

# Agenda

- 10:00am – 10:05am - Welcome
- 10:05am – 10:10am – Background
- 10:10am – 10:25am – Video of test method
- 10:25am – 10:35am – Verification of test method/Work carried out by WARRIP
- 10:35am – 10:50am - Questions



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# Development of bond strength test for assessing asphalt delamination potential

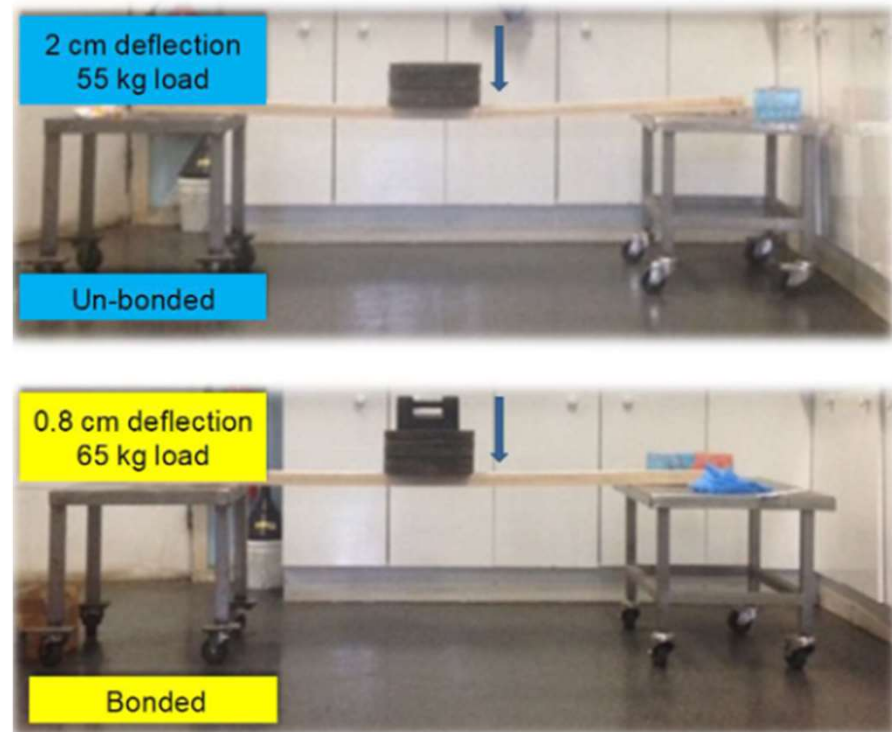
Stage 2  
15 December 2021

AN INITIATIVE BY:



# Background

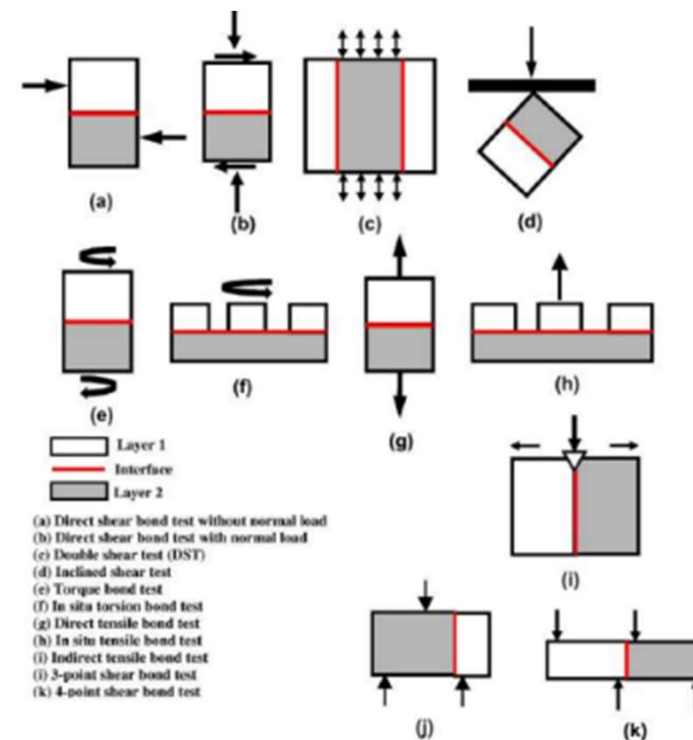
- Why investigate bond strength?
  - Reduced deflection and stains
  - Resistance to horizontal forces
  - Prevent moisture ingress
  - Compare tack coats



