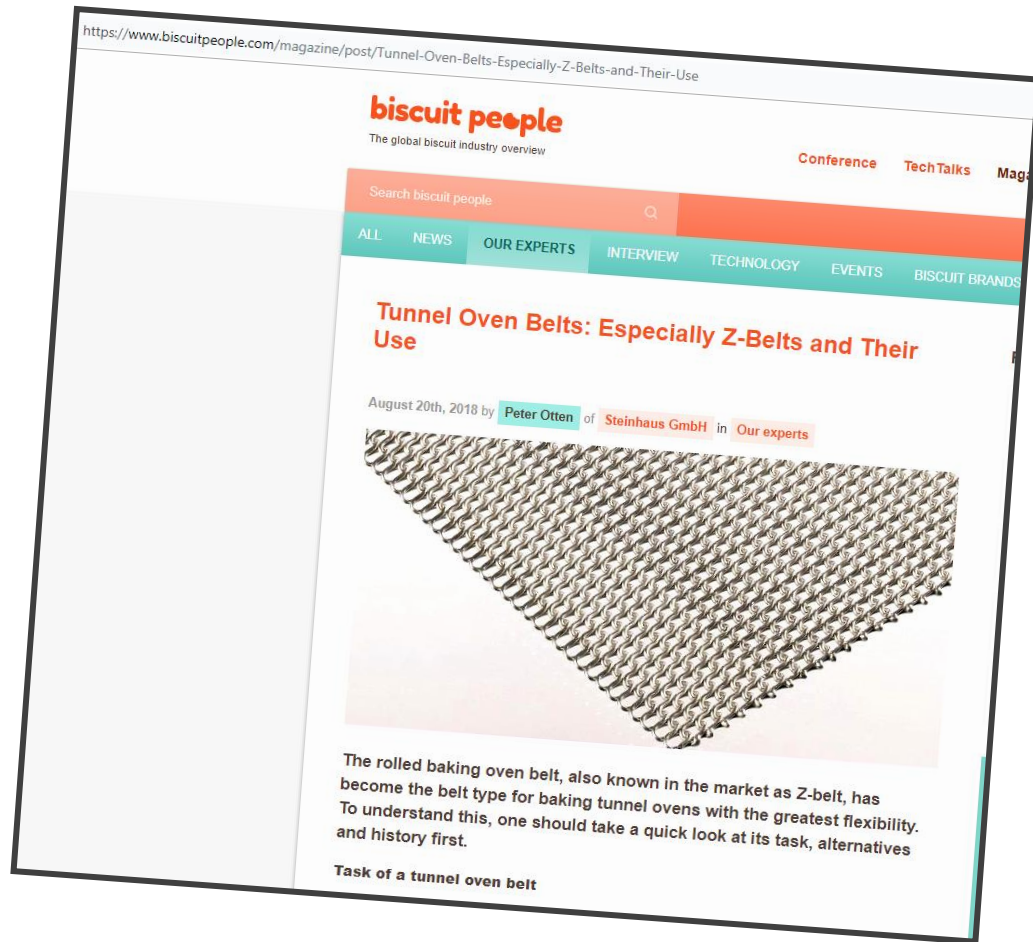
- ❖ Recommendation by OEM
- ❖ Own analysis, evaluation & decision
- ❖ For commercial reasons
- ❖ Out of tradition (not sure) or „*We don't know!*“

## # 2 - Thoughts about the baked product

Question:

? What are criterias to meet by the tunnel oven belt you need ?

- ❖ Baking temperature
- ❖ Baking process: (Radiation / Convection / Conduction)
- ❖ Dough humidity
- ❖ Appearance of baked product



This is an article published  
in August 2018 on  
[www.biscuitpeople.com](https://www.biscuitpeople.com)  
giving many details about  
the various types of belts:

## # 3 - Thoughts about the belt type

Question:

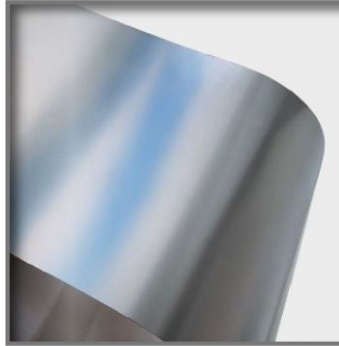
? Which is then the right belt type for your job ?

