PAVEMENT DESIGN
REALITY CHECK 101

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Subgrade Consistency

Testpit locations
Subgrade Investigation

CBR vs Scala

Inferred CBR vs Blows per 100mm
Subgrade Modelling

\[ E_{SG} = k \times (CBR) \]

In NZ: \( k = 10 \)

But can vary from 2 to 50!!!
Subgrade Performance Criterion

\[ N = \left( \frac{12000}{\mu e} \right)^{6.9} \]

\[ N = \left( \frac{9300}{\mu e} \right)^7 \]

\[ N = \left( \frac{8511}{\mu e} \right)^{7.14} \]

Subgrade Performance Criterion

Traffic – Design Loading - Count

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Subgrade

Traffic – Design Loading - Count
Construction

- Weather influences
- Variability in natural materials for Fill, Layer works and Surfacing
- If Recycling (In-situ stabilisation) – can we really see what there is in the pavement?
- Quality
Variability / Assumptions / Uncertainty

- SG Consistency: Variable
- SG Evaluation: Assumption
- SG Modelling: Uncertain
- SG Strain Criteria: Assumption
- Traffic Counts: Uncertain
- Traffic Spectrum: Assumption
- Construction: Variable

Pavement Evaluation

The designed and constructed pavement is then tested with a FWD!
Pavement Evaluation

Using the FWD some Engineers are able to calculate (to the minute) when the pavement will fail !!!!!!!!?????

Load impulse: 57.5 kN or 11.5 t axle load
Impulse duration: 15 to 45 msec
Bearing plate: 300 mm diameter

Geophone for load impulse and deflection measurements

Result for the contractor

$$$$$$ millions
(in the case of Hybrid and PSMC)

to re-construct a section of road that could perhaps fail some time in the future
But let’s get real

What is the major contributor of pavement failure??

Water, Water Water

How much attention do we give to: drainage, lateral support, shoulder seal, etc. ??