Source: "Development of trackless bond coat for providing longer lasting asphalt pavements" AfPA symposium 2021

# Review of Applicable Bond Strength Tests for Assessing Delamination Potential – Tseng 2018

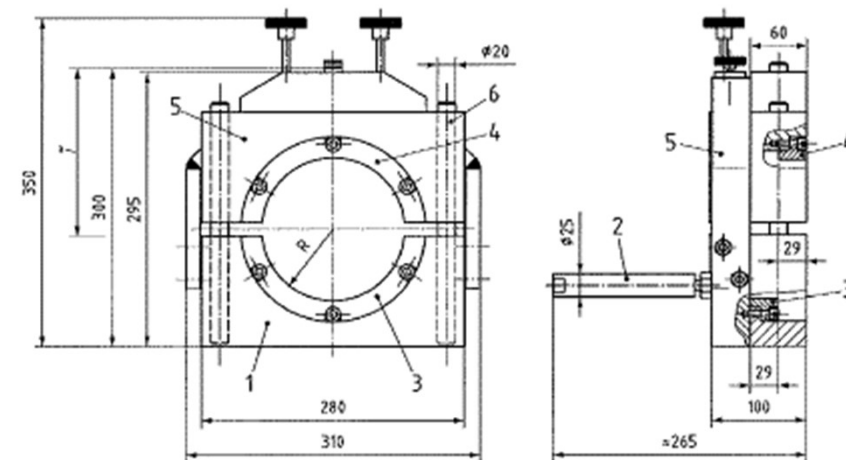
- Visit WARRIP website for more details
- Review of existing destructive and non-destructive test methods to assess bond strength
- Standard direct shear testing carried out in Europe and in some US states – Leutner based devices most commonly used



Source: Rahman et al. (2017).

# Verification of Main Roads Test method

- European test method has been validated and major cross laboratory investigations have been carried out
- European method caters for a number of jurisdictions and therefore aim was to make more specific

**Key**

- 1 base body
- 2 sample support
- 3 lower shear ring
- 4 upper shear ring
- 5 upper body
- 6 guiding bar