- ❖ Solid steel belt
- ❖ Braided mesh belt
- ❖ Balance weave belt
- ❖ Rolled baking oven belt (a.k.a. Z-Belt)

# The 4 main types of tunnel oven belts

## Solid steel belt

- ❖ Closed surface
- ❖ For soft dough products
- ❖ Long life time
- ❖ Cleaning difficult
- ❖ Difficult installation



## Braided link belt

- ❖ Open mesh
- ❖ For snack & sticks
- ❖ Light weight
- ❖ No smooth surface
- ❖ Cleanable



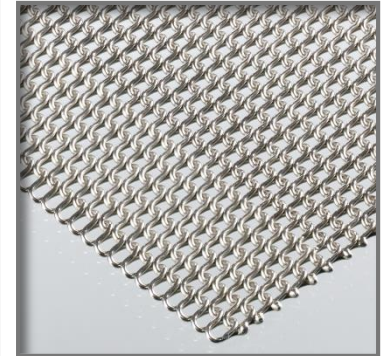
## Balance weave belt

- ❖ Nearly closed mesh
- ❖ High weight
- ❖ Good heat storage
- ❖ hardly cleanable
- ❖ tricky installation



## “Z“-belt

- ❖ Open mesh
- ❖ Flat smooth surface
- ❖ 5 different types
- ❖ Cleaning devices
- ❖ Easy installation



