

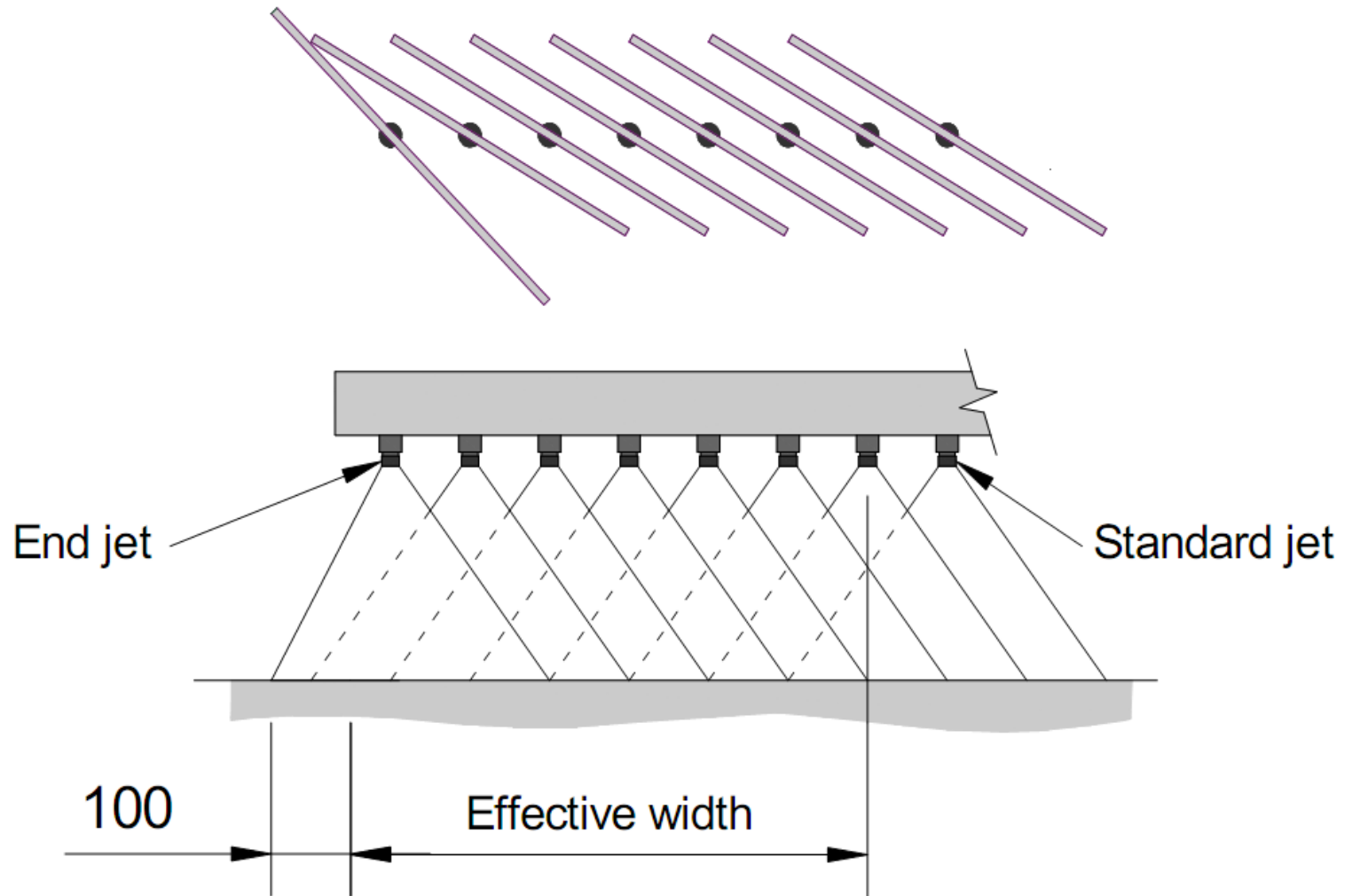
An investigation into the spray pattern of bitumen products

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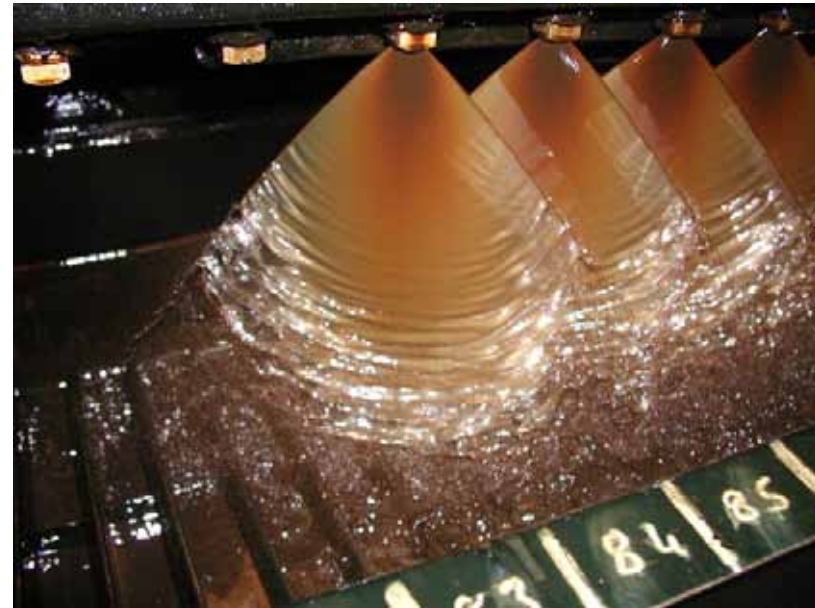
- Equipment
- Experimental method
- Results
 - Between nozzle variation
 - Effect of pressure
 - Alternative nozzles
 - Calibration oil and bitumen/alternative products
- Full spraybar simulation program

Introduction



Introduction

- Traditional sprayer calibration practice relies on calibrating oils
- PMBs and emulsions are not adequately represented
- Single jet laboratory spraying simulator used in experiments
- Investigating
 - performance and repeatability of the nozzles
 - the properties of sprays with alternative materials



Equipment – field sprayer simulator

- Simulates single nozzle spray
- 15 litre storage tank
 - temperature and pressure controls
 - stirrer
- Discharge collected by 25
20 mm wide troughs
- Nozzle height 260 mm
above troughs



Method

- Repeatability of Copley AN18 spray distribution
- Alternative nozzles
 - Copley A3
 - Copley AN18W (end)
 - VeeJet H1/2U.

