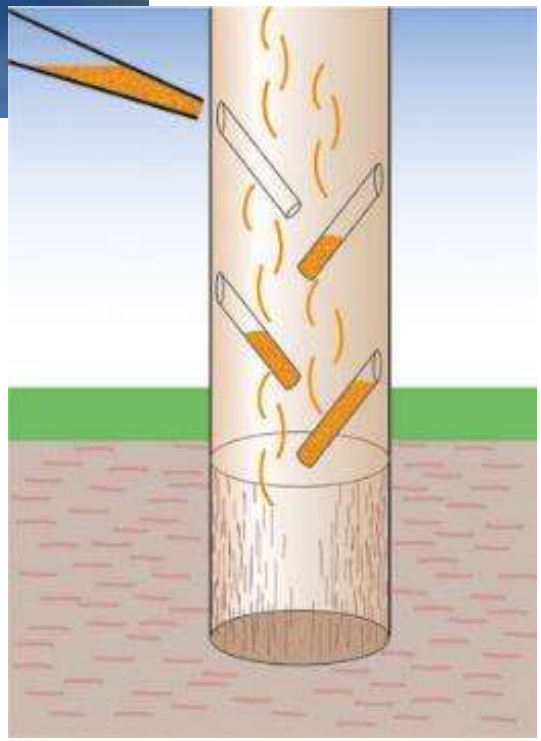
New protection procedures – wooden poles

InsideFume®

An effective treatment product for wooden poles against internal decay

What is InsideFume®



- InsideFume® is based on Dazomet as active ingredient (99 %).
- InsideFume® is a white solid, in granular form.
- When applied Dazomet decompose to MITC - the primary fungitoxic component.
- MITC is highly effective against wood destroying fungi (basidiomycetes)
- According to the European approval of InsideFume® a dosage rate of 150 g / pole (25 cm diameter) or 90 g for a Telecom pole is related to an 8 years treatment cycle.

InsideFume®

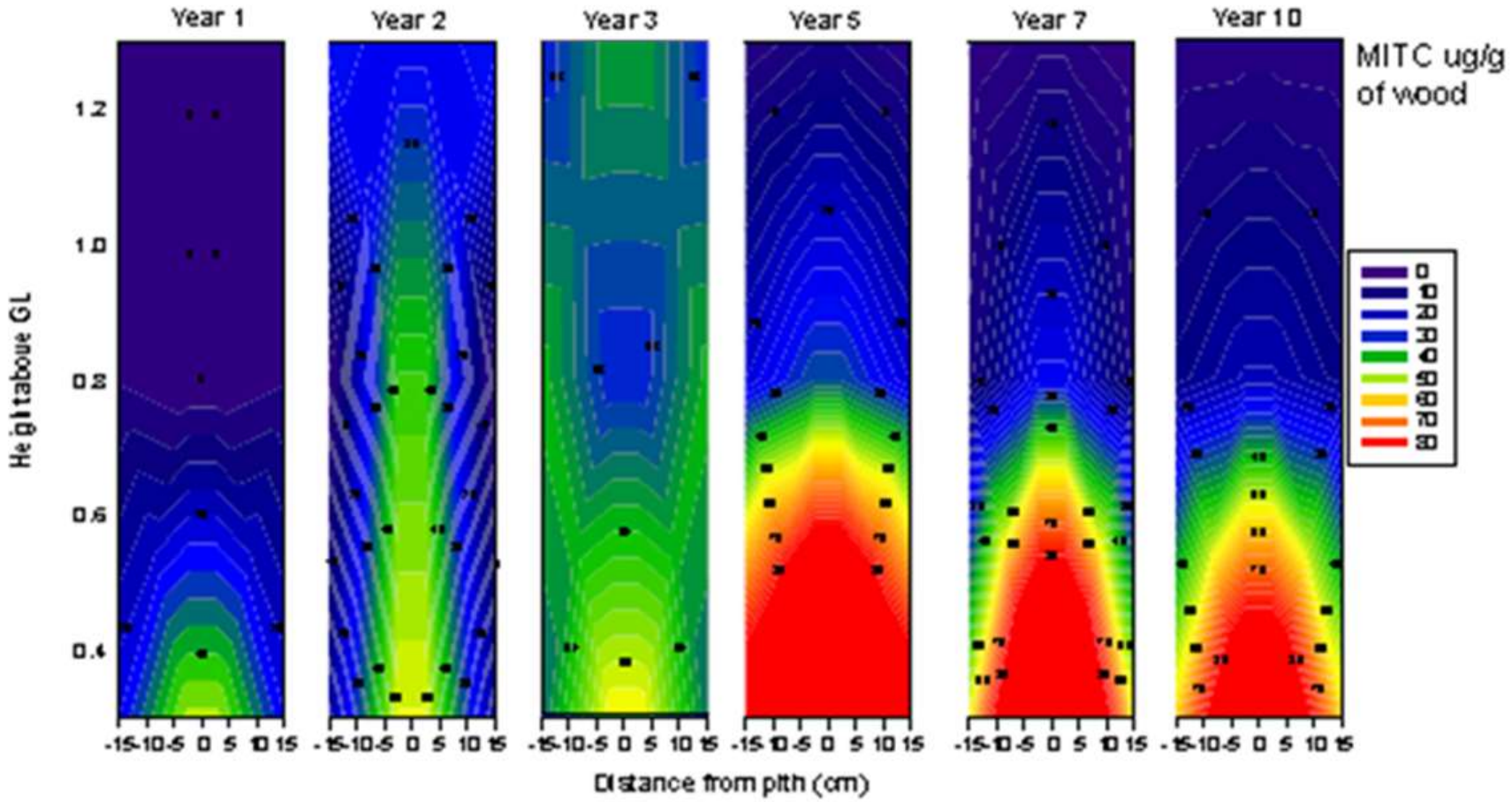
How does it work?