Figure 1 — Schematic diagram of the shear bond test apparatus

Source: prEN 12697-482013

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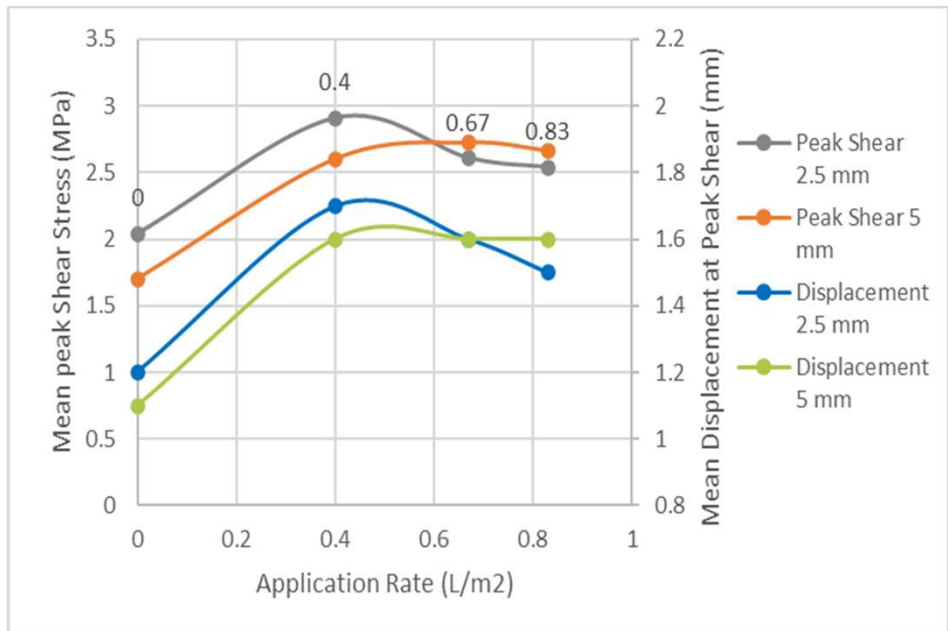
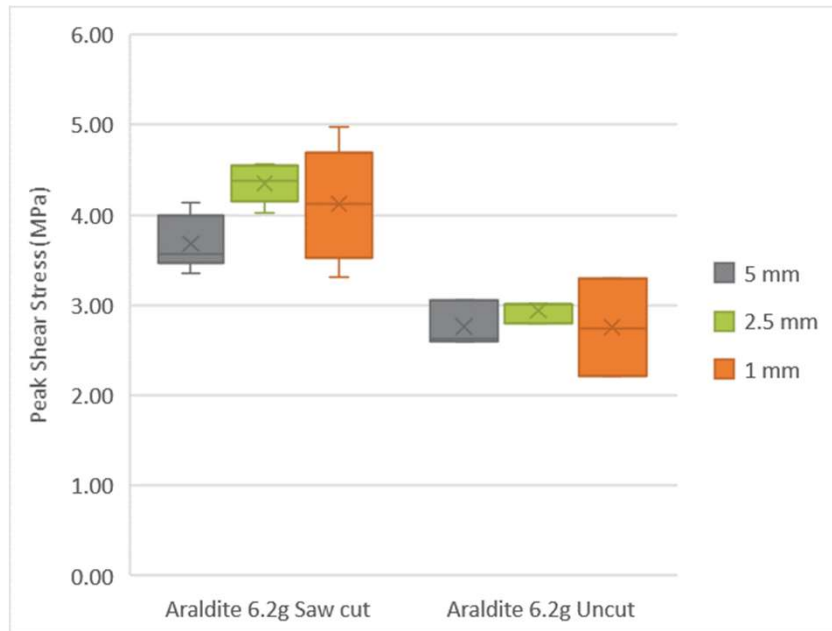
## Samples “Test Pad” and Gyratory

- 3 layers of Main Roads approved 20mm Intermediate mix (WMA 135°C)
- 3 “tack coats”
  - SAMI Bond 007
  - Standard CRS
  - No tack coat
- Different application rates