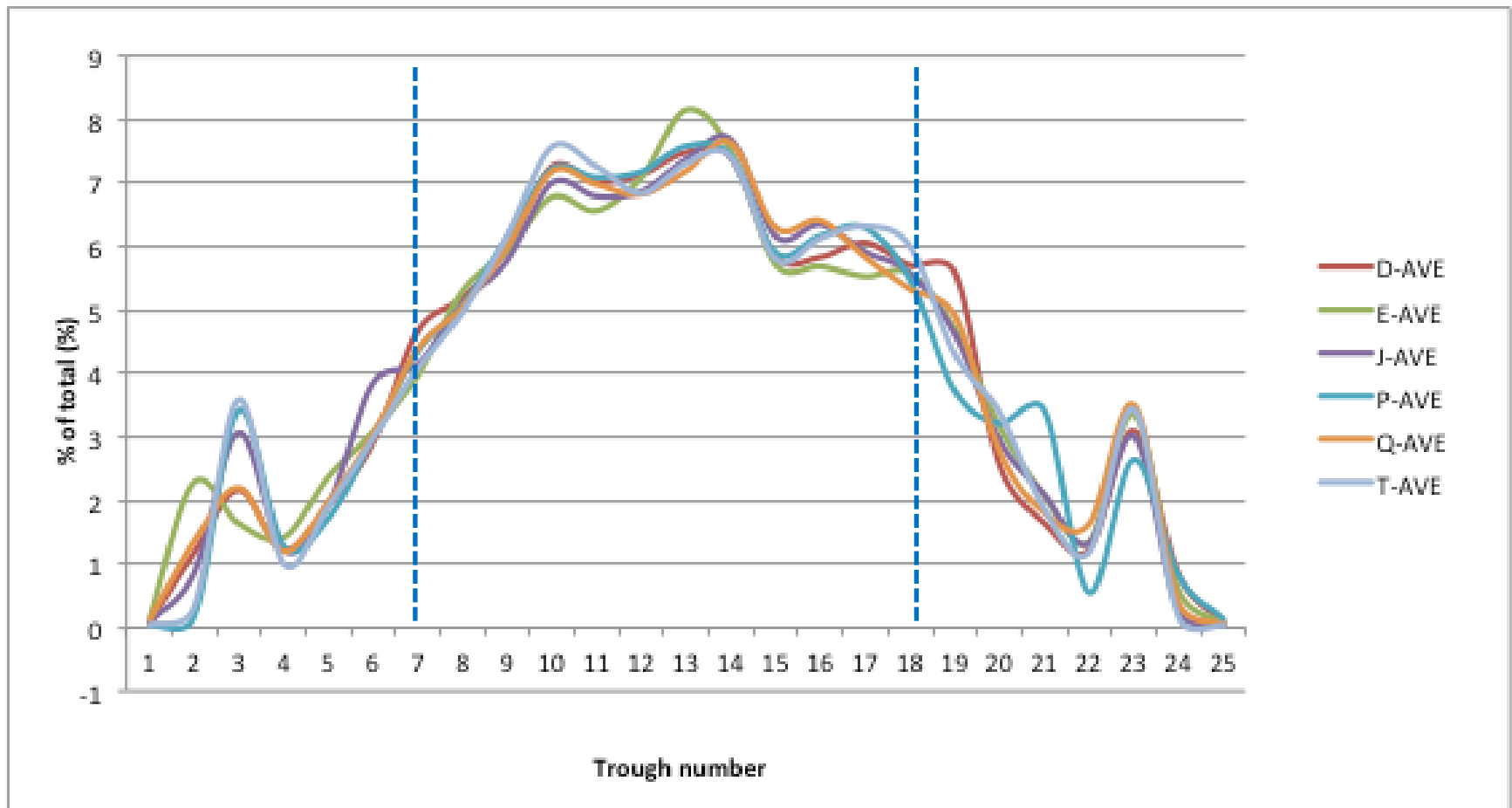


Method (2)