- Internal decay started to become a bigger problem in thin sapwood poles (e.g. Douglas fir) at the US Westcoast in the late 1960s.
- Investigations on Dazomet as MITC generating fumigant began in the 1980s.
- Dazomet has been approved in US as wood preservative for remedial treatment of wood in 1997 and is now in practical use since more than 20 years.

InsideFume®

Distribution in Douglas-fir poles

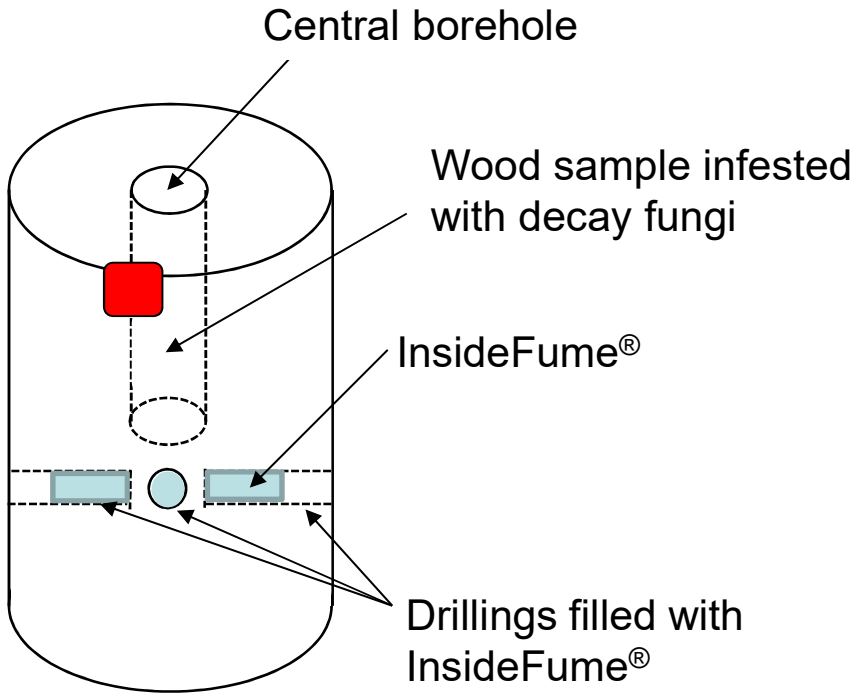
Distribution of MITC in Douglas-fir poles 1-10 years after treatment



