

# Test site 1

36 °C surface temperature at start

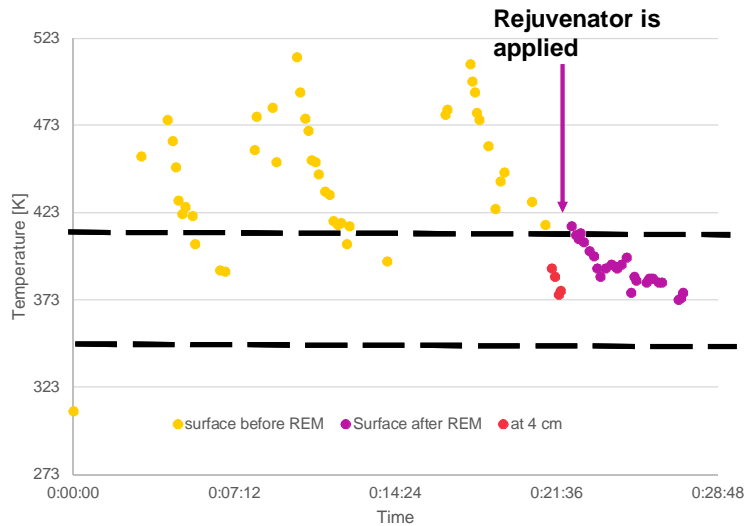
25 °C air temperature

7% Limestone  
Max. Density = 2450 kg/m<sup>3</sup>

(Estimated from composition)

C<sub>p</sub> = 81 J/kgK

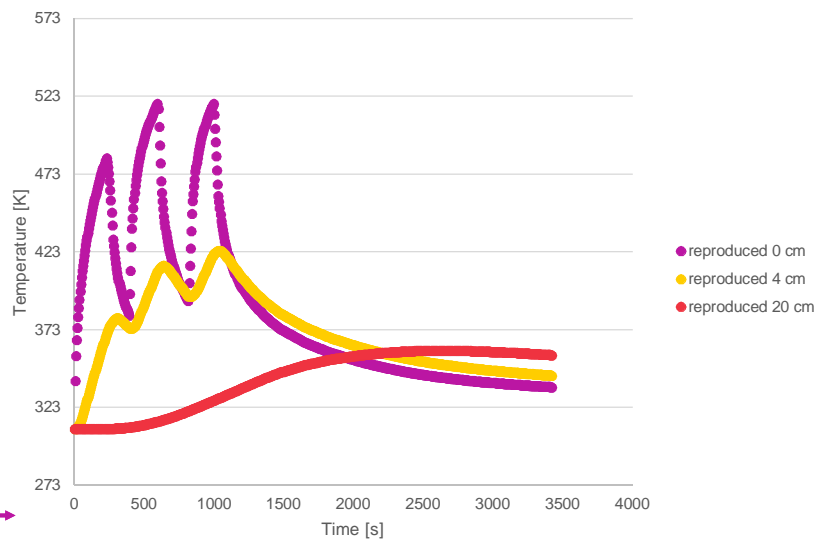
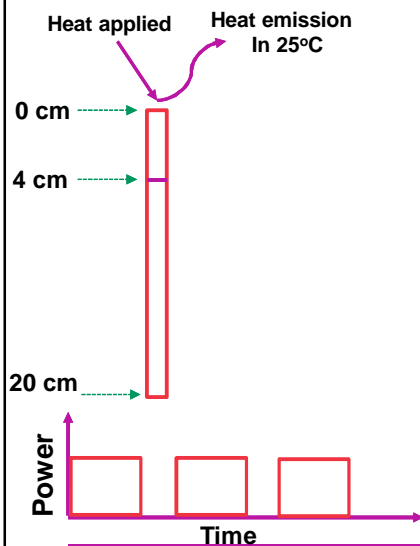
Place 2 - dry



343 K – 70 °C	Suggested end of compaction	
373 K – 100 °C	Water evaporation	
393 K – 120 °C	Suggested average temperature for REM	24.3.2017
513 K – 240 °C	Suggested maximum surface temperature during REM	6
553 K – 280 °C	Bitumen ignition point	

# Reproduced in COMSOL (reference 1)

COMSOL reproduced



343 K – 70 °C	Suggested end of compaction	
373 K – 100 °C	Water evaporation	
393 K – 120 °C	Suggested average temperature for REM	24.3.2017
513 K – 240 °C	Suggested maximum surface temperature during REM	7
553 K – 280 °C	Bitumen ignition point	

# Hypothesis

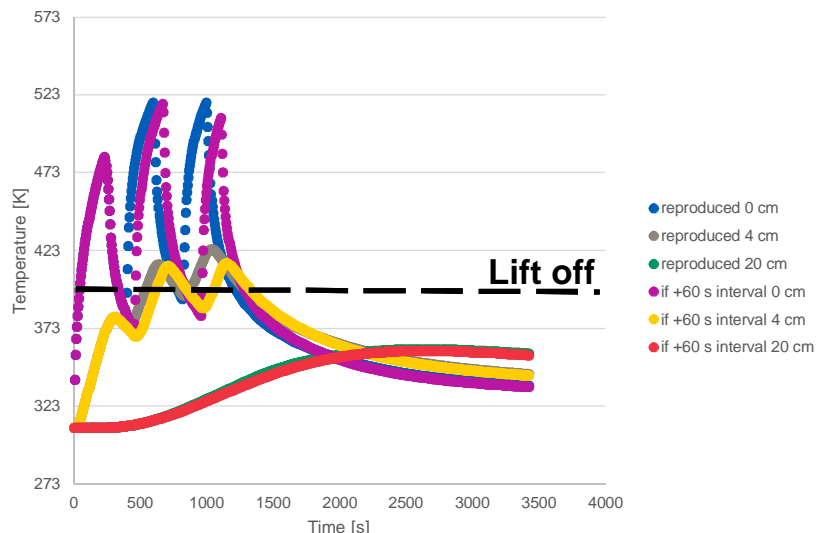
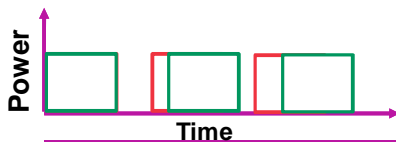
1. Bitumen is an isolator and needs longer time to equalize the temperature gradient within the heated surface
2. Applying more heat on the surface does not improve the homogenous temperature
3. à going slower, but how?