# Gap width between shearing heads

**NOTE** The gap length between shear rings influences the test results. A gap length  $\leq 5$  mm is recommended.

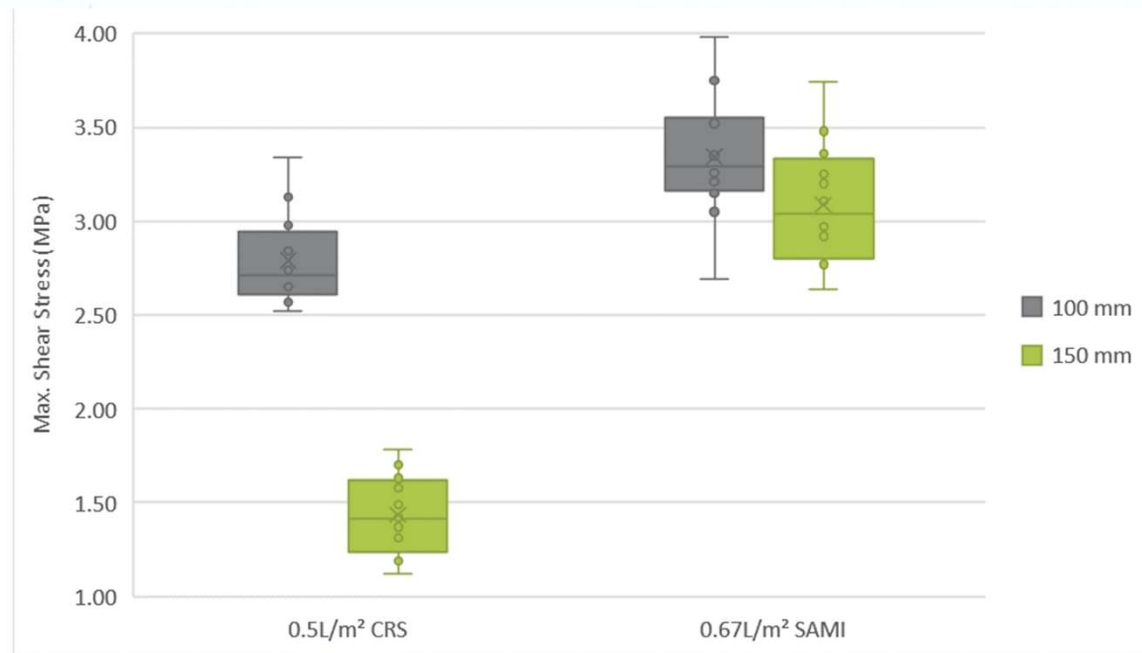




# Impact of Diameter

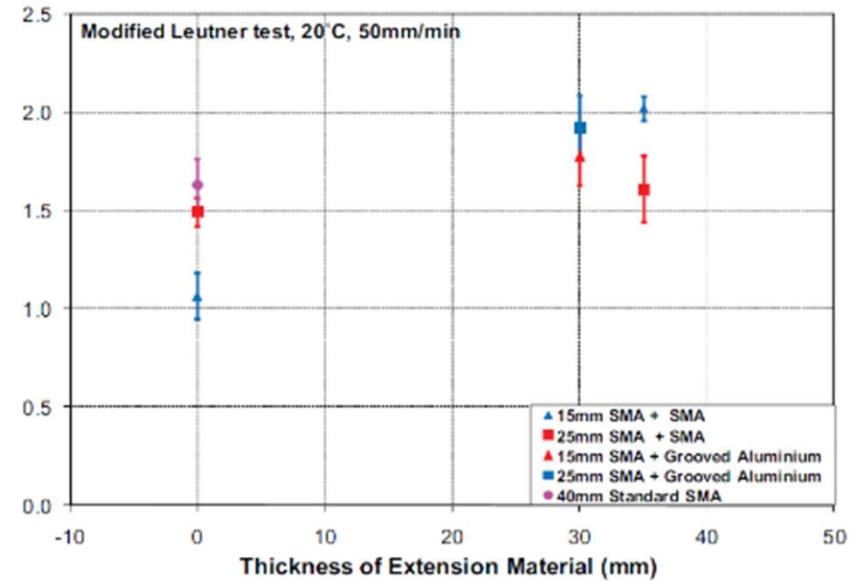
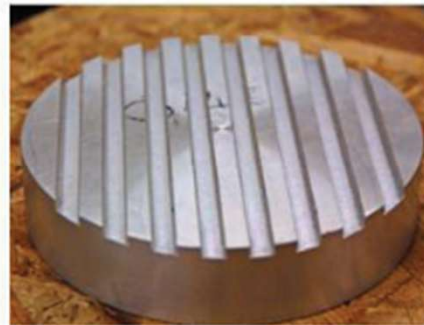
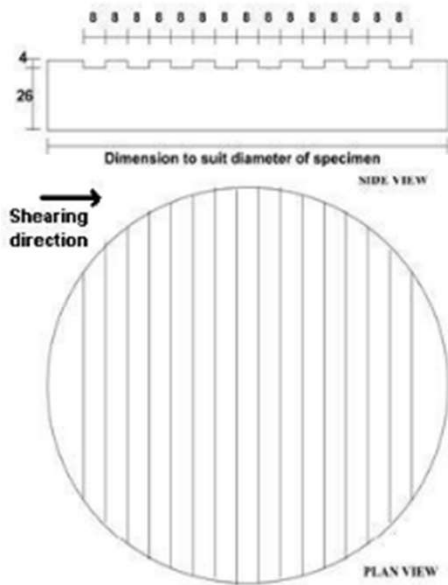
**4.2.3.1** Specimens shall be cores of  $(150 \pm 2)$  mm or  $(100 \pm 2)$  mm diameter. The minimum thickness of the layers above the interface to be tested shall be 20 mm and below the interface 70 mm respectively. Specimens shall be cored from an in-service pavement according EN 12697-27 or from a slab manufactured using a laboratory roller compactor in accordance with EN 12697-33.

