Bitumen Treated Basecourse

WHAT IS IT AND HOW DO YOU TEST IT?

JANUS GROVE

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Outline

- What is it and where is it used
- Specifications
- Mix Designs
- Testing
- Conclusion

What is it?

- Bitumen Treated Basecourse (or BTSB)
- Typically an AP40 put through an asphalt plant
- Aggregate mixed with 3-4% bitumen
- Essentially a modified granular layer
- Placed hot with a paver or excavator
- Term can be confusing

Advantages

- No curing time
- Quick to construct
- Aggregate readily available
- Generally more resilient to moisture
- Larger stone size – can be placed in thicker layers than typical asphalt mixes

Where is it used?

- Subgrade improvement layers
- Replacement for cement bound layers
- Instead of typical asphalt layers
- Where expedient solutions are required
- Often on small areas where cement stabilisation is




Where is it used?

Case Studies:

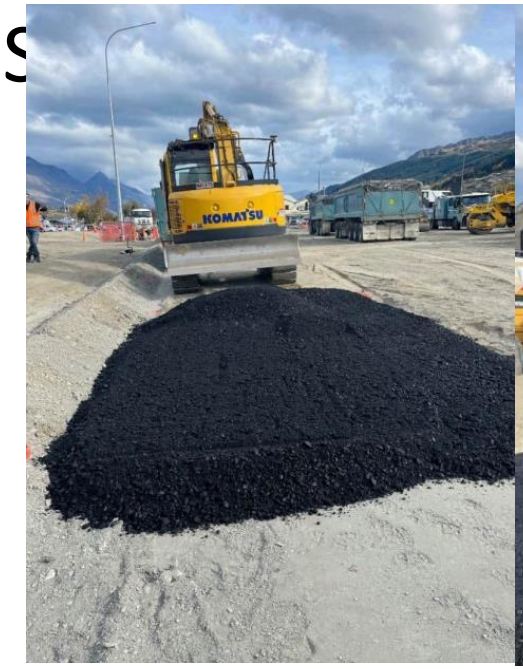
- SH20B in Auckland as a lowe
- WWNOC Heavy Maintenance
- Midland Port as Basecourse
- SH01N Whangarei Capital Pr
- Sail GP Canterbury Upgrades

Design

- Not included in NZ/Aus design guidelines
- Modelling:
  - Sub-layering
  - No fatigue criteria
- Modelling assumptions need to be realistic
- Sufficient unbound cover over the layer
  - Concern BTB might crack (like CTB)
- Depends on expected performance of

Construction

- Placement with a paver
- Placement with Excavator
- Compaction – Asphalt or Granular?
- S



Specification

- No common specification available in industry
- Project specific – highly variable
- Often requires a new mix to be developed
- As subbase or subgrade improvement – should not be an asphalt spec
- Because of input aggregate – cannot comply with AC specs
- We need a, practical, fit for purpose industry specification

Specification – FH Internal

- FH developed internal specification
- Roadbase™ - not an asphalt
- We don’t expect the performance of an asphalt
- Performed well where used
- Covers:
  - Input aggregate and bitumen requirements
  - Mix design requirements – ITS and TSR
  - Production testing – grading and bitumen content