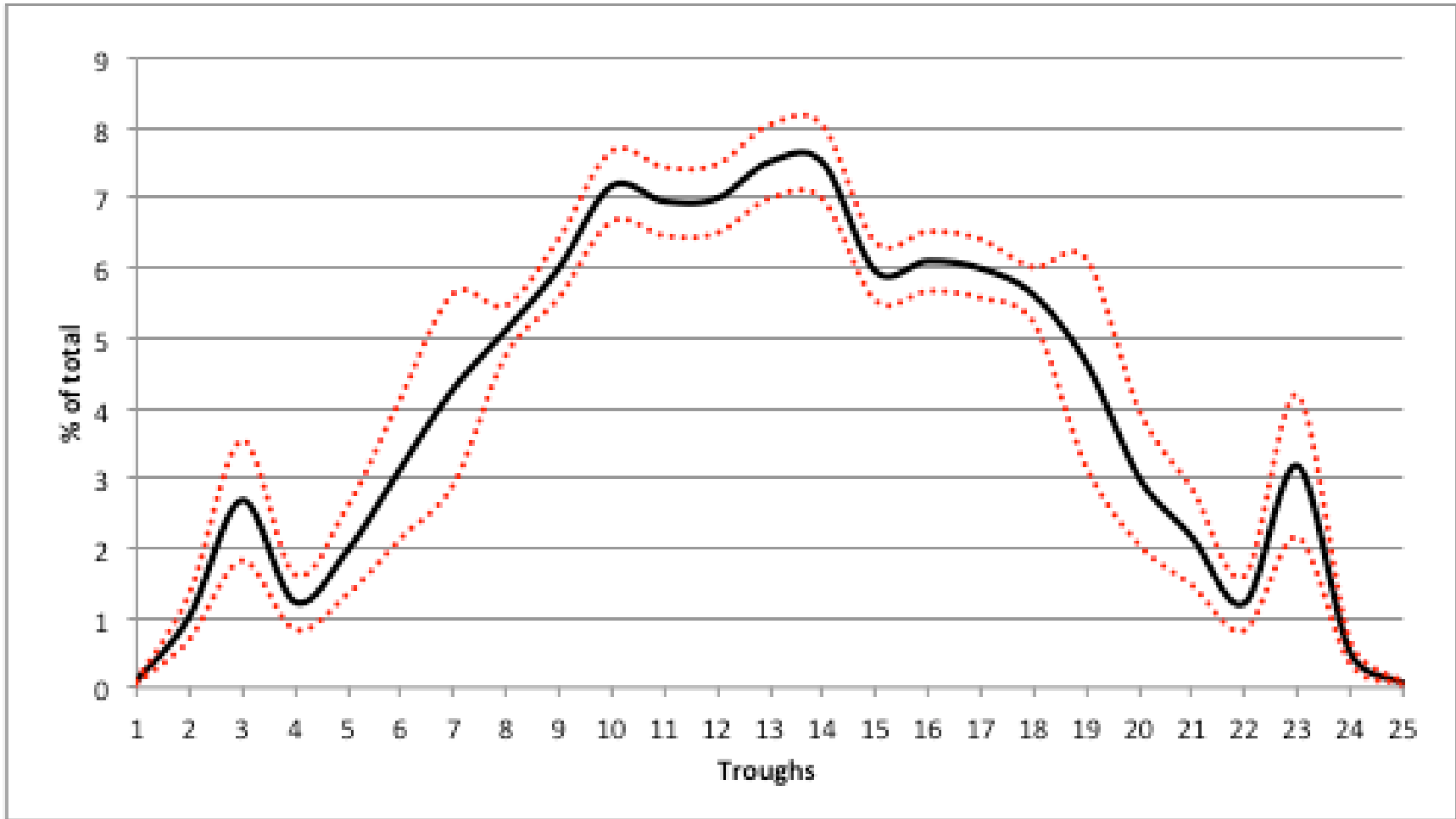
- Testing with products
 - C170
 - C320
 - S20E
 - S25E
 - S35E
 - S15RF
 - CRS Emulsion
- Simulation program