**NOTE 1** The specimen diameter influences the test results.



# Metal plate extension

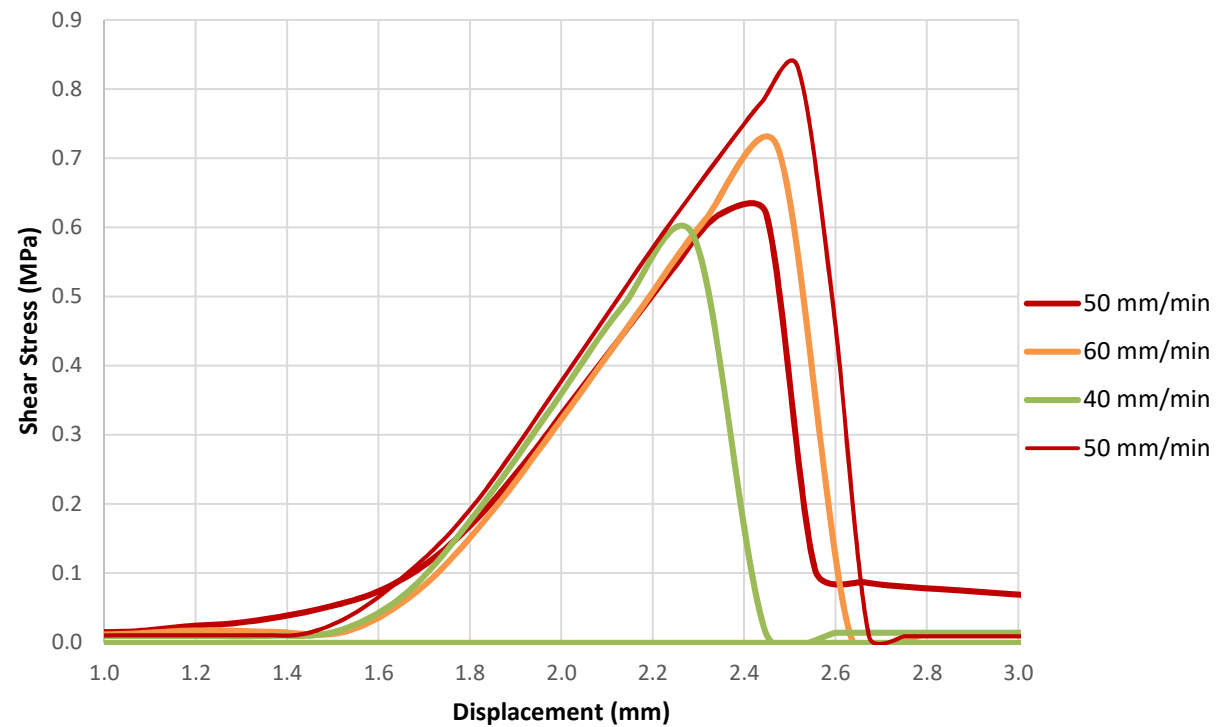
**NOTE 2** For top and/or bottom layer thickness below the requirement, a metal plate extension shall be glued to the specimen.



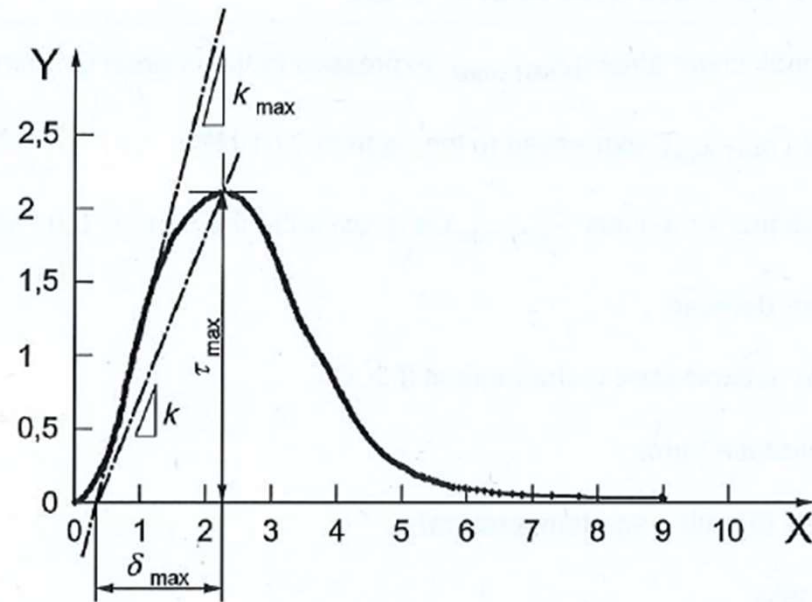
Source: Sutanto (2010)

