Traffic Speed Deflectometer

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Traffic Speed Deflectometer

Introduction

- NZ Background – Pavement condition data
- What are the benefits for the NZ Transport Agency?
- Correlation with existing Falling Weight Deflectometer and High Speed Data
- Opportunities/Discussion going forward

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NZ Background – Pavement condition data

High Speed Data collection since 1998

- Skid Resistance, Rutting, Texture, Roughness and Geometry

Cracking

- Only collected in limited visual surveys

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NZ Background – Pavement condition data

Falling Weight Deflectometer collected by NZ Transport Agency since 1998

- Routine Network FWD – 200 m apart in alternate direction
- Scheme FWD – 50 m apart in alternate direction

Use 140+ “benchmark” sites for input to pavement deterioration model.

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What are the benefits for NZ Transport Agency?

Continuous coverage of pavement structural condition across the State Highway

- Network surveyed at traffic speed
- Greater coverage of network
- Increased survey detail

Theoretical compatibility with existing condition measurement tool – Falling Weight Deflectometer.

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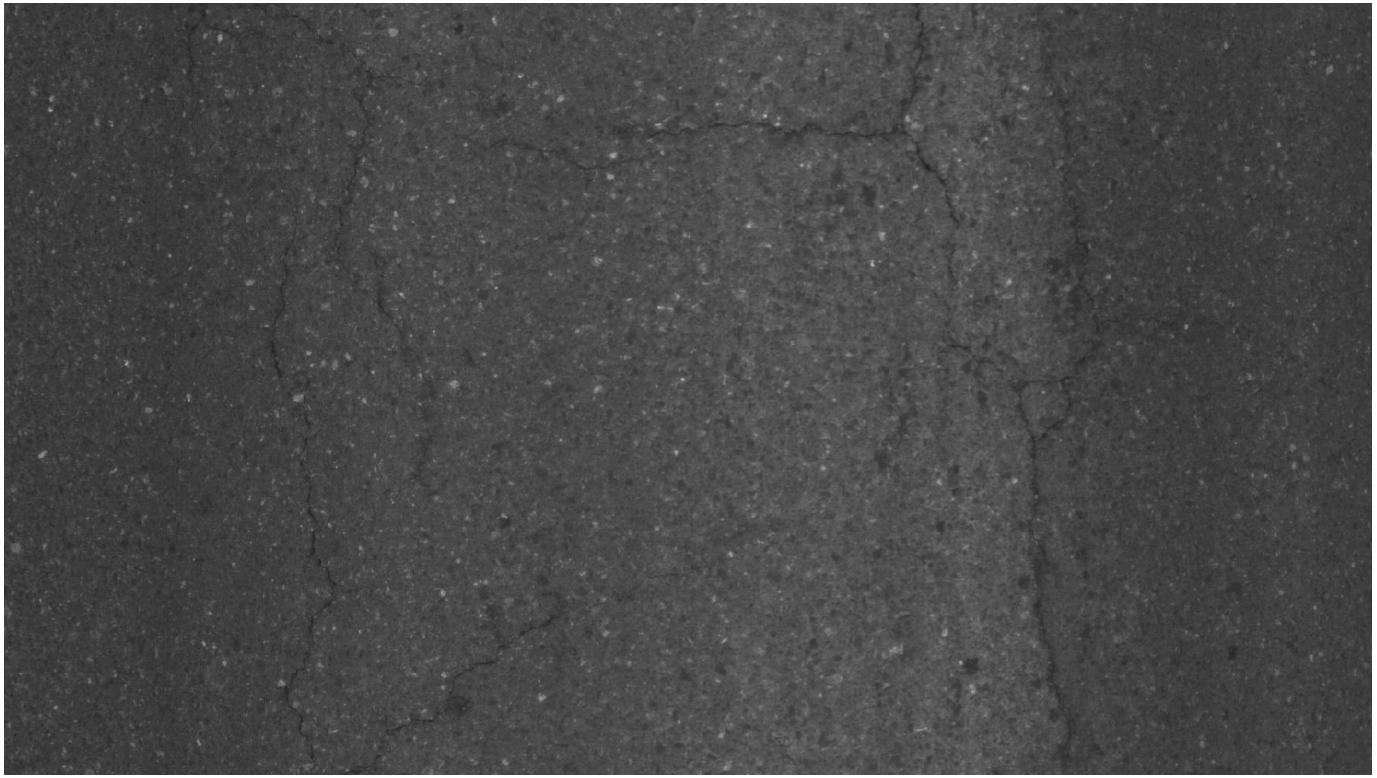
How does it work?