# With same power and increased interval

reproduced and + 60 s interval between grills

- Lower surface temperature (lower risk of ignition)
- Similar temperature at 4 cm
- Lower Temperature at 20 cm (lower risk of rutting of base course)



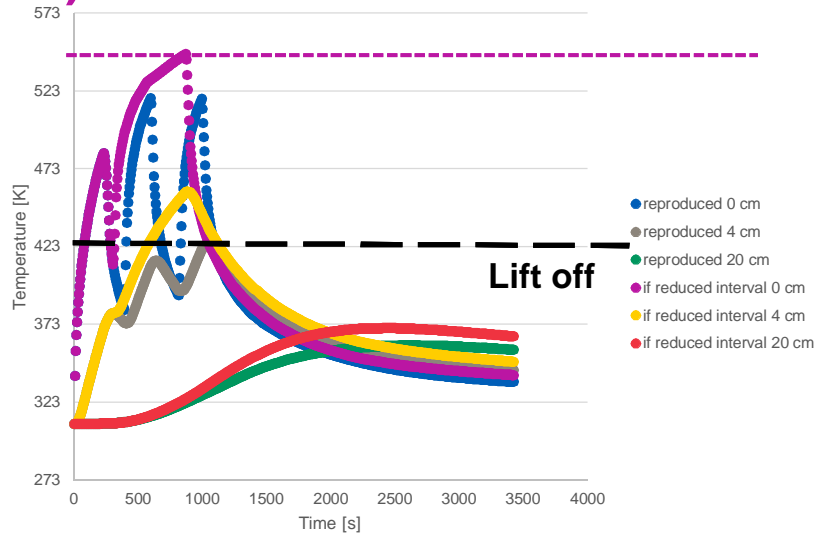
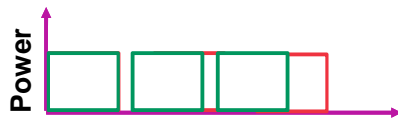
343 K – 70 °C	Suggested end of compaction
373 K – 100 °C	Water evaporation
393 K – 120 °C	Suggested average temperature for REM
513 K – 240 °C	Suggested maximum surface temperature during REM
553 K – 280 °C	Bitumen ignition point

24.3.2017

## When grills are too close to each other, same power (-20% time)

if interval between grills = 60 s

- High risk of **surface ignition**
- Much higher temperature at 20 cm (100°C) –RISK OF **BASE COURSE RUTTING**

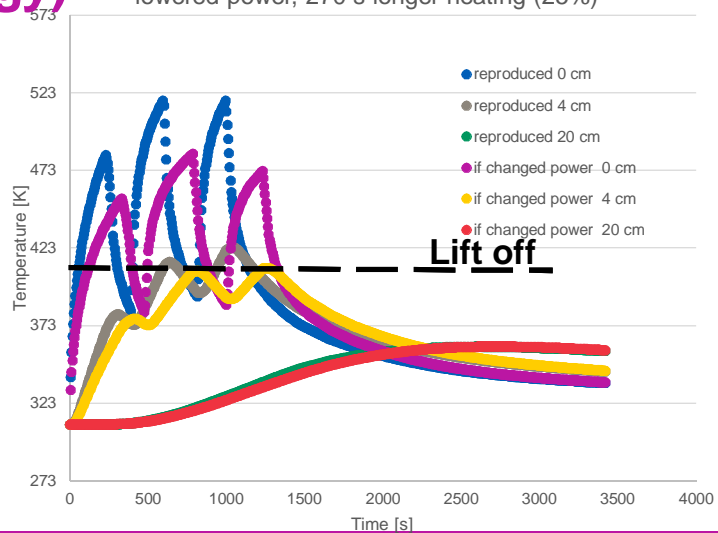
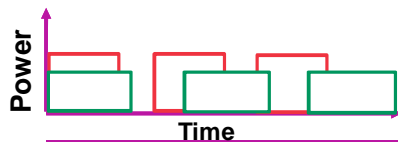


343 K – 70 °C	Suggested end of compaction	24.3.2017
373 K – 100 °C	Water evaporation	
393 K – 120 °C	Suggested average temperature for REM	
513 K – 240 °C	Suggested maximum surface temperature during REM	
553 K – 280 °C	Bitumen ignition point	

## Same interval, lower power and increased time (same energy)

lowered power, 270 s longer heating (25%)

- Lower surface temperature (lower risk of ignition)
- Similar temperature at 4 cm at lift of temperature
- Lower Temperature at 20 cm during compaction (lower risk of rutting/damage of base course)



343 K – 70 °C	Suggested end of compaction	24.3.2017
373 K – 100 °C	Water evaporation	
393 K – 120 °C	Suggested average temperature for REM	
513 K – 240 °C	Suggested maximum surface temperature during REM	
553 K – 280 °C	Bitumen ignition point	