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FH-RB-SP1-NZ

Standard Practice for Supply of RoadBase™ within New Zealand

Specification – Project Specific

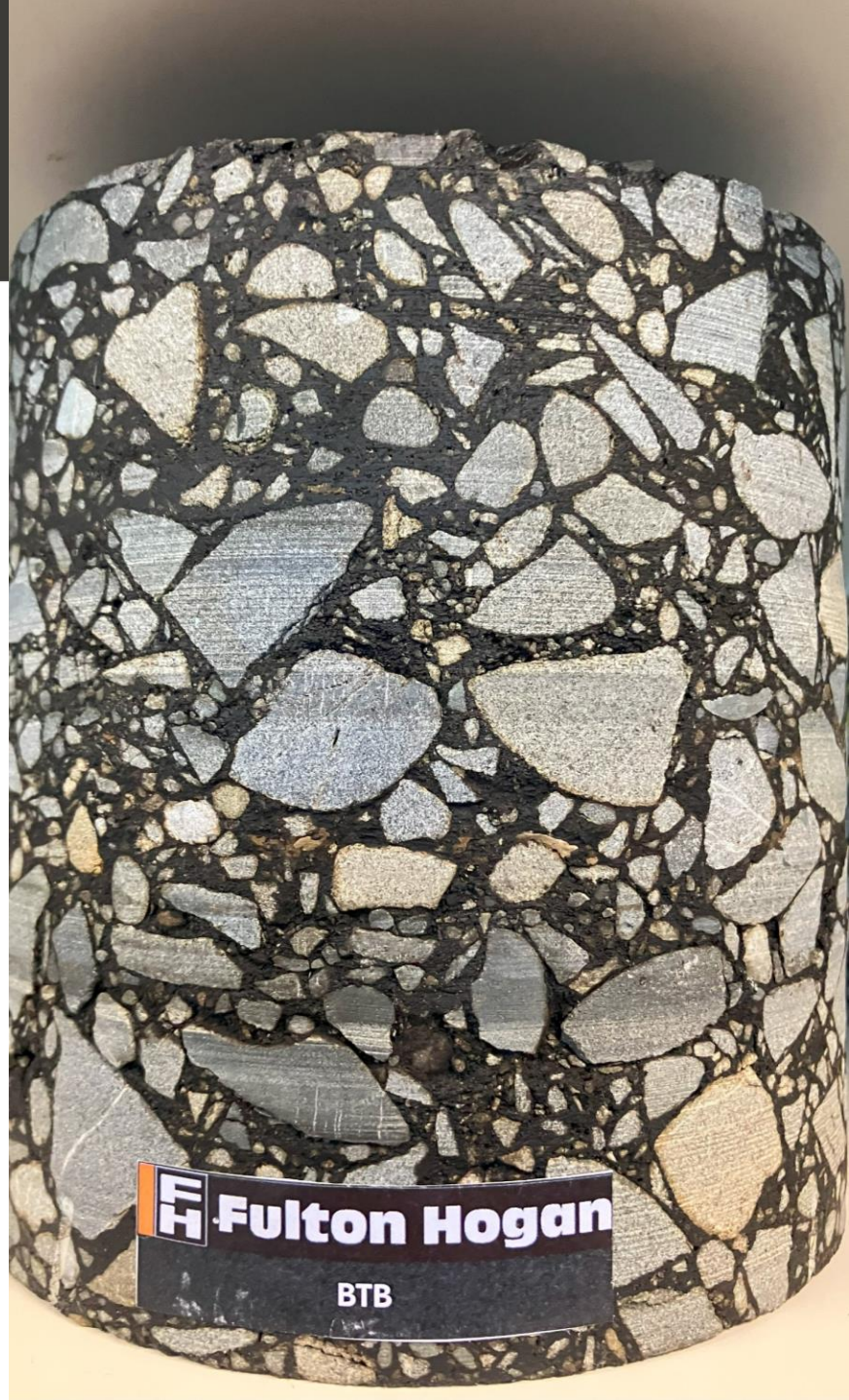
- Roading specifications – variable across projects
- Ports and Airports – variable, but generally more stringent
- Ports and Airports – why not just use an AC28?
- Project Specific Specifications:
  - Kā Huanui a Tāhuna NZ Upgrade Programme BTS
  - Airports Spec AIAL
  - Northern Corridor Improvements