Efficacy of InsideFume®

Semi practical test (Laboratory scale) I

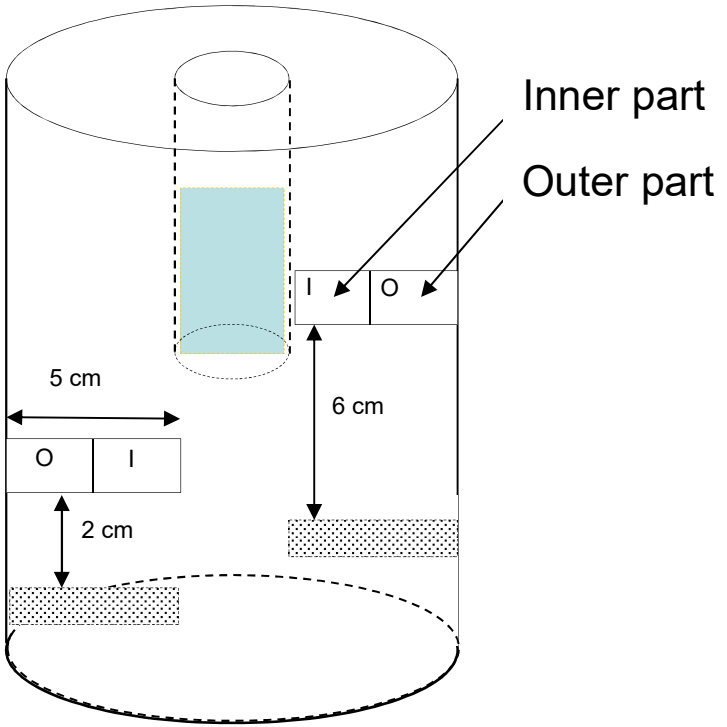
- Preparation of specimens for testing



Efficacy of InsideFume®

Semi practical test (Laboratory scale) II

- Setup for sampling and analysis

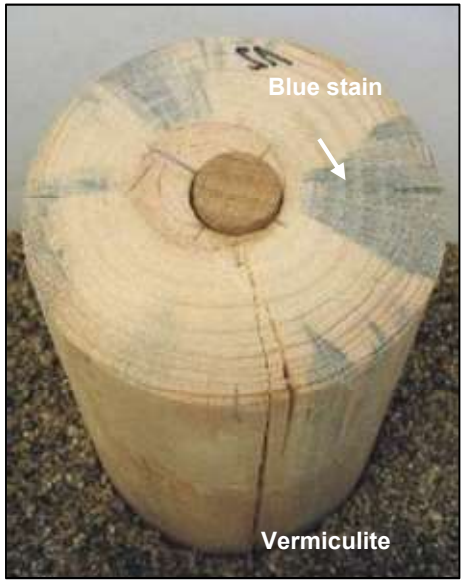


Efficacy of InsideFume®

Semi practical test (Laboratory scale) III

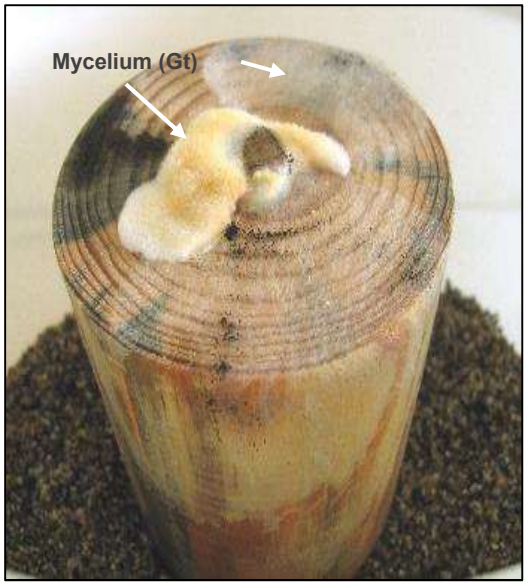
- Specimens without InsideFume® treatment

