

▼ New protection procedures – wooden sleepers

▶ **FSS – Fürstenberg-System-Sleeper**



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▶ **Market philosophy**



Fürstenberg-THP began development of a new sleeper without creosote 15 years ago for the following reasons:

- offering customers a wooden sleeper without creosote
- keeping wooden sleepers for the future because of their unique properties compared to all alternative materials

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▶ **Status quo**



- System-Sleeper has become the standard sleeper for many state and private railways
- 2 industrial plants already producing System-Sleeper
  - Hüfingen
  - Sobeslav
- Until today approx. 300.000 sleepers in the lines of various customers
- Tendency further increasing

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▶ **Fürstenberg-System-Sleeper**



What is **FSS – Fürstenberg-System-Sleeper**

1. Mechanically pre-treated surface of sleepers
2. Adapted impregnation processes, use of wood preservatives based on copper and co-biocides
3. Quality management

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▶ **Mechanically pre-treated surface**



- Wood is subjected to different kinds of tensions
  - Growth tensions
  - Tensions during the drying process
- Occurring checks are the result
- **Incising is able to reduce these checks**
- Re-distribution of stresses across the surface
  - Stress-concentration to the incising slits
  - Substantial reduction in the number of big single shacks
  - Development of a number of smaller checks

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▶ Evaluation of check formation (without Incising)

Start

After 32 weeks of drying

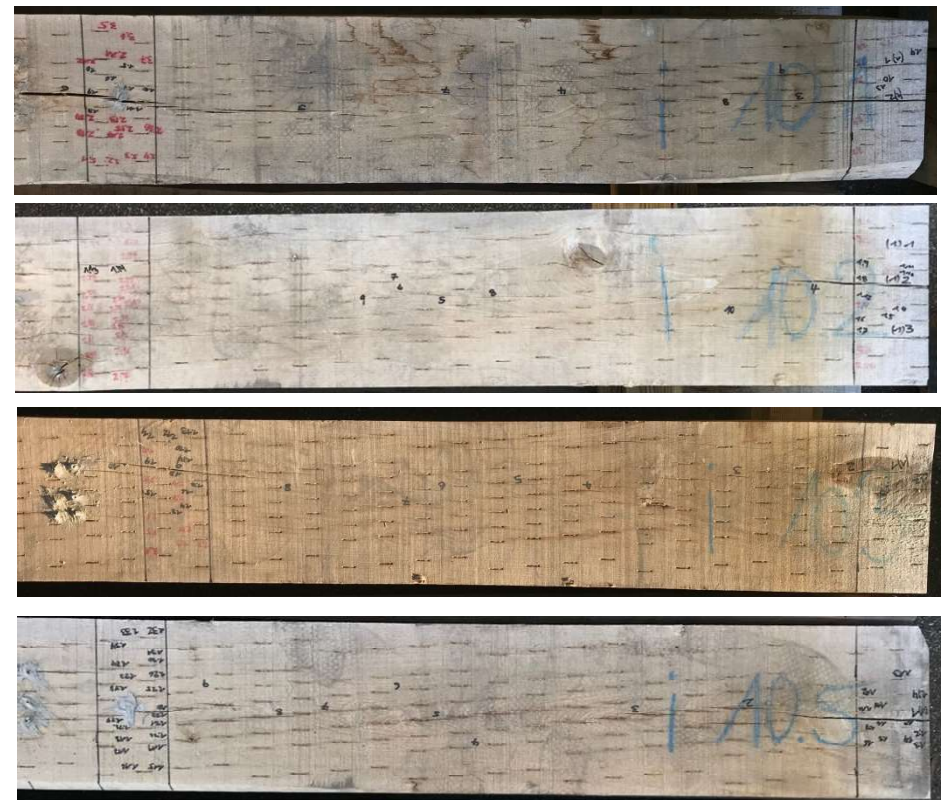


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▶ Evaluation of check formation (with Incising)

Start

After 32 weeks of drying



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▶ **Impregnation processes**



Adapted impregnation processes for Beech and Oak

- Double impregnation of sleepers out of Beech
  - 1.step: Impregnation with a water based preservative
    - Complete penetration of the cross section
  - 2.step: Impregnation with oil based preservatives
    - Additional protection combined with hydrophobic surface
- Mono impregnation of Oak sleepers with oil based preservatives



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▶ **Double impregnation of Beech**



Completely penetrated cross section (Beech)



With oil based preservatives impregnated fringe area (Beech)

- 1.step: Impregnation using water-based wood preservatives
  - ✓ Complete penetration of the sapwood for Beech sleepers
- 2.step: Impregnation with oil based preservatives
  - ✓ Additional treatment in combination with hydrophobic effect
  - ✓ Optimal protective effect against wood-destroying fungi and insects
  - ✓ Hydrophobic surface

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▶ Qmanagement



Consecutive numbering of each sleeper

TREATMENT PROTOCOL		
<b>Facility</b>	<b>Product</b>	<b>Customer</b>
Fürstenberg - THP GmbH Hüfingen	beech regular sleepers 16 x 26 x 2600  control no.: <b>2124 - 2274</b>	XY
Treatmentsystem:	_____	
Humidity before treatment:	_____	
Weight before treatment:	_____	
Weight after treatment:	_____	
Treatment retention quantity:	_____	
Quantity of sleepers	_____	
Date:	_____	
Signature:	_____	

Sleeper continuing control number

Inclusion of the control number in the production process

- The following parameters are documented as part of the treatment and quality management system:
  - ✓ Wood moisture content required for impregnation
  - ✓ Process parameters of the applied impregnation process
  - ✓ Retention of the wood preservatives used in kg/m<sup>3</sup>

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▶ **Mounting of baseplates at site**



- **Three** major advantages of mounting the base plates at site
  1. **Drilling the holes before impregnation**
    - Preservative penetration of the wood in the area of the sleeper screw
    - Higher protective effect against wood-destroying fungi
  2. **Monitoring of the track gauge**
    - Highest accuracy due to automated drilling
    - The track gauge for each single sleeper will be manually controlled after mounting the base plates
  3. **More cost effective**
    - Automated drilling with high precision saves significant labour costs

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**Thank you for your attention**