## # 4 - Thoughts about the cleaning

# Possibilities for belt cleaning

Brushes

Steam

Chemicals &  
Detergents

Other  
belt type

Hot air

Carbonizing

Dry ice

Scrapers

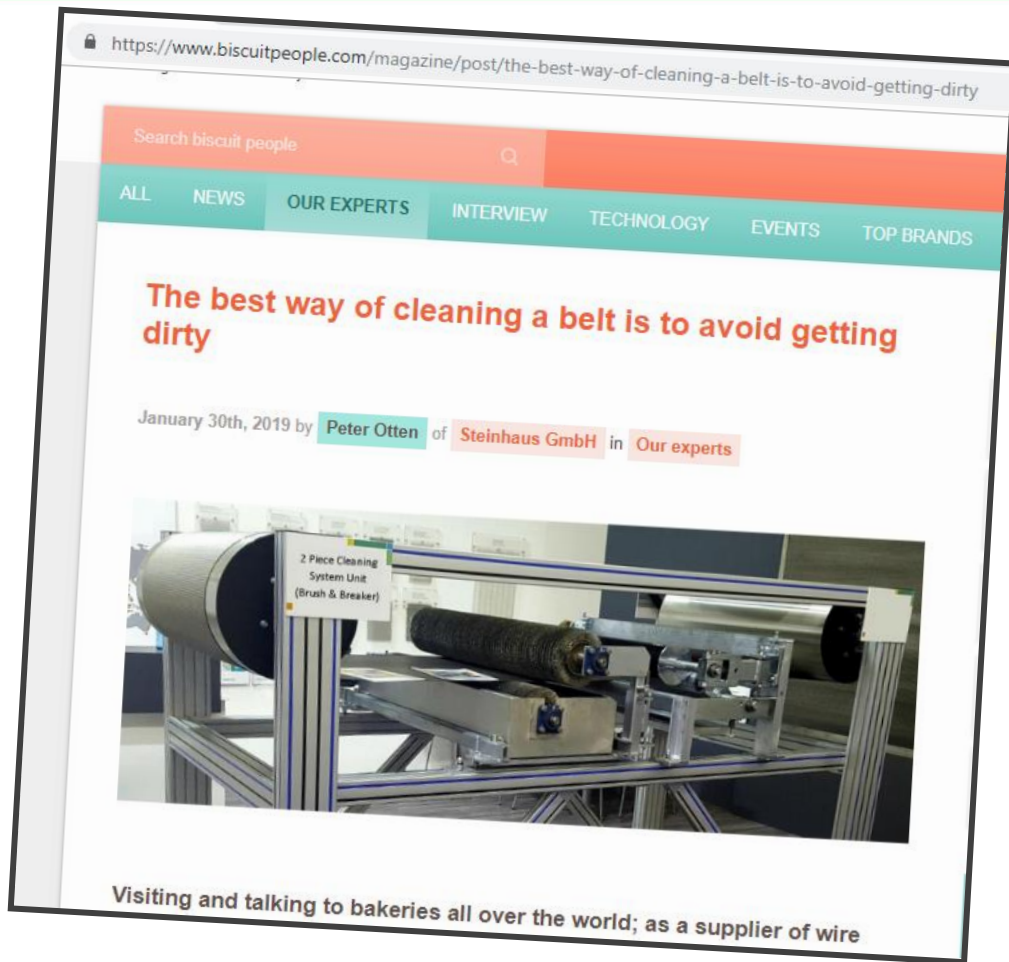
Doing  
nothing

Water jet

Flip-flop  
needle felt  
cylinders

CLEANBELT

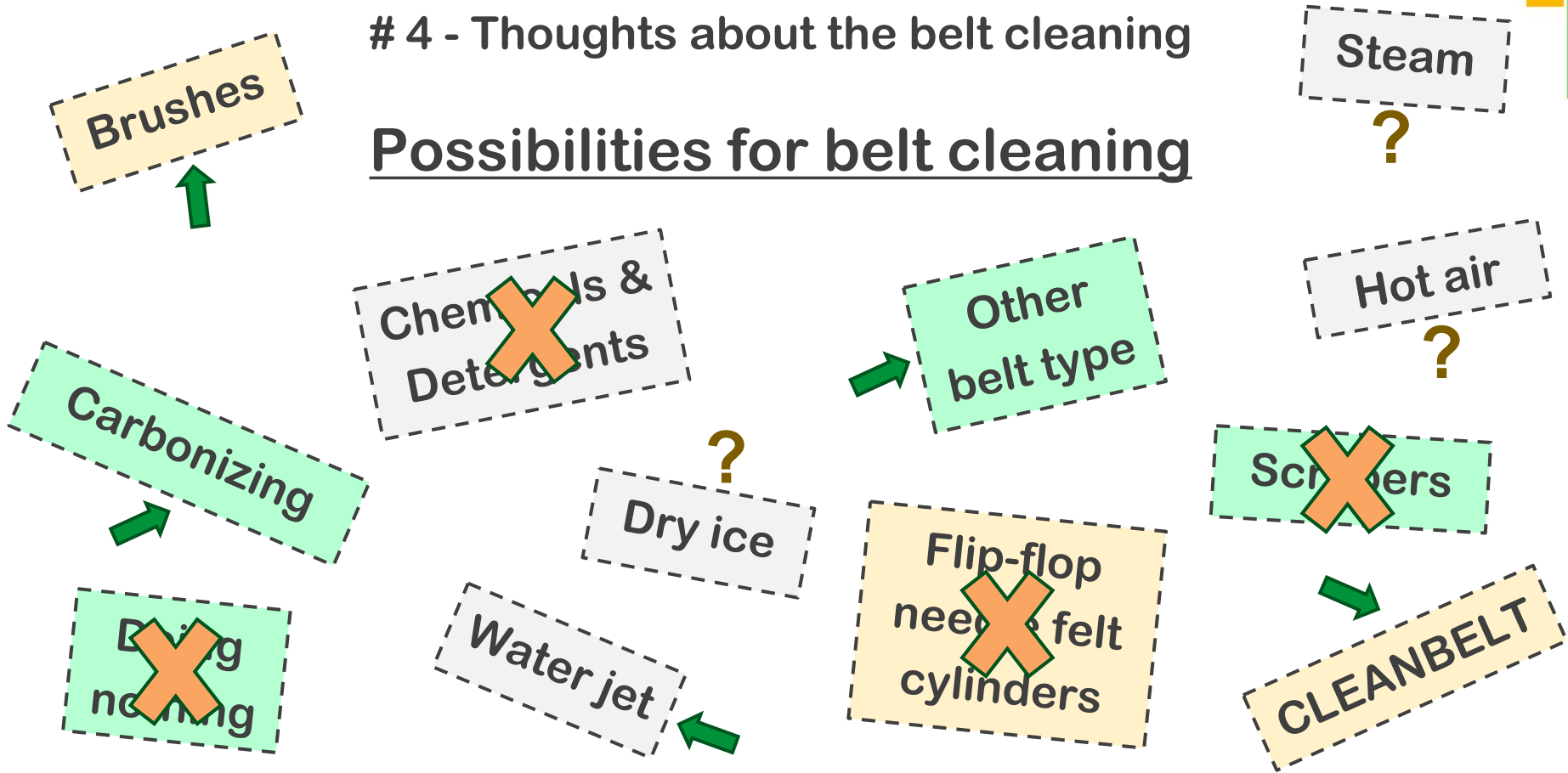




This is another article from  
January 2019 on  
[www.biscuitpeople.com](https://www.biscuitpeople.com)  
dealing with the cleaning  
issue for tunnel oven belts  
with detailed explanations

## # 4 - Thoughts about the belt cleaning

# Possibilities for belt cleaning



## Most promising strategy for belt cleaning

- ❖ Check for maybe another (better) belt type
- ❖ Brushes (with steel wires) => dirt swiping
- ❖ CLEANBELT\* (prior to brushes) => dirt breaking
- ❖ manual cleaning by water jet etc. (in intervals)
- ❖ and / or carbonizing (again in intervals)