# Loading Rate

**4.2.1.2 Loading frame** capable of achieving a constant vertical displacement rate of  $(50,0 \pm 2)$  mm per minute up to a displacement of at least 7 mm and a maximum load of at least 35 kN.

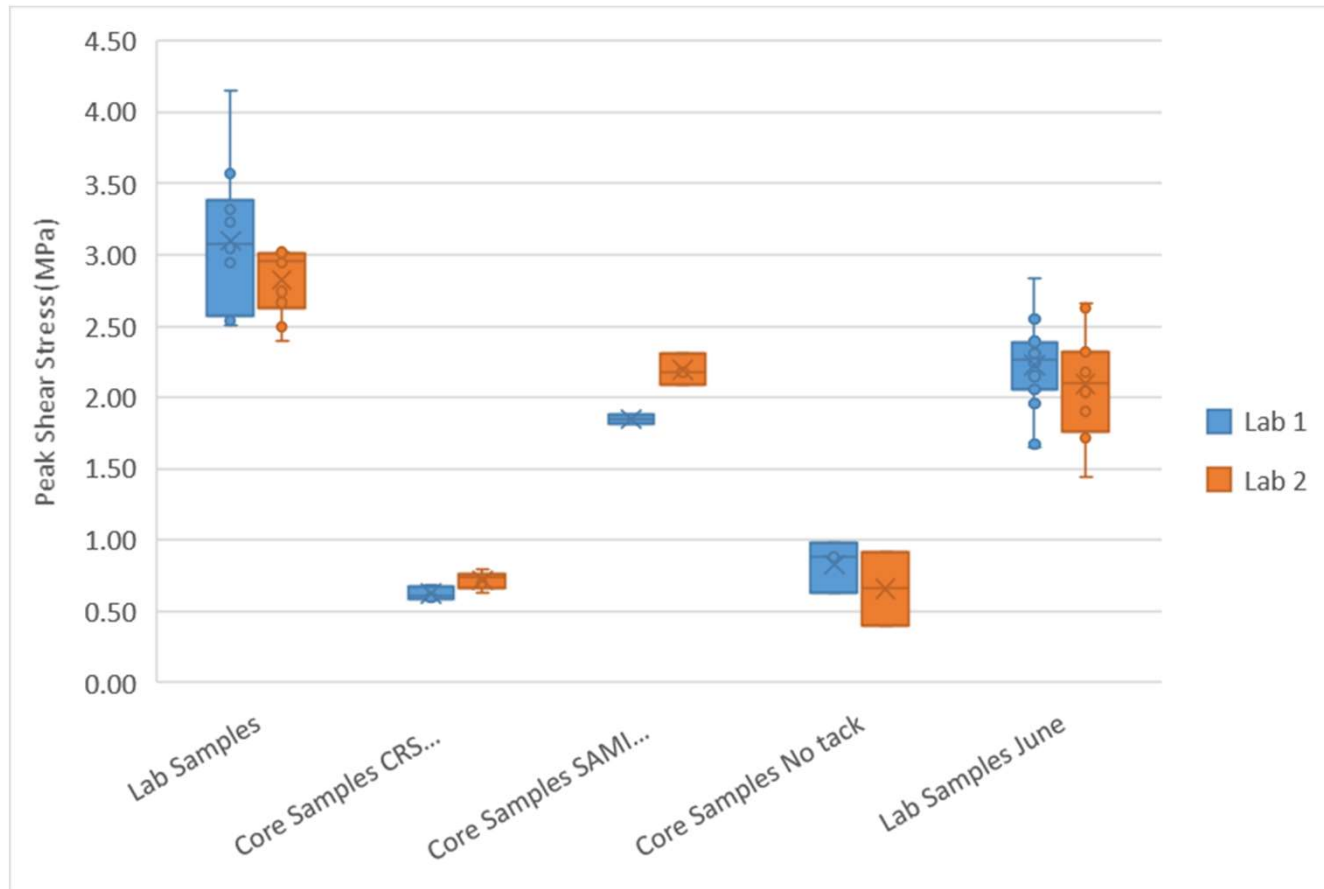