Results – Calibration oil testing

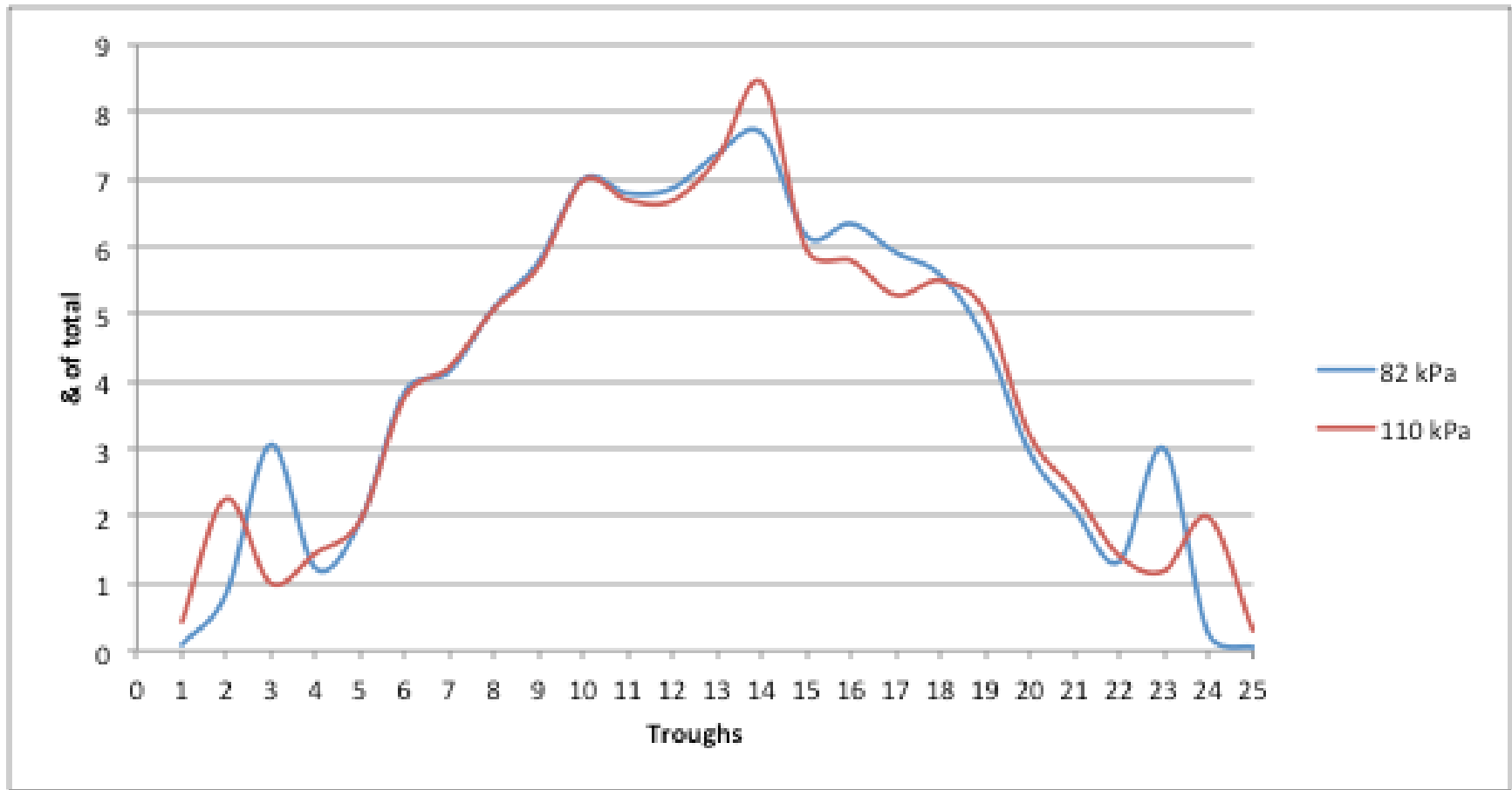
Results – Between nozzle variation



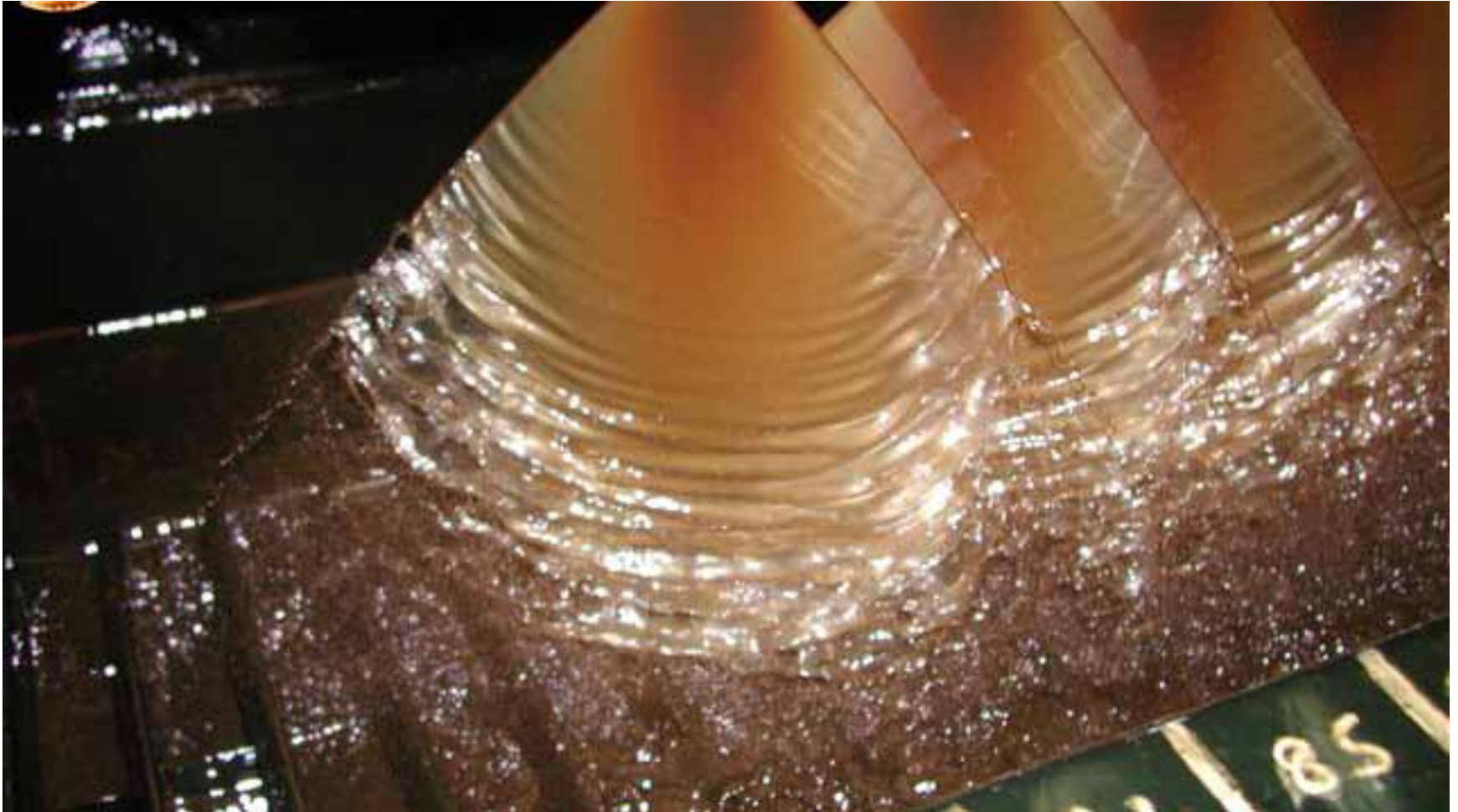
Results – Quantifying variation



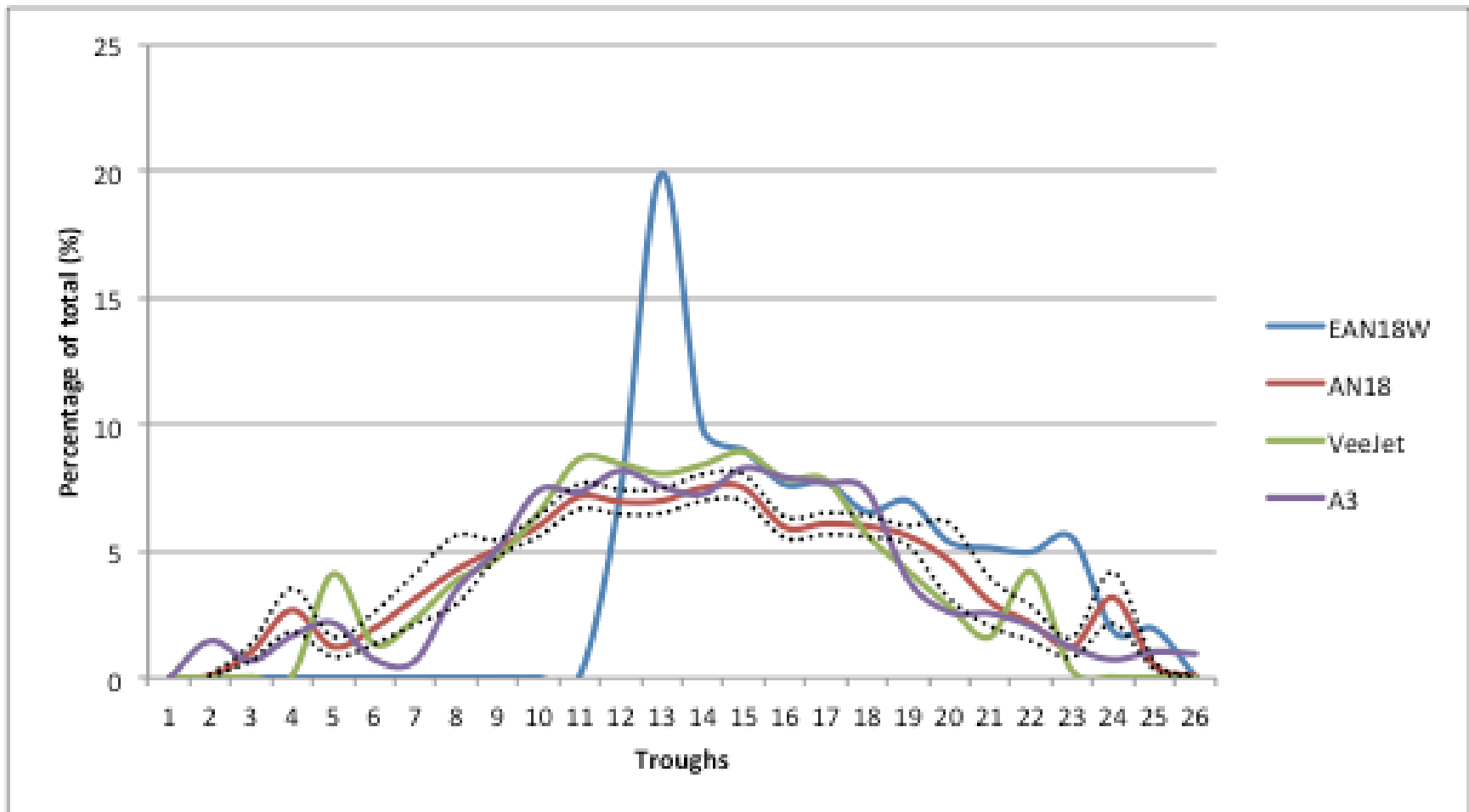
Results – Effect of pressure



Results