\*) only for Z-belts

*! The best way to clean a belt is to avoid getting dirty !*

## These are the dirt breaker & dirt swiper:

- ❖ **Brush system of top & motorized bottom brush**



- ❖ **CLEANBELT dirt breaking & cleaning device**

## # 5 - Thoughts about the tracking in the oven

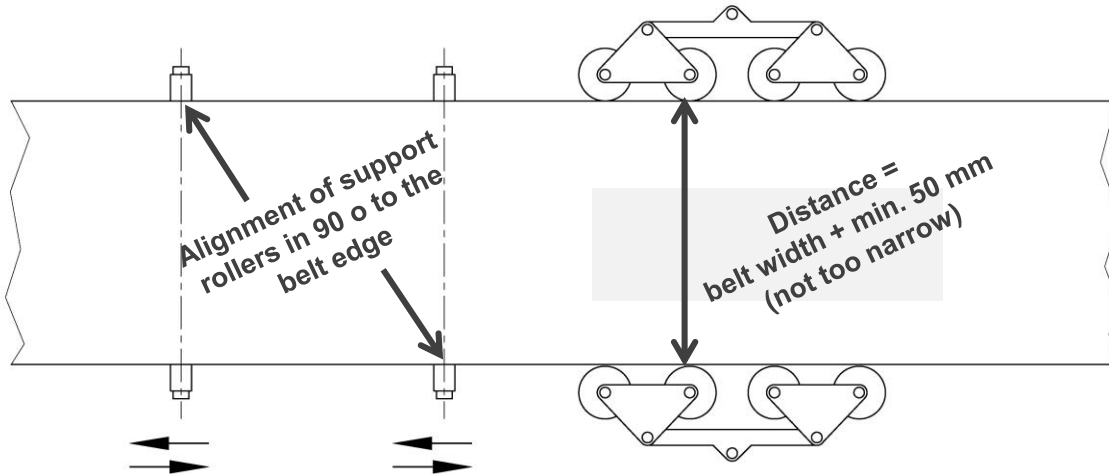
### Aspects to follow for a good belt tracking

- ❖ Correct alignment of oven sections
- ❖ Vertical guiding rollers & guide rails only as emergency
- ❖ „Soft acting“ tracking station (hydraulic or pneumatic)
- ❖ Support rollers & no skid bars (for big ovens)
- ❖ Belt with equal & rectangular mesh structure
- ❖ Belt with small width tolerances

## # 5 - Thoughts about the tracking in the oven

# Aspects for a good belt tracking - details

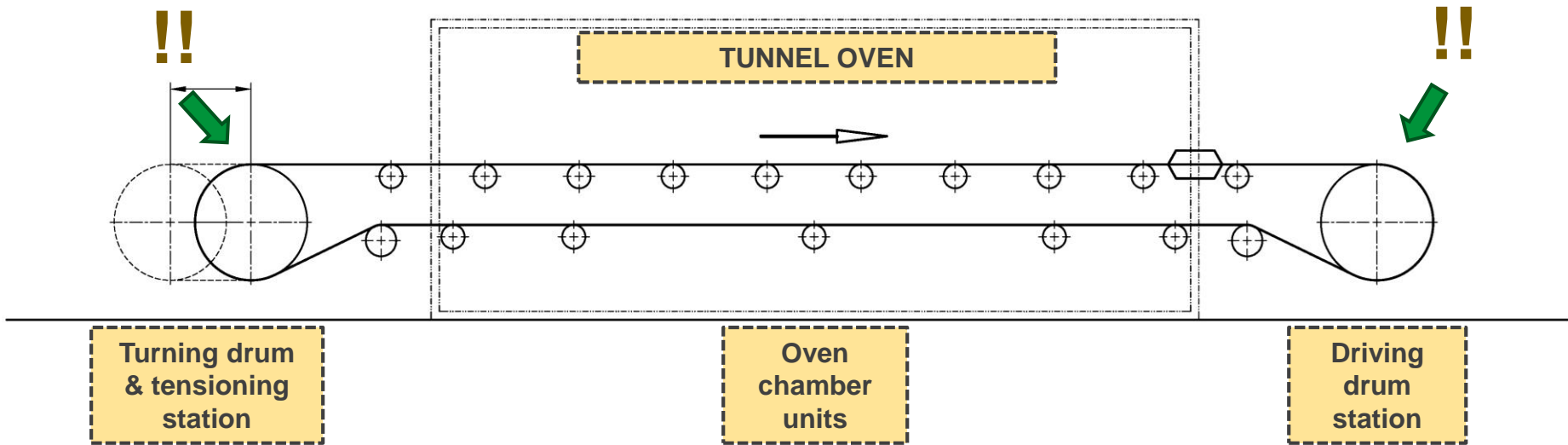
Proper alignment of really all support rollers along the oven run



- Lateral guide rolls:
- for emergency only
  - with enough space to the belt edge