# Determination of shear stiffness modulus

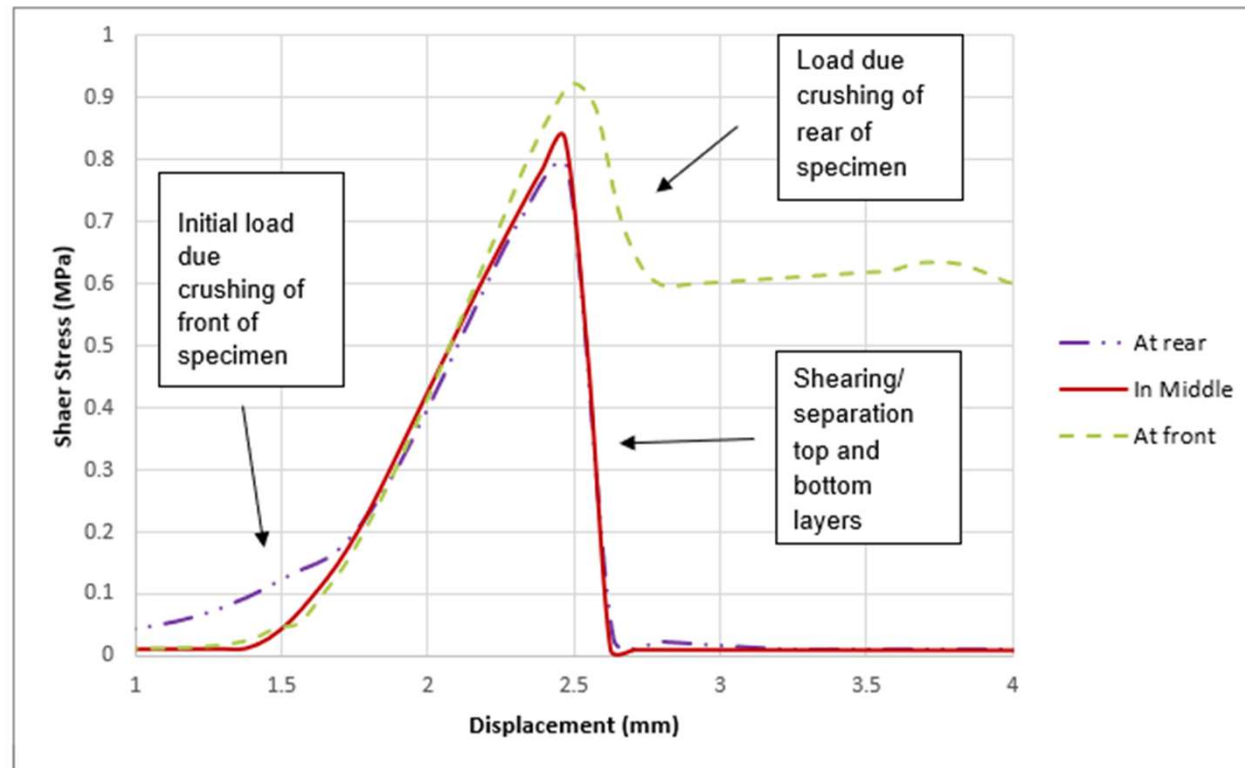
**Key**

- Y shear stress, MPa
- X displacement, in mm

# Comparison testing Main Roads WA and ARRB



# Placement of the specimen in the device



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**Thank you for your time and participation**