Mix Design

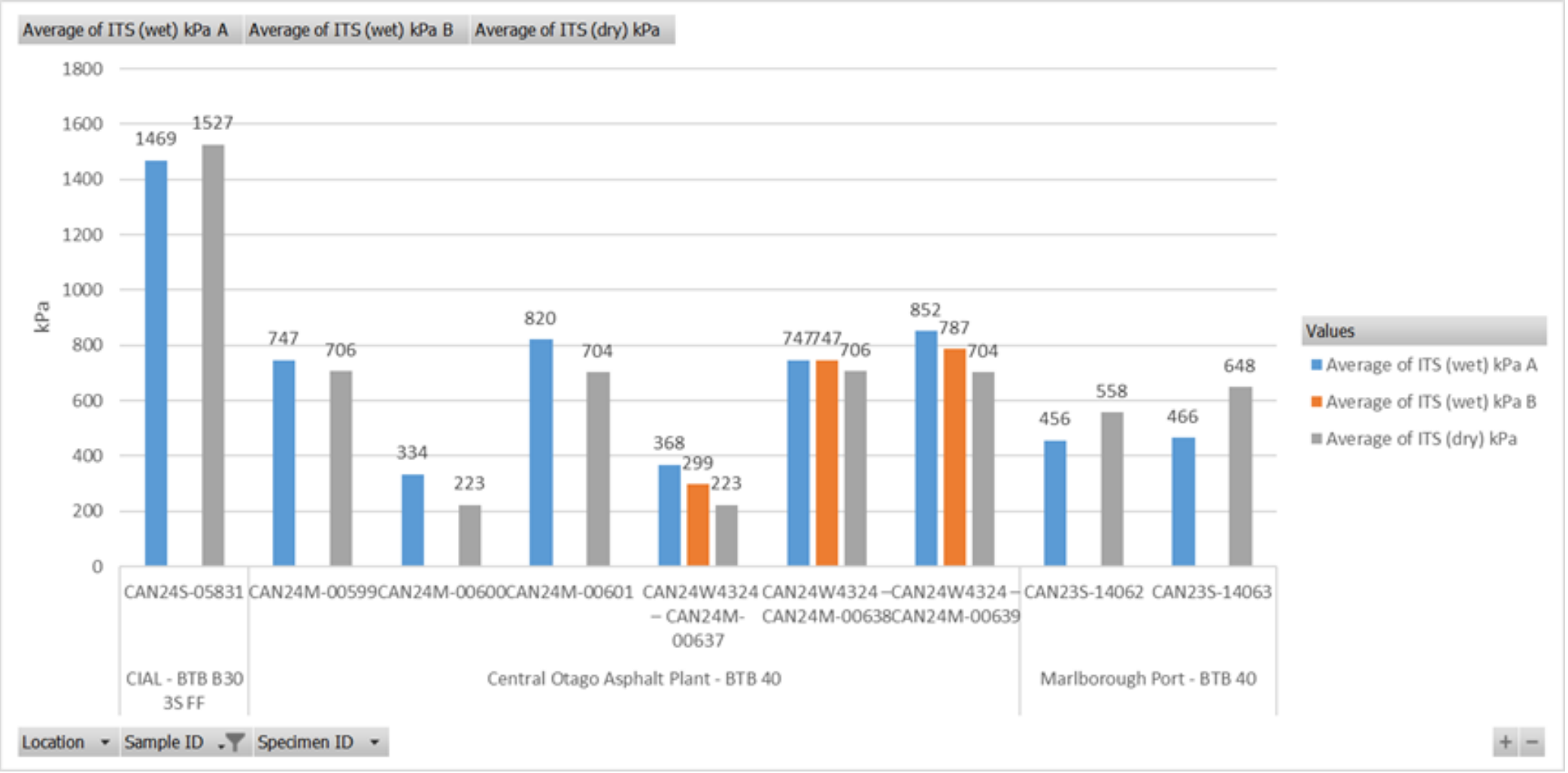
- FH Spec – Follow NZTA T/19
- Confirm input aggregate complies

Mix Design:

- Typically, @ 3 Binder contents
- ITS Range – depends on the design
- TSR > 75% to confirm performance in moisture