## # 5 - Thoughts about the tracking in the oven

# Aspects for a good belt tracking - details



All these oven line sections have to be aligned both horizontally and vertically

# 6 - ? How can we achieve a good operational life time for the belt ?

## Criteria for correct belt maintenance

- ❖ Low tensioning & good tracking
- ❖ Permanent cleaning (by brushes & dirt breakers)
- ❖ Permanent tracking & tensioning control
- ❖ Regular cleaning & maintenance shifts
- ❖ Regular belt edges control for mechanical damages
- ❖ Immediate repairs of damaged parts



**!!! ATTENTION !!!**

**Wrong Tracking & Too High Tensioning  
Are The Main Reasons For Belt Damages  
And A Premature Deinstallation**

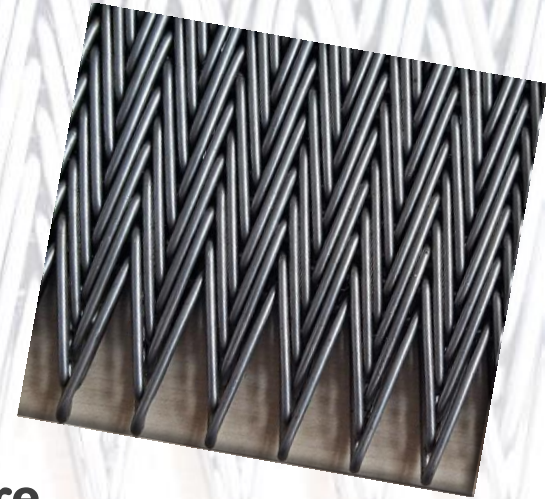
## # 7 - Belt Type Change In A Tunnel Oven

**=> A Case Study From The Field: <=**

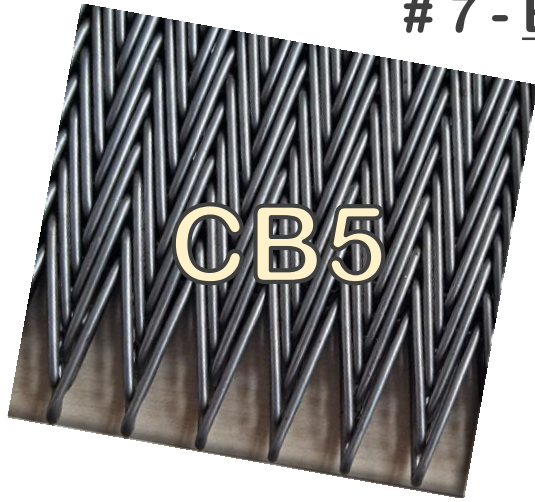
A balanced weaved CB5 belt was used so far.

Experience & conclusions:

- ❖ **Very dense belt structure**
- ❖ **Limited heat circulation**
- ❖ **Difficult to clean with brushes**
- ❖ **Very high weight per sqm**
- ❖ **High impact on belt drive and oven structure**
- ❖ **Used „out of tradition“**



## # 7 - Belt Type Change In A Tunnel Oven

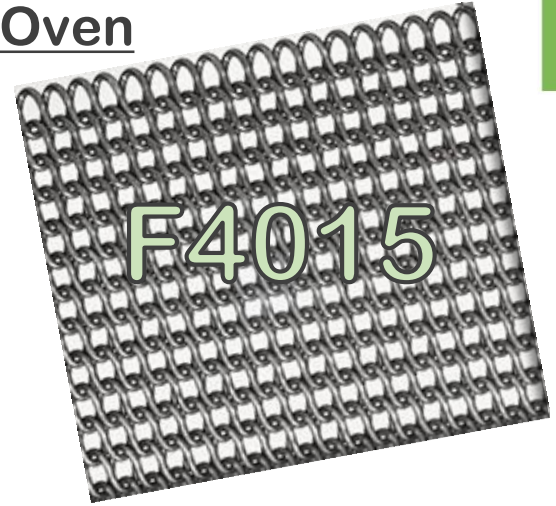


- Composed balance weave
- High weight (~22 kg)
- Very dense mesh structure
- High belt tensioning
- Small open mesh area (<2,5%)
- Belt connection tricky

=> Case Study #2 <=

from CB5  
to F4015

*The belt  
differences*



- Rolled woven structure
- Low weight (~10 kg)
- Open mesh structure
- Low belt tensioning
- Big open mesh area (~26,5%)
- Easy belt connection

And then some internal evaluation started.

Eventually there came this email:

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**Von:** [redacted] [mailto:[redacted]@[redacted].com]  
**Gesendet:** Dienstag, 23. Juli [redacted] 17:21  
**An:** Peter Otten  
**Cc:** [redacted] / Export  
**Betreff:** Z-47 baking oven band - Budget cost?

