

Test Site 3, frosty night

Test Site 3

3 °C surface temperature
at start

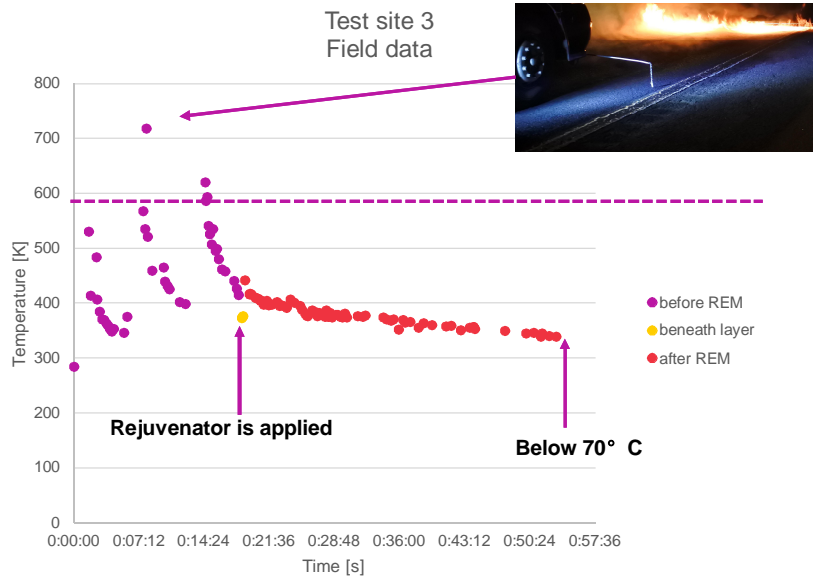
7 °C air temperature

7% Limestone
Max. Density = 2669
kg/m³

(Estimated from composition)

C_p = 82 J/kgK

But no info on slag aggregate Cp
Assumed granite value



343 K – 70 °C
373 K – 100 °C
393 K – 120 °C
513 K – 240 °C
553 K – 280 °C

Suggested end of compaction
Water evaporation
Suggested average temperature for REM
Suggested maximum surface temperature during REM
Bitumen ignition point