Mix Design

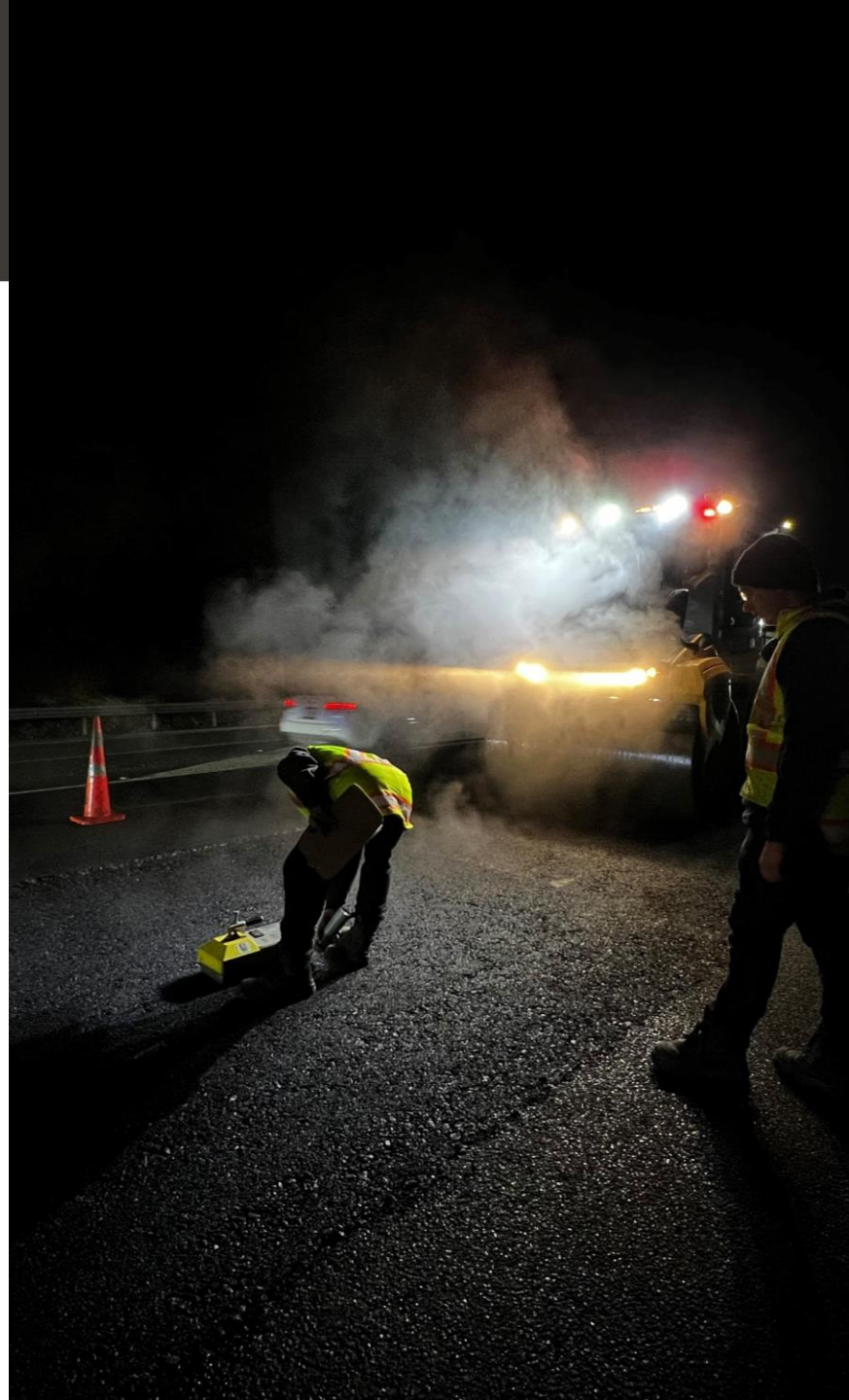

Average of ITS (wet) kPa A
Average of ITS (wet) kPa B
Average of ITS (dry) kPa
kPa
1800
1600
1400
1200
1000
800
600
400
200
0
1469
1527
747
706
334
223
820
704
368
299
223
747
747
706
852
787
704
456
558
466
648
CAN24S-05831
CAN24M-00599
CAN24M-00600
CAN24M-00601
CAN24W4324 – CAN24M-00637
CAN24W4324 – CAN24M-00638
CAN24W4324 – CAN24M-00639
CAN23S-14062
CAN23S-14063
CIAL - BTB B30 3S FF
Central Otago Asphalt Plant - BTB 40
Marlborough Port - BTB 40
Values
Average of ITS (wet) kPa A
Average of ITS (wet) kPa B
Average of ITS (dry) kPa
Location
Sample ID
Specimen ID

Testing

- ITS or Resilient Modulus
- Testing of input aggregate – from AC plar
- Compaction – MDD
  - Variability because of grading
  - Compacting hot material
- Production testing
- Seems to be done differently around the country

Testing – Construction

- Mainly compaction
- Really important to do regular plateau testing
- How should we test compaction compliance?
- NDM Testing
  - Asphalt/Thin lift mode
  - Granular mode
- Core air voids



Testing – Construction

NDM Testing

- Variability in different modes
- Some data, but not enough to conclude
- Seems to be project/region specific
- At the moment, choose one and stick with it

Deflection testing – valuable for designers, but shouldn’t be a compliance measure

Conclusion

- A valuable tool in the pavement design toolbox
- Robust, expedient solution
- Designers should match testing with expected performance and intention
- Need industry harmonisation around design and testing
- Need more data to develop guidelines

Questions?

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Ngā mihi | Thanks!

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