Peter, [redacted]

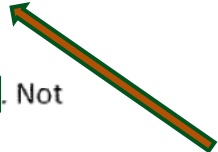
I have done some rudimentary calculations on energy savings for a 1m wide Z-47 oven band that is 646 feet long (197m). The reduction in the cost of natural gas in heating the lighter band is between \$20 000 and \$30 000 per year for the oven I used as an example.

I need now to compare purchase prices of the two oven bands.

Can you give me a budget price for a Z-47 band x 1m wide x 197 m long delivered to [redacted]. Not sure if your technician needs to be present for installation, but you should include his/her costs also.

Thank you.

**\$20-30.000  
less energy**



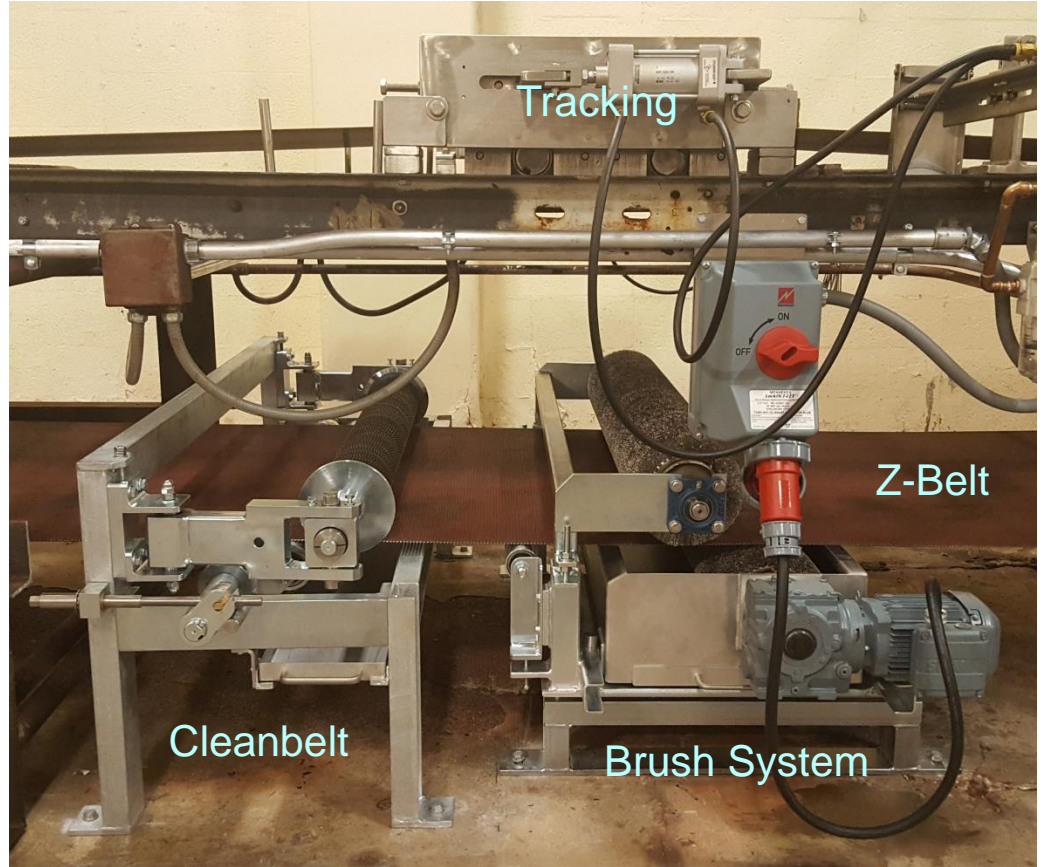
## *Decision For The Full Change & Complete Package:*