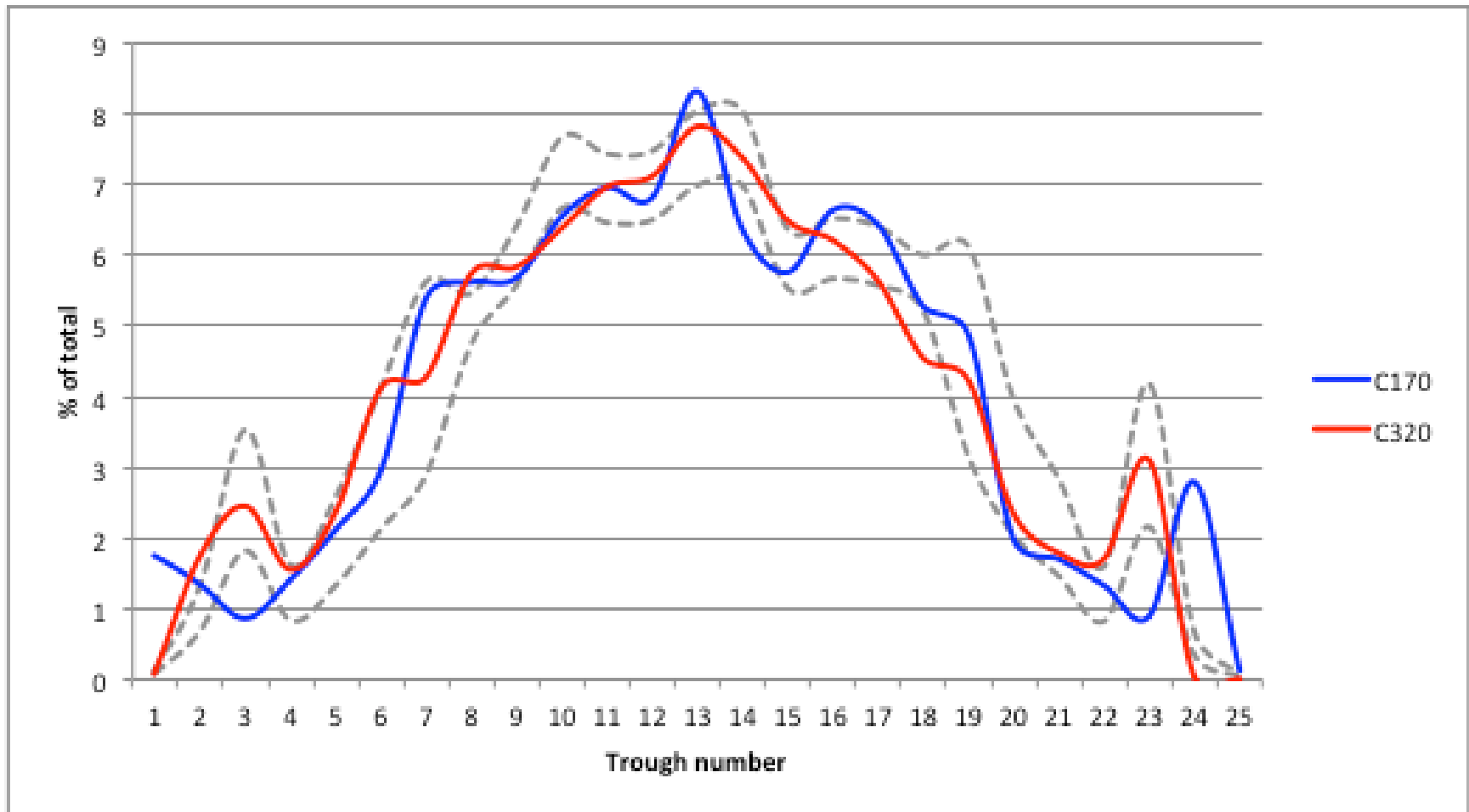


Results – Alternative nozzles

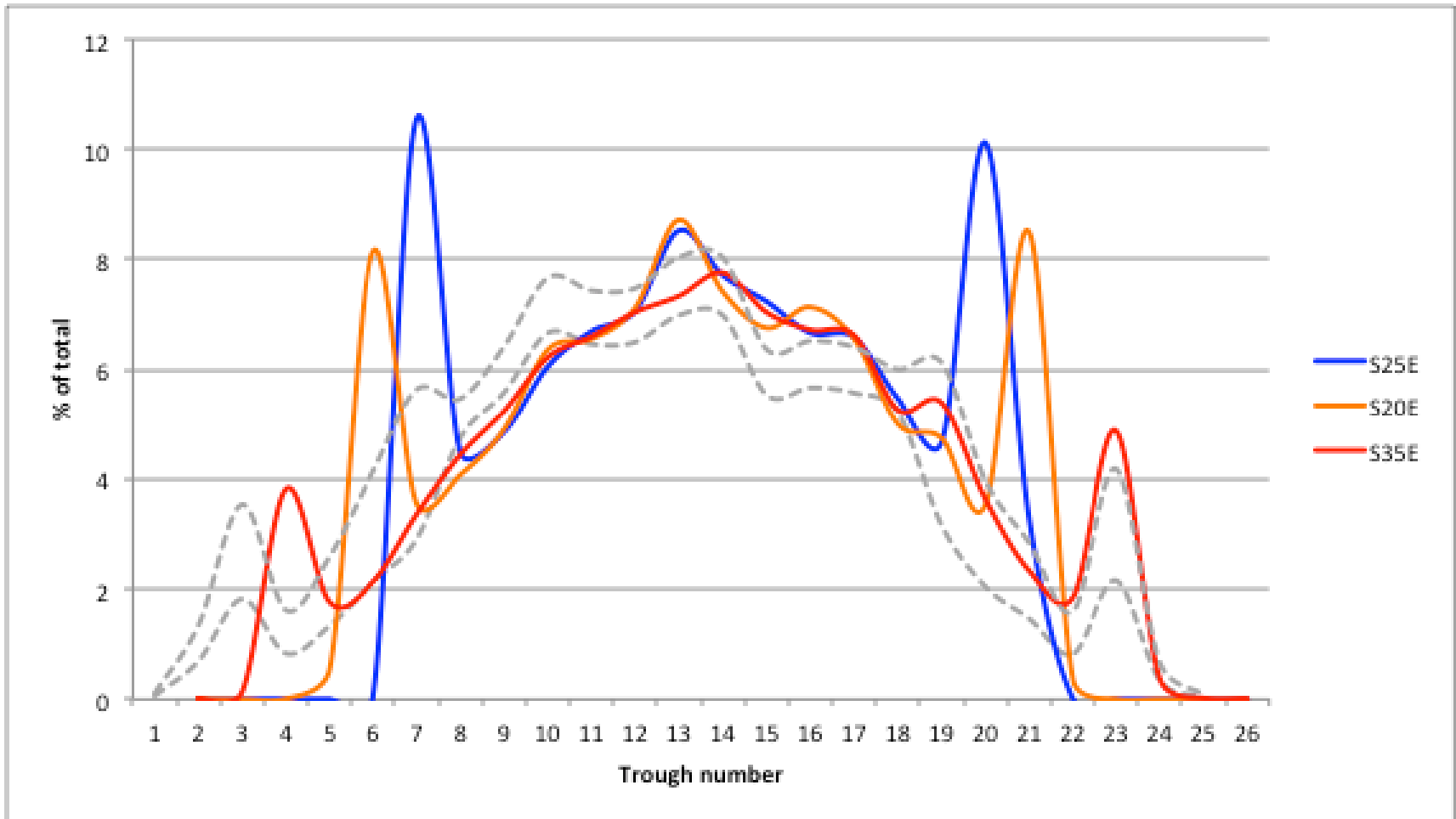


Results – ‘Hot’ product testing

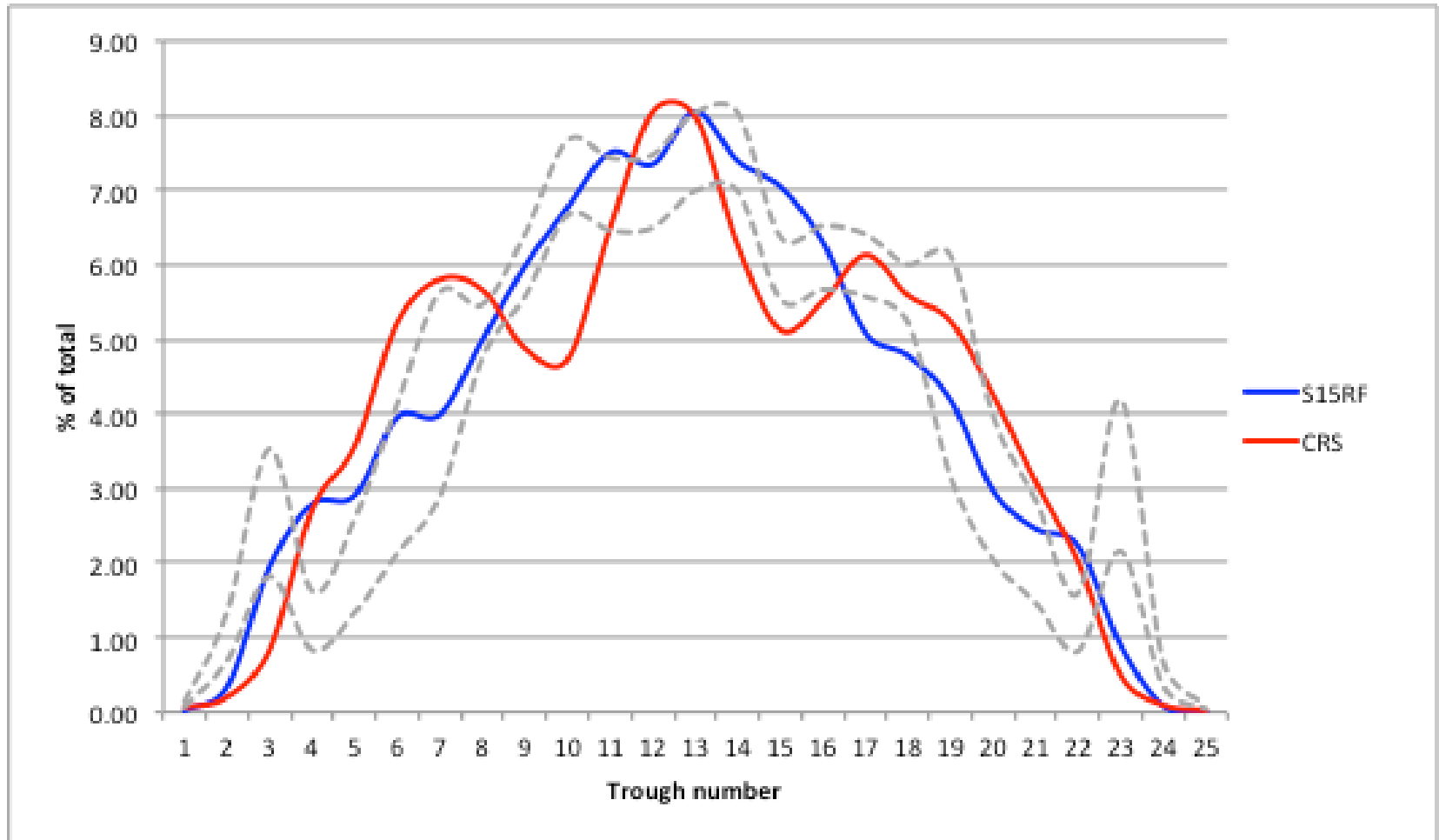
Results – Bitumen products



Results – PMBs

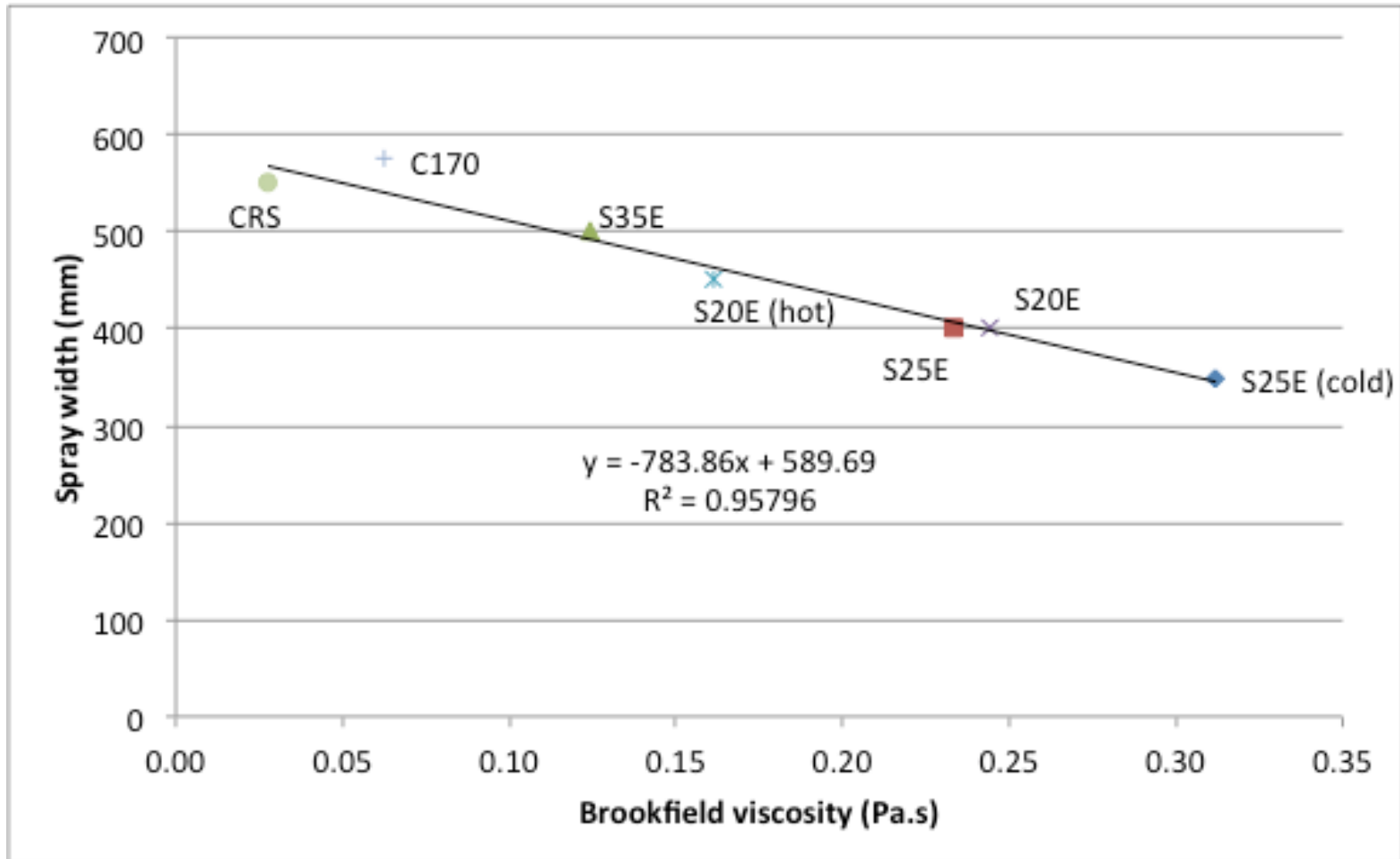