Start



August 2016

After 2 month



October 2016

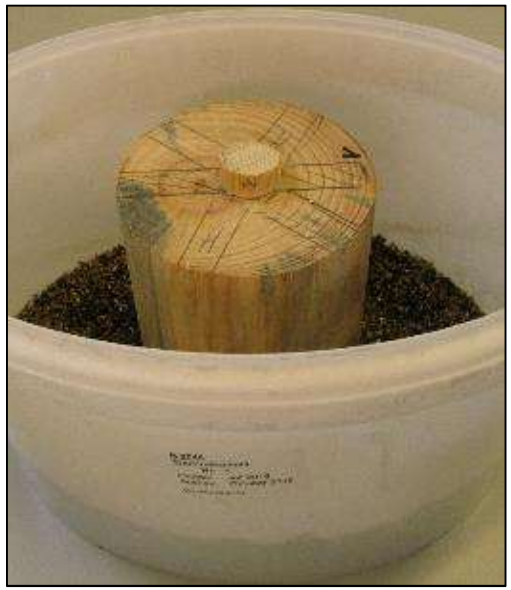
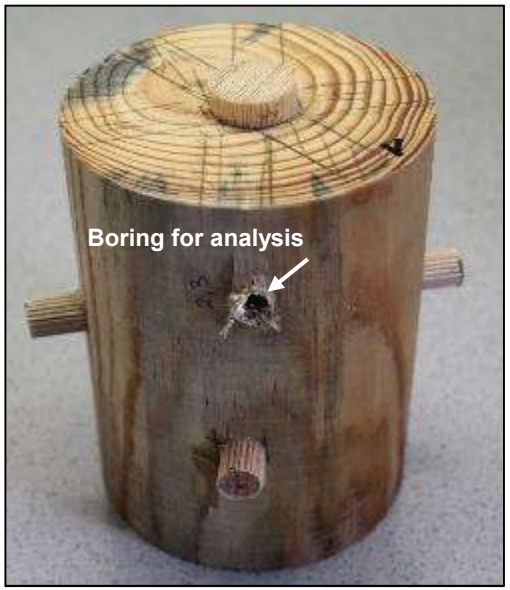
End of the test after 8 month

May 2017

Efficacy of InsideFume®

Semi practical test (Laboratory scale) IV

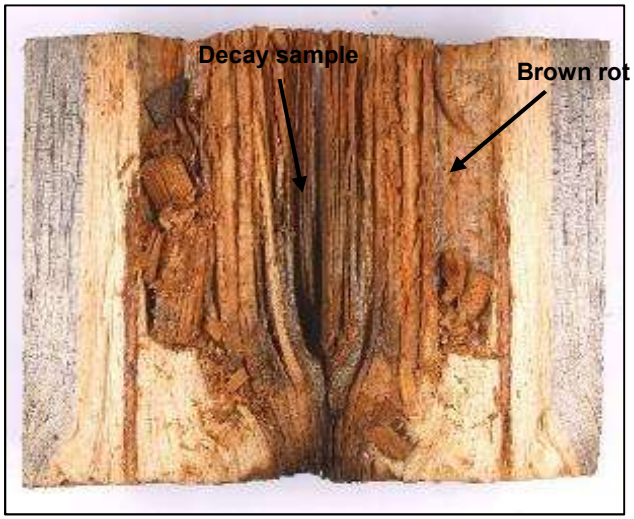
- Specimens treated with InsideFume® at installation

Start	After 2 month	End of the test after 8 month
		
August 2016	October 2016	May 2017

Efficacy of InsideFume®

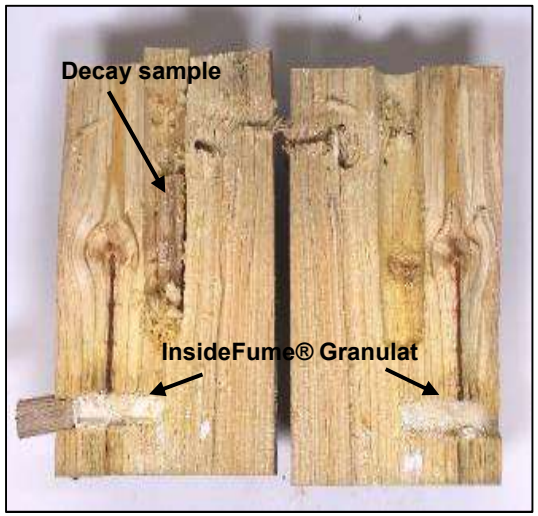
Semi practical test (Laboratory scale) V