24.3.2017

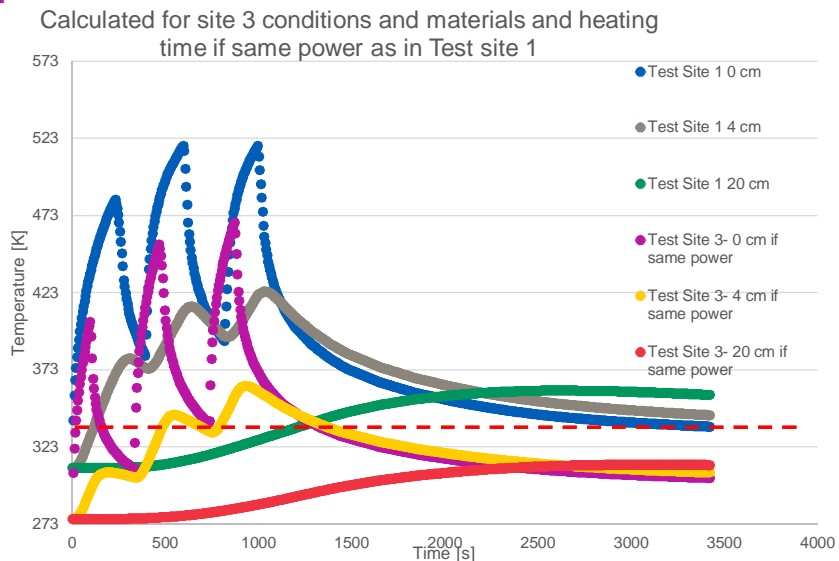
15

The effect of the start conditions and material properties is important

The intervals are shorter than in Test site 1

Observed burning

Obviously power cannot be specified and is dependant on the road at hand



343 K – 70 °C Suggested end of compaction

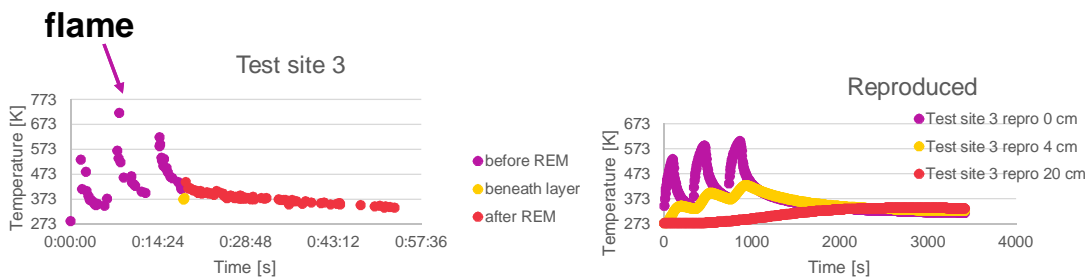
373 K – 100 °C Water evaporation

393 K – 120 °C Suggested average temperature for REM 24.3.2017

513 K – 240 °C Suggested maximum surface temperature during REM 16

553 K – 280 °C Bitumen ignition point

Bitumen ignition point 553 K / 280 °C



The reproduction is not ideal because it does not consider temperature of flame



343 K – 70 °C Suggested end of compaction

373 K – 100 °C Water evaporation

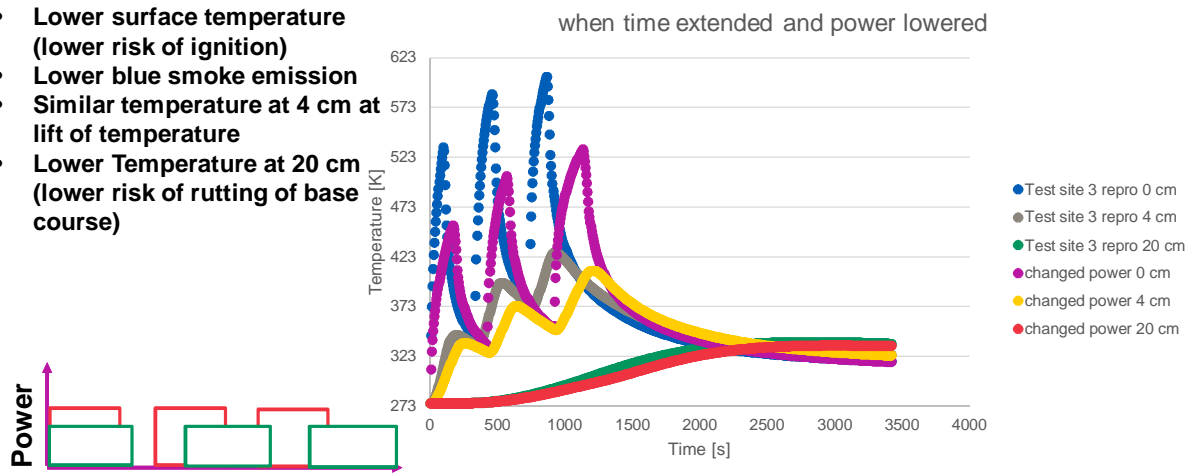
393 K – 120 °C Suggested average temperature for REM 24.3.2017

513 K – 240 °C Suggested maximum surface temperature during REM 17

553 K – 280 °C Bitumen ignition point

Avoiding emissions should be a target same energy is used, time extended but environmentally more correct and bitumen not destructed

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



343 K – 70 °C
373 K – 100 °C
393 K – 120 °C
513 K – 240 °C
553 K – 280 °C

Suggested end of compaction
Water evaporation
Suggested average layer temperature for REM ^{24.3.2017}₁₉
Suggested maximum surface temperature during REM
Bitumen ignition point

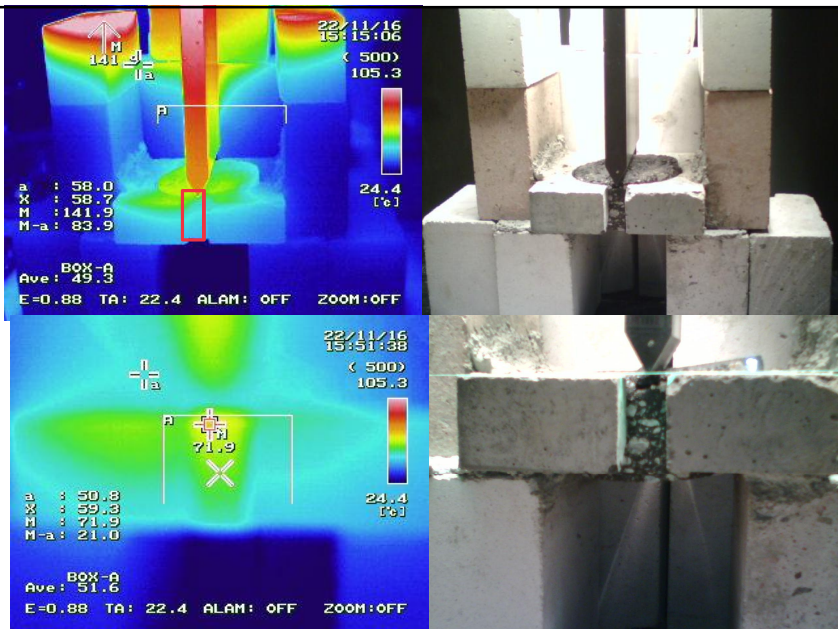


How to take it to the laboratory?

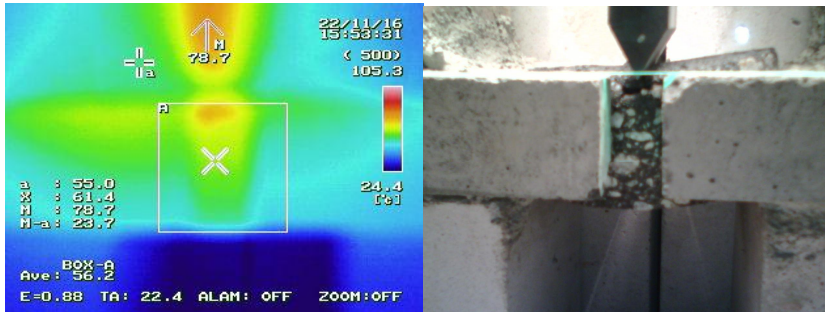
Proof-of-concept "Asphalt softening Point test"



13 bricks,
metal weight
2 UV lamps
a thermal camera



When it bends and fails the temperature in the bottom is crucial



An idea...



Conclusions

The exact power should be determined based on the environmental conditions, asphalt composition, road structure et.

Structure: If layers are detached – risk of ignition higher

Suggested is lower power for longer time

Especially if burning and ignition is observed – lower the power and slow down

Bitumen ignition point should be avoided

Development of a simple Asphalt softening Point test is advised

Plans for the future

1. (Defend PhD)
2. Process the collected data
3. Process the data being collected from ongoing measurements
4. Write a summary and final report