Results – Crumb rubber & emulsion



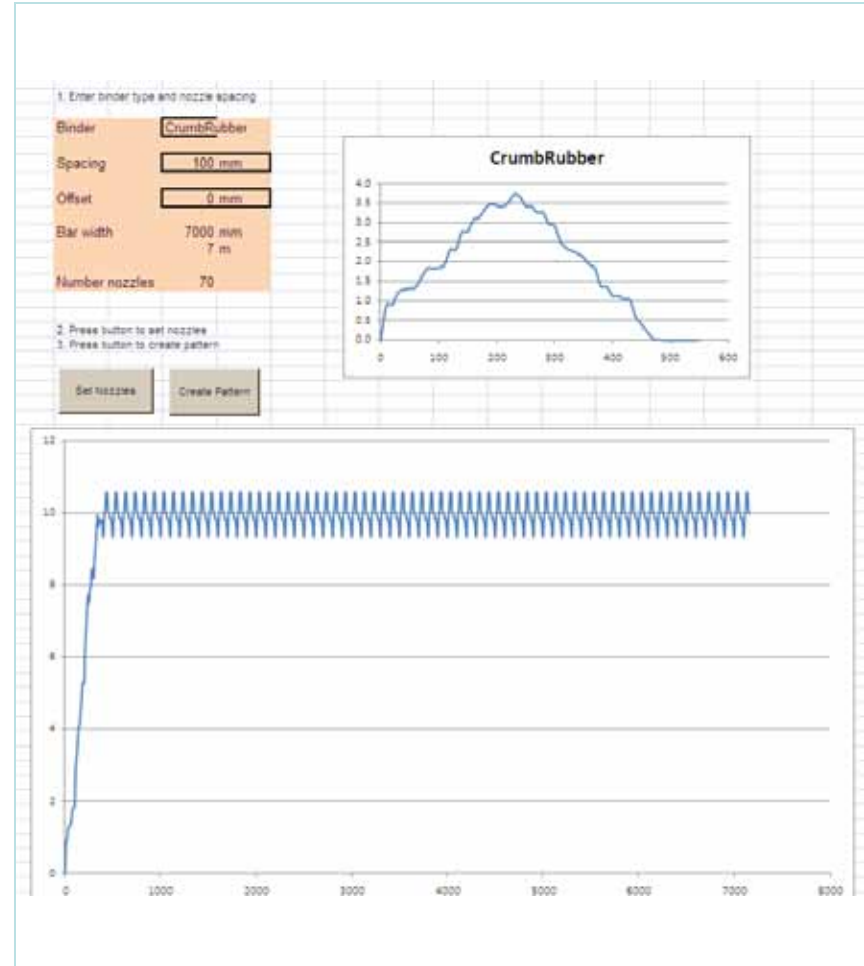
Results – spray width & viscosity

Results - Viscosity

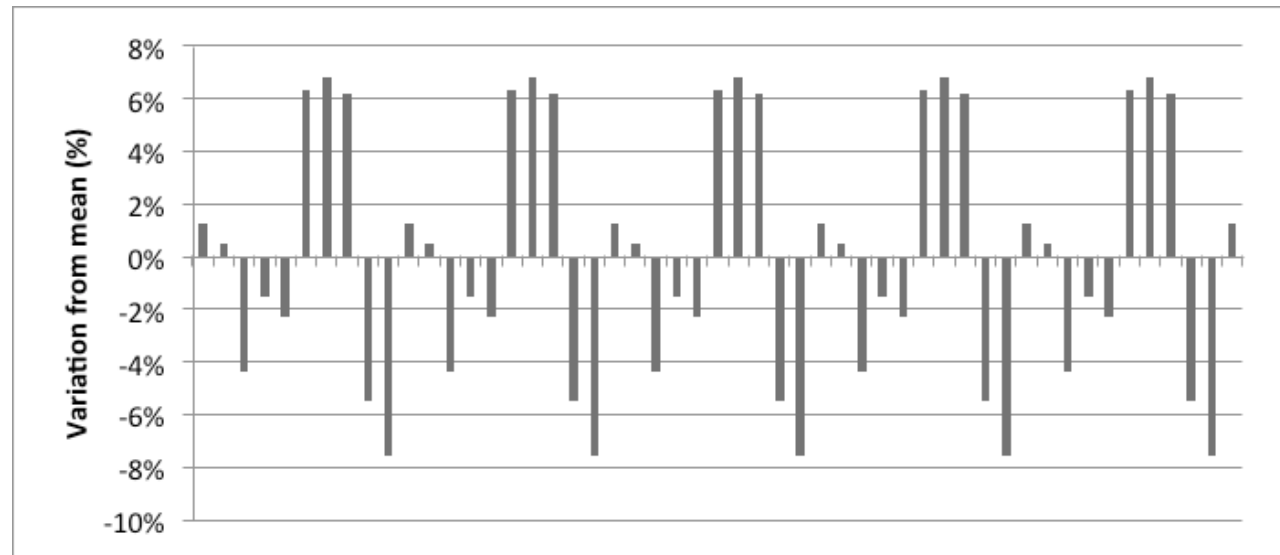
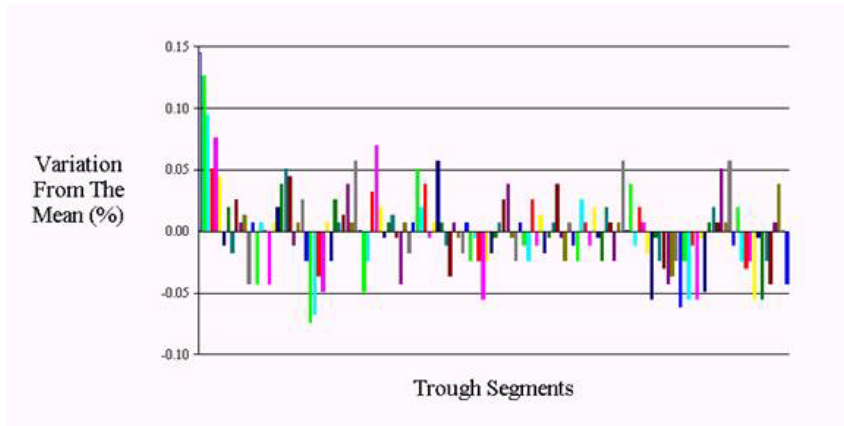


Ongoing work – simulation program

- Conducts full spraybar simulations
- Variables
 - binder type
 - nozzle spacing
 - nozzle angle
 - number of nozzles.



Ongoing work – simulation program (2)



Conclusion

- Testing undertaken with calibration oil and bitumen products
- The Copley AN18 nozzle showed good repeatability
- Conventional bitumen & PMBs tested
 - bitumens conformed to expected shape well
 - PMBs showing more variation
 - crumb rubber retained a very uniform fan shape.
- Spraybar simulation under development

Thankyou

- AAPA, VicRoads, RTA and TMR
- Bitumen donators