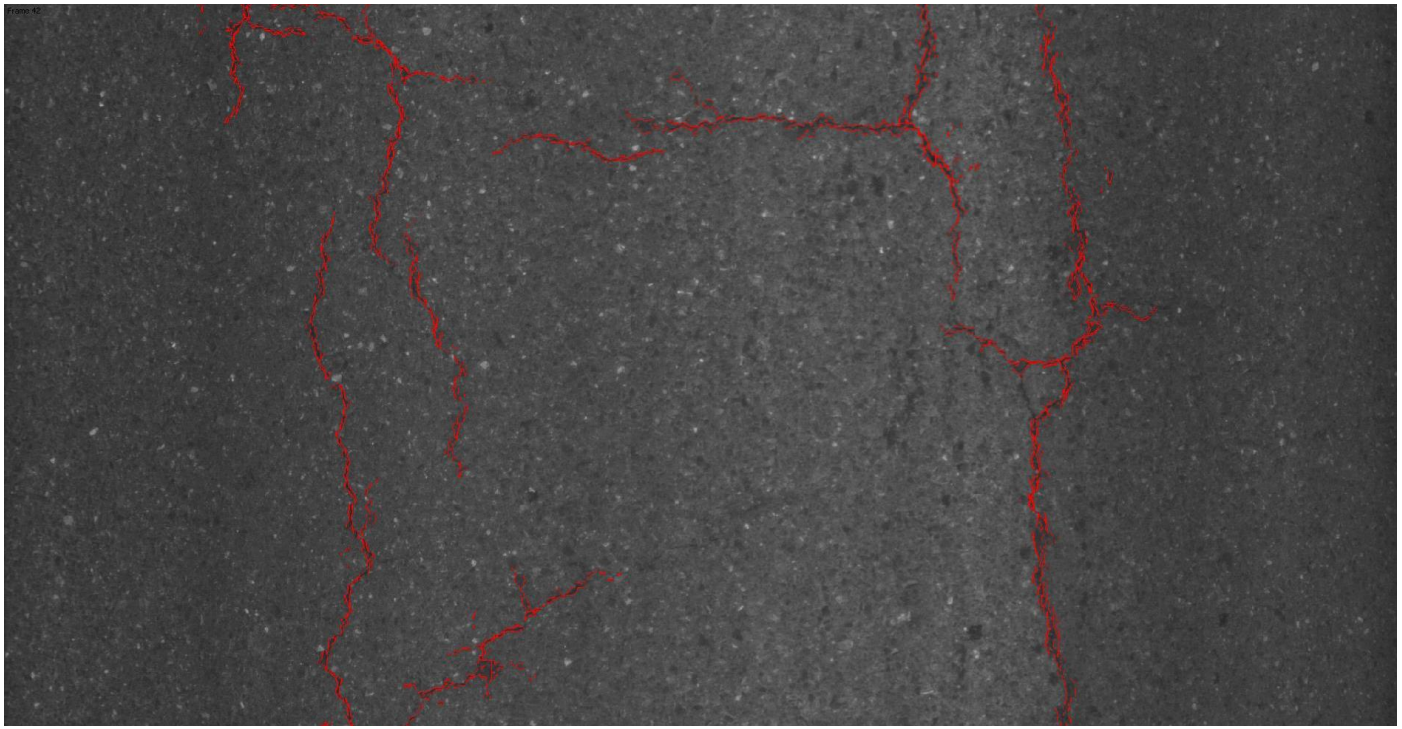
- Doppler laser sensors
- Mounted at a slight angle
- Measures vertical and horizontal vehicle suspension velocity and vertical pavement deflection velocity
- Deflection bowls calculated from the pavement velocities
- Crack detection achieved through wavelet analysis of results obtained from rear mounted lasers
- Crack results can be combined with photo of pavement surface

Interior of TSD

TSD Crack Detection



TSD Crack Detection



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What are the benefits for NZ Transport Agency?

- Expected that improved data quality will feed into improved pavement deterioration models
    - Better informed pavement management and investment decisions
- Ability to collect comprehensive cracking data for the first time.
- Reduced traffic management need during data collection results in less disruption to the customer.