- Specimens divided into two halves
- MITC levels analysed in the increment cores were in average significantly higher than the threshold of 20 µg/g wood

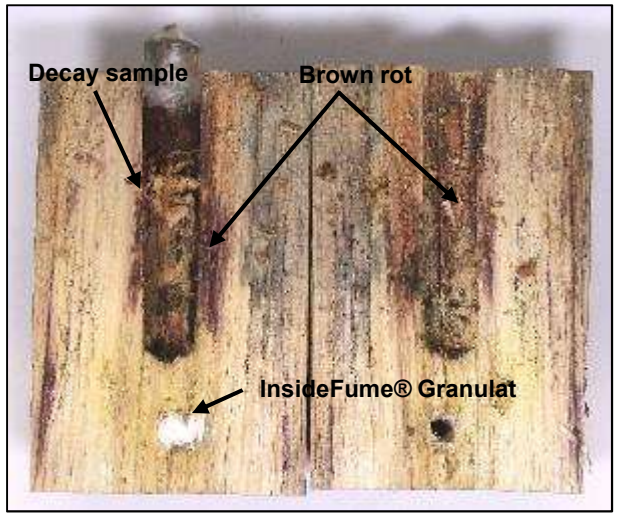


Untreated

Severe brown rot attack
Mass loss approximately 25%
Moisture content 70 - 90%



Specimen treated with InsideFume® at installation:
No fungal attack



Specimen treated InsideFume® 3 month after installation
Slight brown rot attack
Mass loss < 5%

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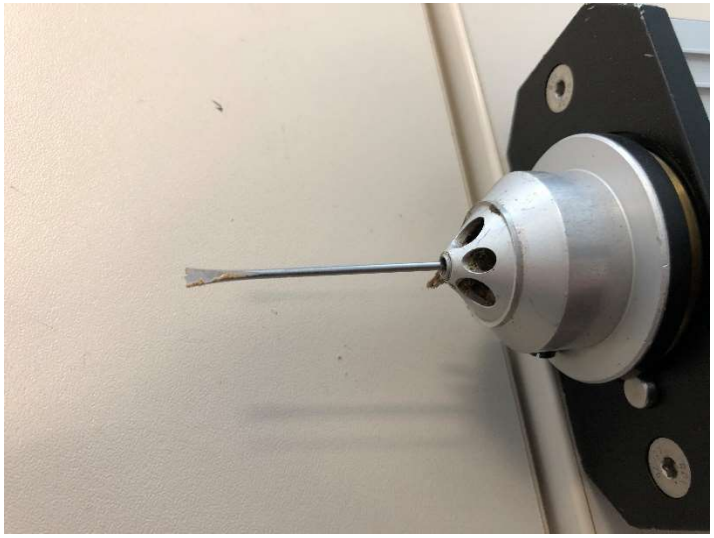
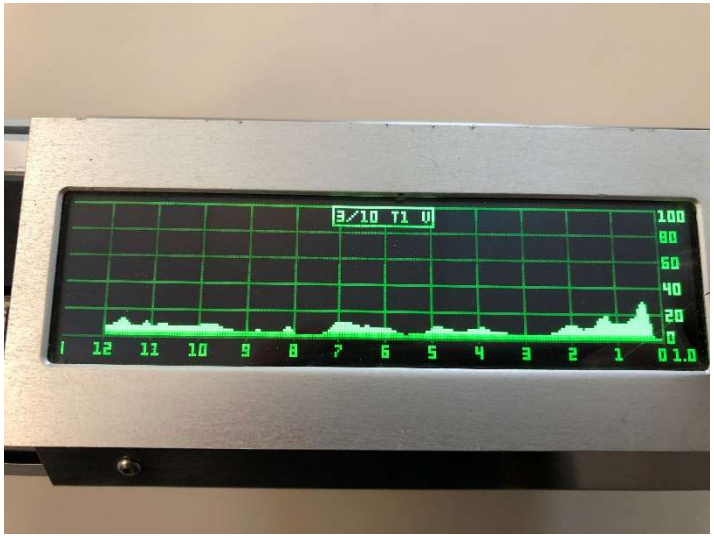
Decay control