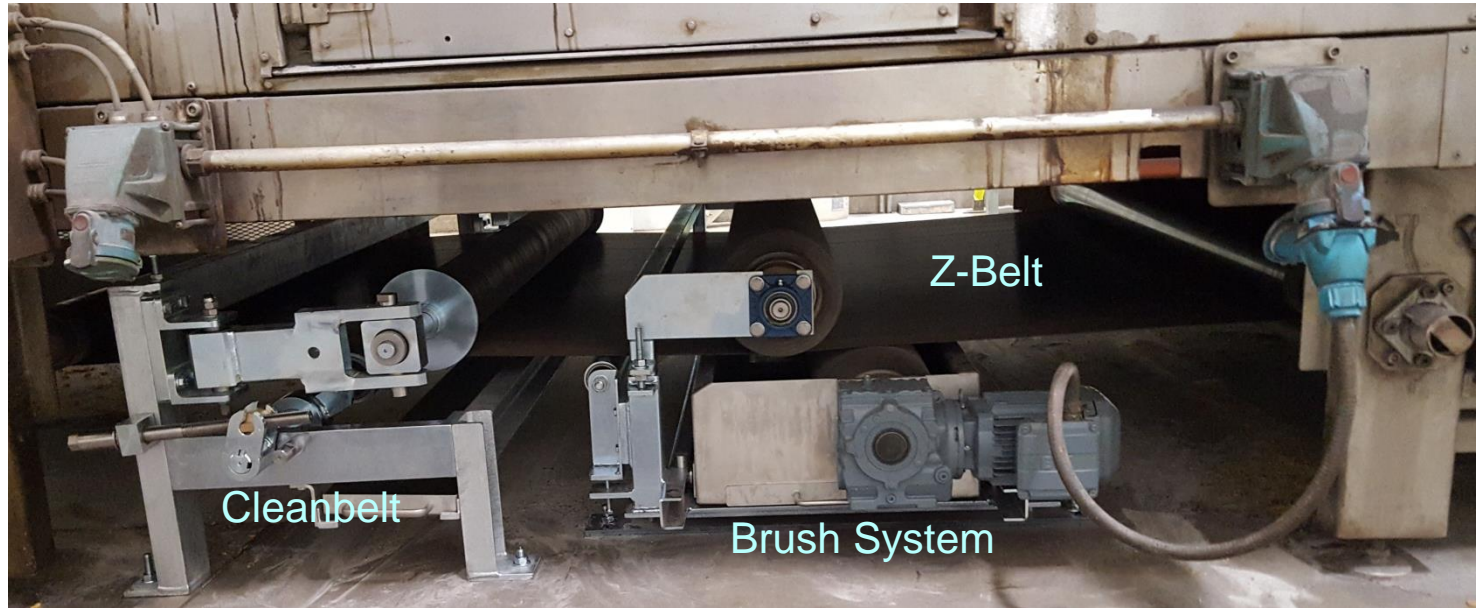
- ❖ **New belt type F4015 (Z-belt)**
- ❖ **Dirt breaking CLEANBELT**
- ❖ **Dirt swiping brush station**

*As a „full risk decision“ for all 3 lines in the plant*



1st Installation of Z-Belt,  
CLEANBELT & Brush  
System in the Smaller  
1000 mm Oven,  
Mainly used for Crackers





**2nd Installation of Z-Belt, CLEANBELT & Brush System**  
**in the Bigger 1600 mm Oven for Sticks & Snacks**  
(quite a challenge because very limited space available)