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Validation and Correlation with HSD/FWD

Validation Sites – SH58 (approx 30km return)

Used to check for any bias and precision limits, namely repeatability and reproducibility

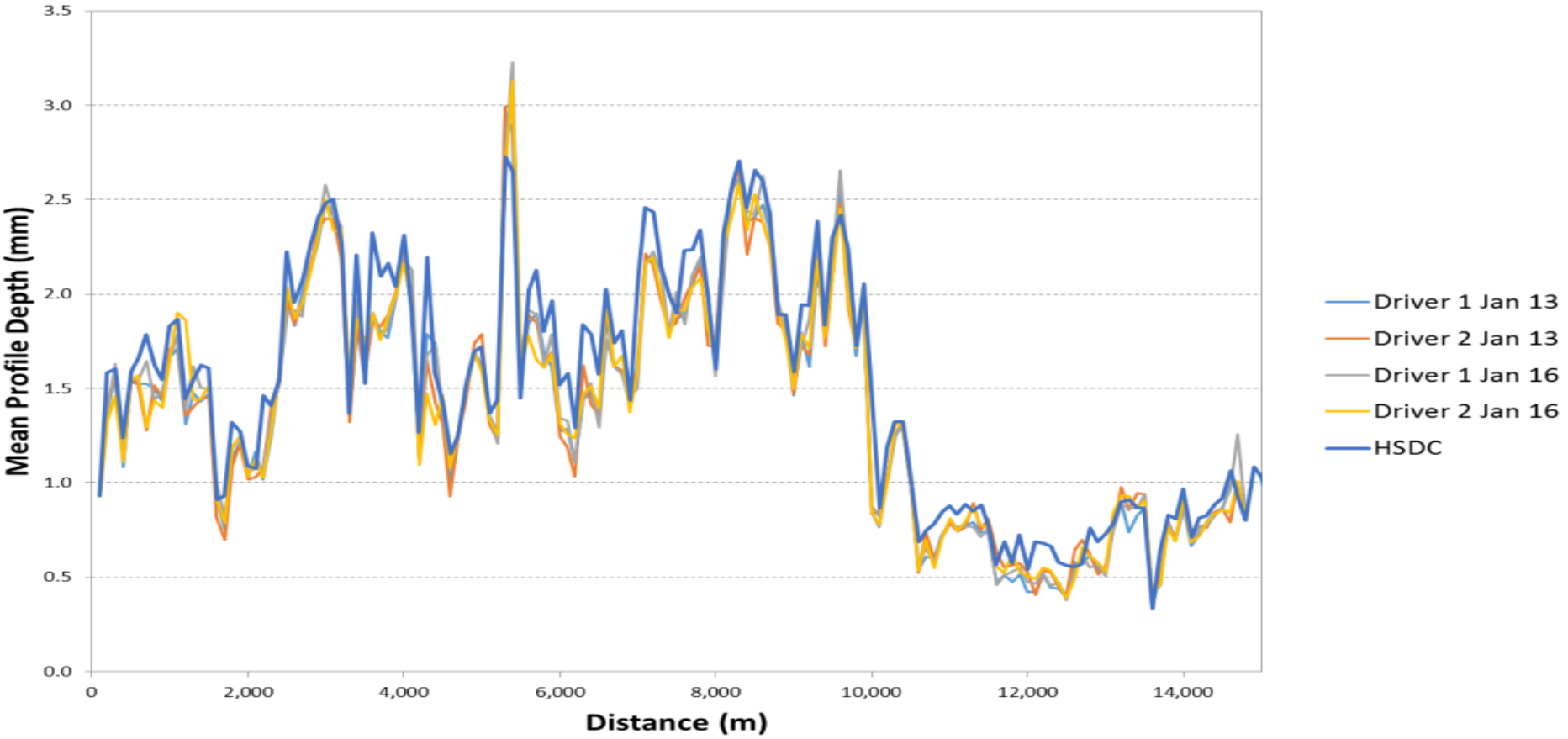
Also used for validation of NZTA HSD annual survey

- Provided opportunity to assess TSD against HSD for rutting/texture/roughness etc.