Drilling resistance meter

- **Drilling resistance meter:**
  - Poles condition assessment through drilling resistance measurement



Drilling needle



Graphical diagram of the drilling resistances

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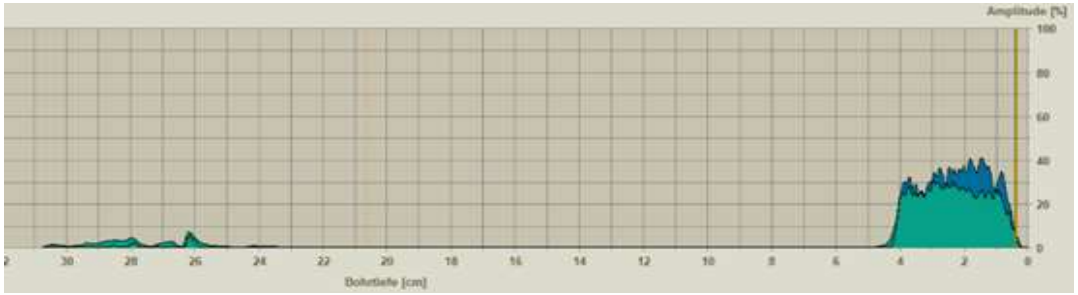
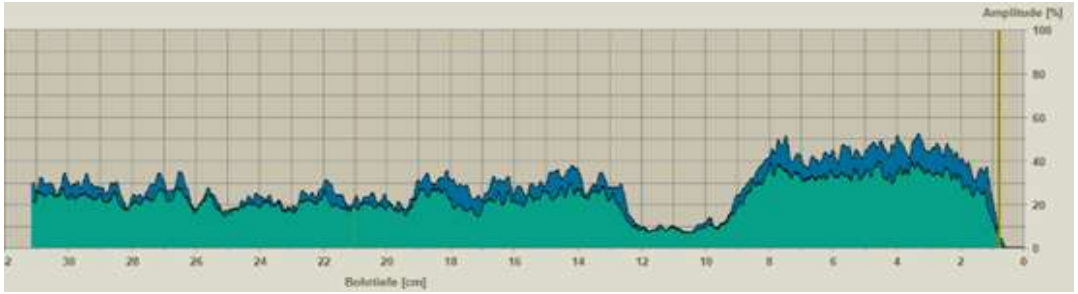
Drilling resistance meter

- Use of a drilling resistance meter for identification of rot

Component does not show internal rot



Component shows advanced internal rot



Component shows incipient internal rot and can be treated with InsideFume®

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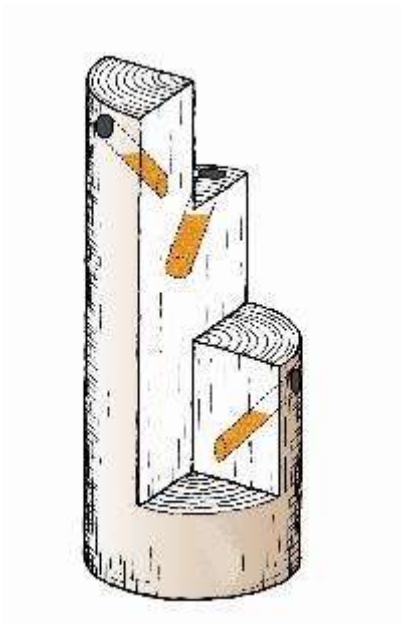
How is it used for poles?