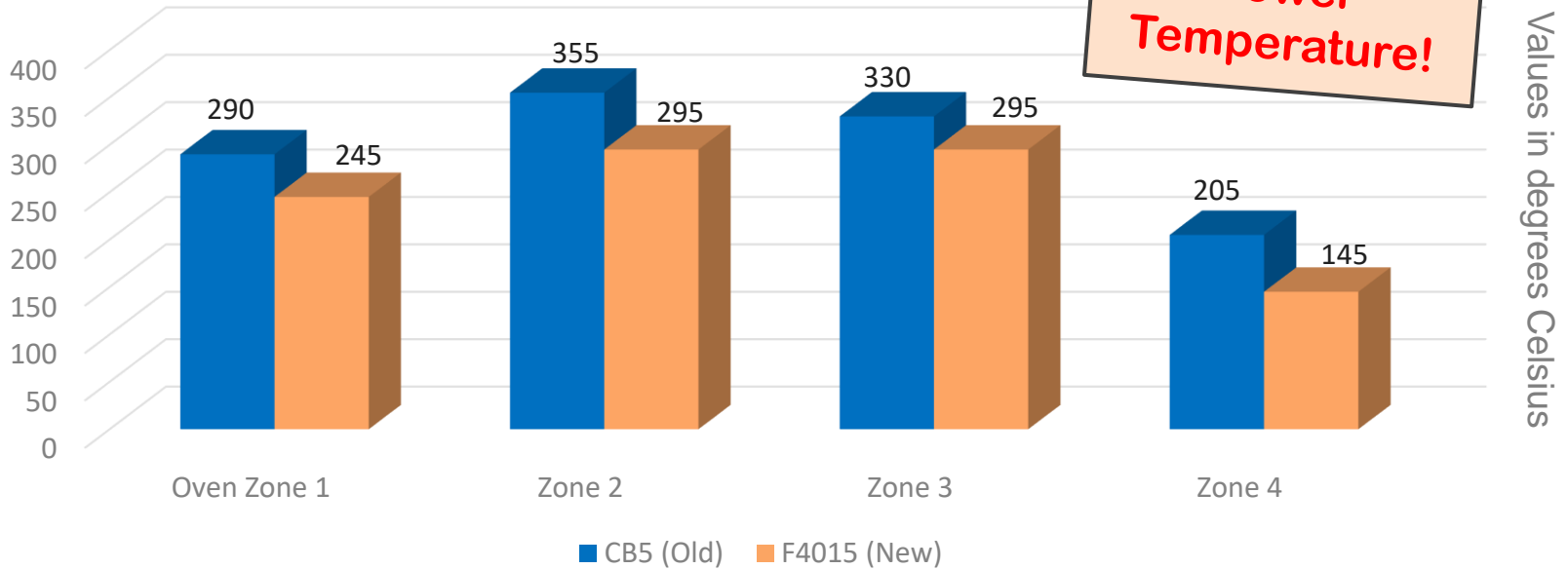


**Don't forget!!!**  
**None of the 3 oven lines baked**  
**„typical Z-belt products“**

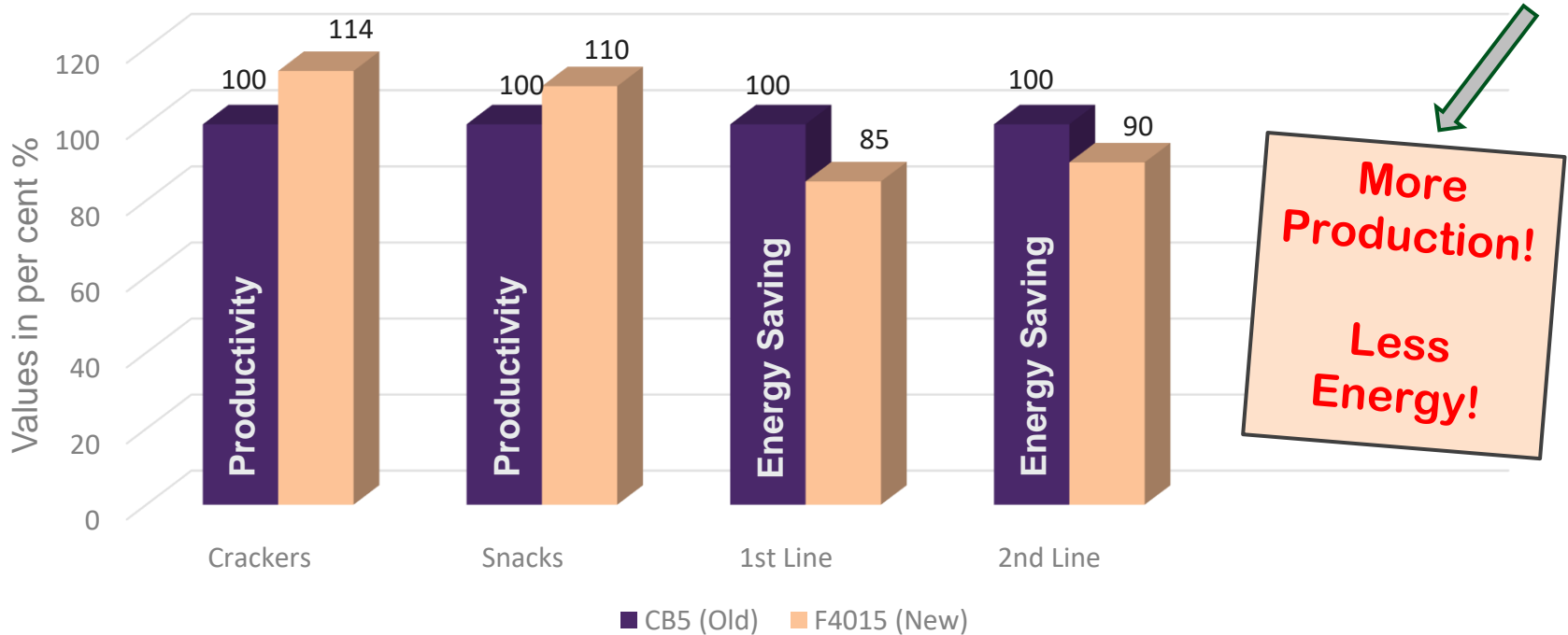
*The result of this belt &  
system change was  
exciting and surpassing  
expectations !!!!*



To start with:  
Example of Temperature Comparison in  
Oven Zones of One Line



## To go on: Productivity & Energy Saving



# Summing Up Of Advantages Of Using F4015 (~Z47R)

- Minute corrections to oven programme only
- Improved heat, air & gas circulation because of belt's open weave
- Better convection baking with less necessities to adjust fans & dampers
- Equal colouring of baked product along the belt width
- No more scorching of product's edges
- Less time for heating up or cooling down belt & oven
- Average oven temperature reduction by 43 to 65 ° Celsius
- Lower belt tensioning from >4 bars to <3 bars
- Proven increase of production

*.. maybe you got something  
to think about ..*

*Leaving the beaten track might work out !!!*

*Thank you for your attention*

*Peter Otten*

*Questions & discussions welcome*