Validation Sites – SH45 (5 sites between 400 -1000m long)

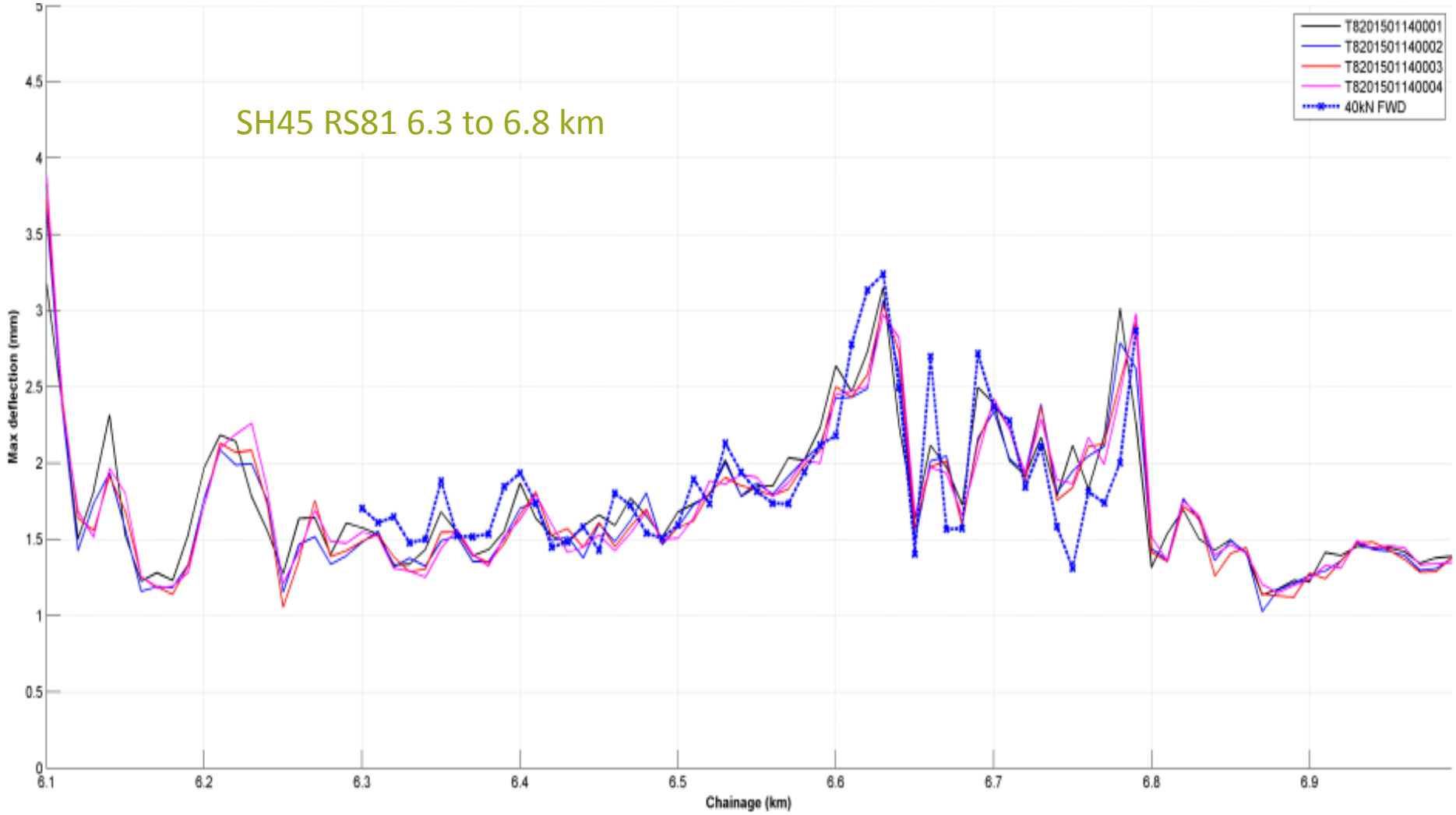
Chosen for variable pavement strength to assess repeatability of TSD and correlation with FWD.

Repeatability – SH58 Texture



SH58 - Left wheel path Mean Profile Depth

Correlation with FWD data – SH45



TSD – The way forward

How we see the data from the TSD being used

- Better resolution will allow weak areas of pavement to be identified.
  - Optimised treatment lengths
- Falling weight deflectometer data provides insight into pavement characteristics associated with good performance
  - The characteristics associated with good performance should allow performance to be established based on characteristics established by past precedent
- Provided there is good correlation between the falling weight deflectometer and the traffic speed deflectometer then the TSD will allow the expected precedent performance to be identified at a far greater resolution.
  - Should be able to identify weak sections of road and prioritise renewals