- Drilling of 2 -4 holes into pole
- Starting at ground line level, then offset 180°/120°/90° and 15 cm upwards

- Apply fumigant with applicator (approx. 50 grams per hole)
- Close holes with plastic plug

3 borings of 18 mm diameter and 40 cm length reduce the strength of a pole of 20 cm diameter by 3,5 %

Environmental assessment / Human health

Results:

- No emission of MITC could be detected during the test period.
- The results are confirmed by the additional bio-monitoring
- Safety of professional operators when applying InsideFume® has been assessed by EU Competent authorities within the approval process acc. to the European biocidal legislation

▼ New protection procedures – wooden sleepers

► InsideFume®

▼ New protection procedures – wooden sleepers

► Post-treatment of sleepers with InsideFume®

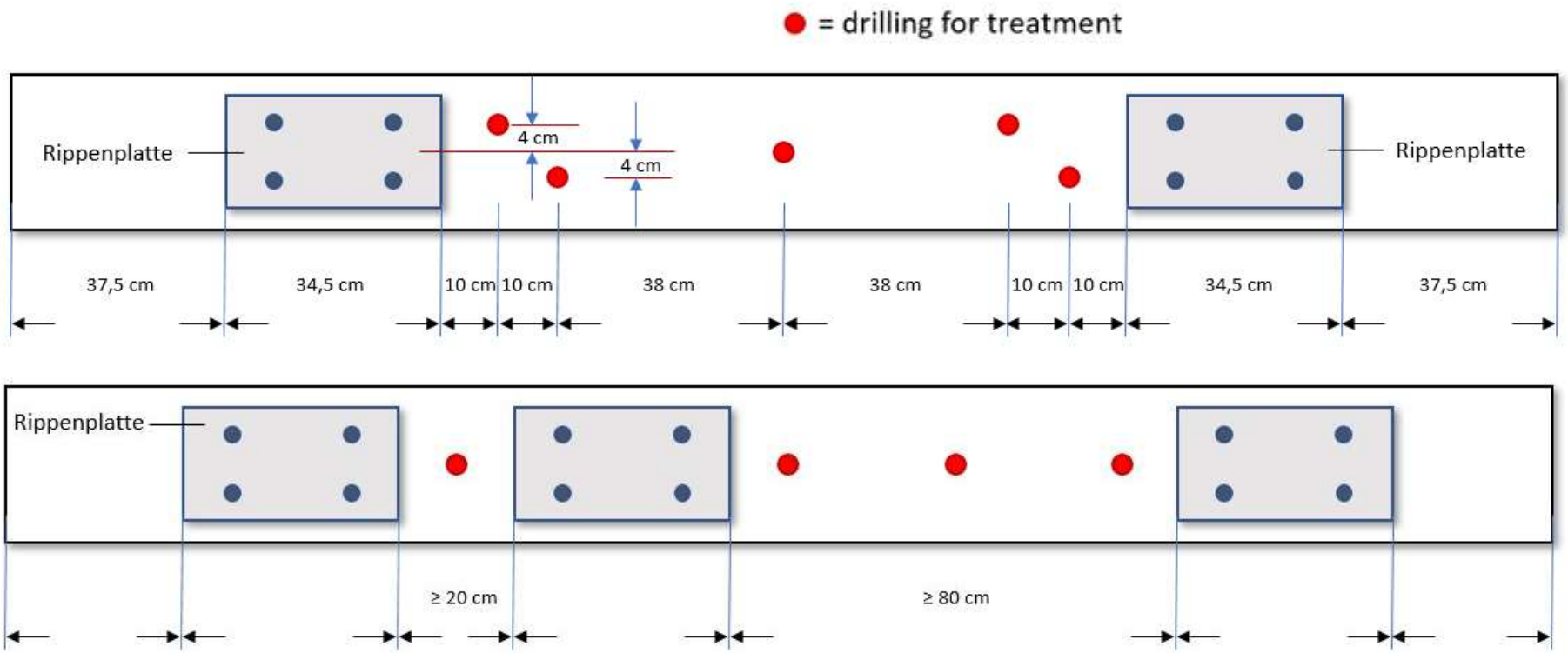
➢ Treatment of installed impregnated sleepers made of Beech, Oak and Pine

Marked sleepers which can‘t be treated

▼ New protection procedures – wooden sleepers

► Post-treatment of installed impregnated sleepers

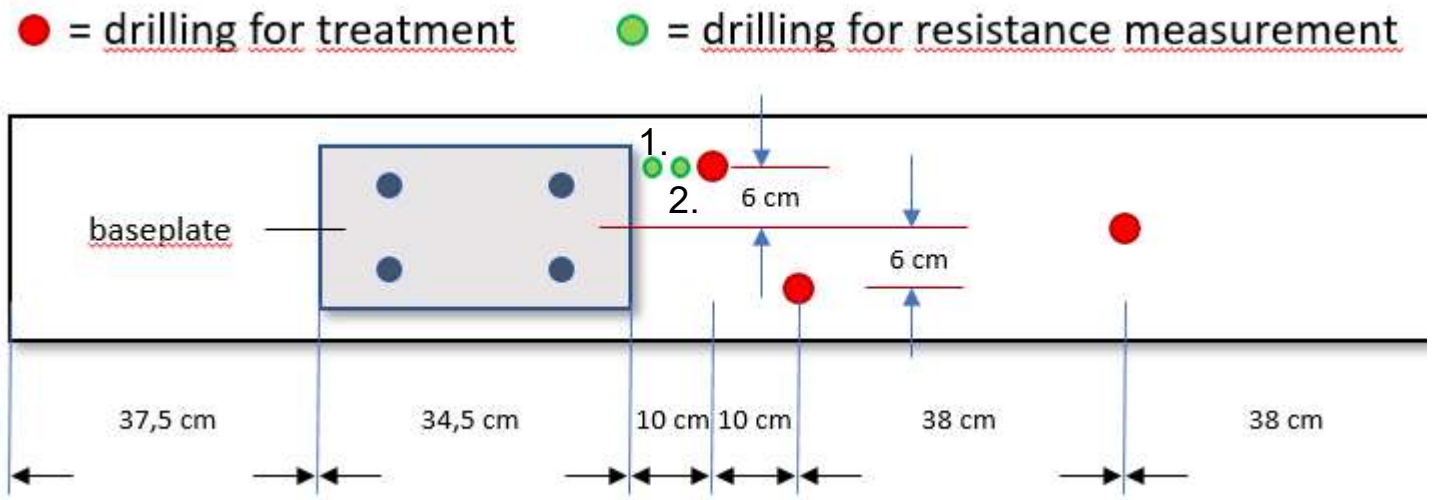
- Post-treatment between the baseplates
- Drilling holes (depth: 14 cm, diameter: 18 mm) each filled with 20 - 25 g Fürstenberg-InsideFume



▼ New protection procedures – wooden sleepers

► Guarantee service

- Selection of approx. 5% of sleepers after treatment procedure together with the customer
- Documentation of the sleeper conditions with the help of the drilling resistance meter
- Check and documentation of the sleeper conditions 8 years after the treatment procedure



▼ New protection procedures – wooden sleepers

▶ Cost example for state railway companies

Replacement of partially decayed sleepers in a track section of 1 km length

- ➢ approx. 1,700 sleepers

- Total replacement costs according to the DB and ÖBB are approx. 800,000.00 €
- Costs of treatment with InsideFume® (without arrival and departure, overnight stay, expenses)
  between 35.00 € and 40.00 € per sleeper

Maximum treatment costs:

38.00 €	x	1,700 sleepers	=	64,600.00 €
Travel expenses of 3 workers for 10 days			=	approx. 4,000.00 €
			max.	68,600.00 €

68,600.000 € corresponds to **8.58 %** for replacement costs of 800,000.00 €

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Treatment for components exposed to weathering

Procedure of an InsideFume® treatment

- Initial inspection of the installed wooden components
- Check of the condition of the components by means of a drilling resistance measuring device
- Implementation of the InsideFume® treatment
- Treatment report

Practical part

New protection procedures – wooden sleepers

Questions and discussion

Thank you for your attention