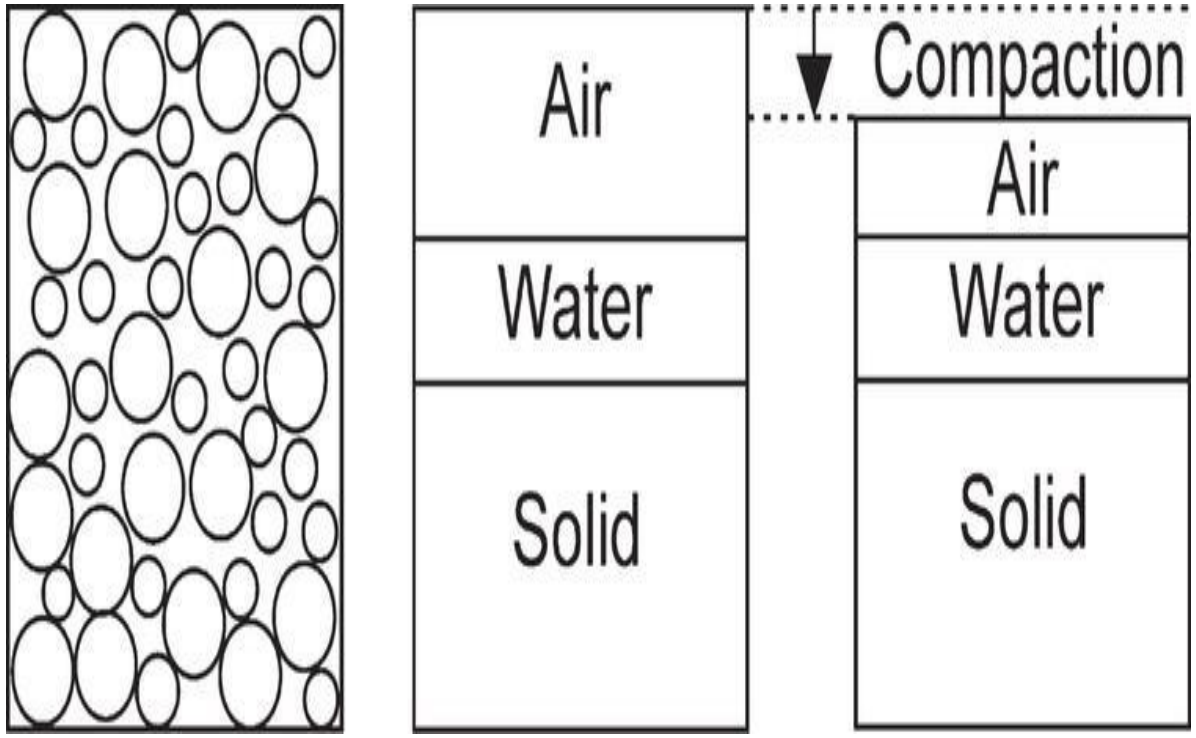
PLATEAU DENSITY TEST ANALYSIS

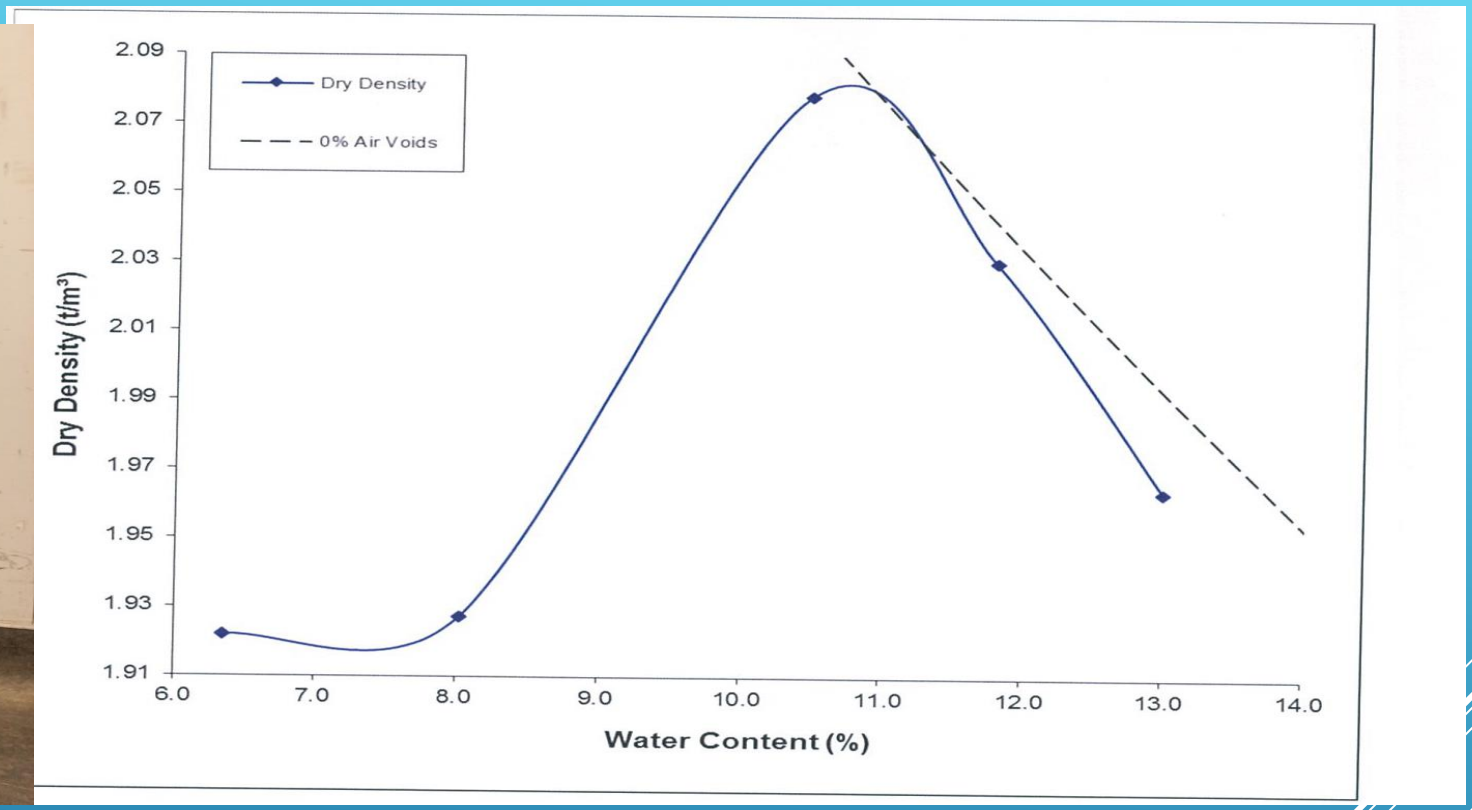
PRIT Analysis

COMPACTION

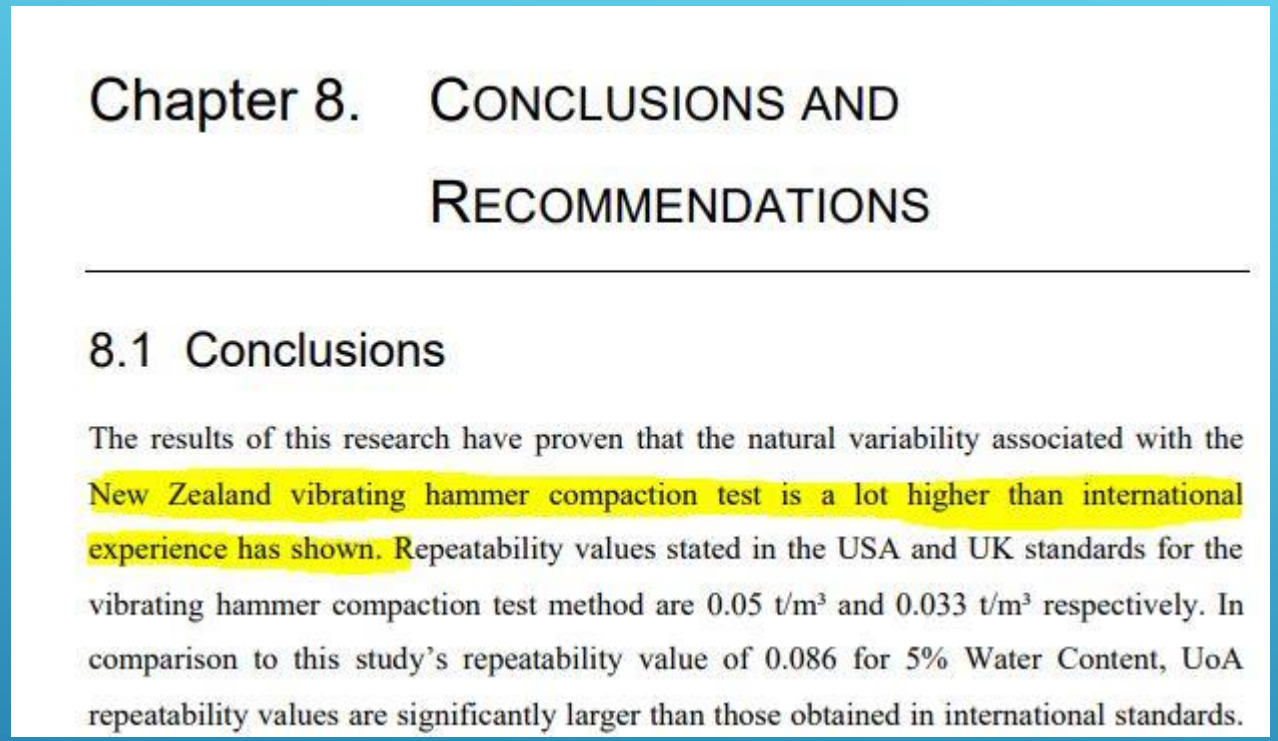
Compaction is a process of mechanically increasing the density of soil to improve:-

- **load bearing Capacity**
- **Increases friction between particles**
- **Reduce settling of soils**





MAXIMUM DRY DENSITY TEST



Chapter 8. Conclusions and Recommendations

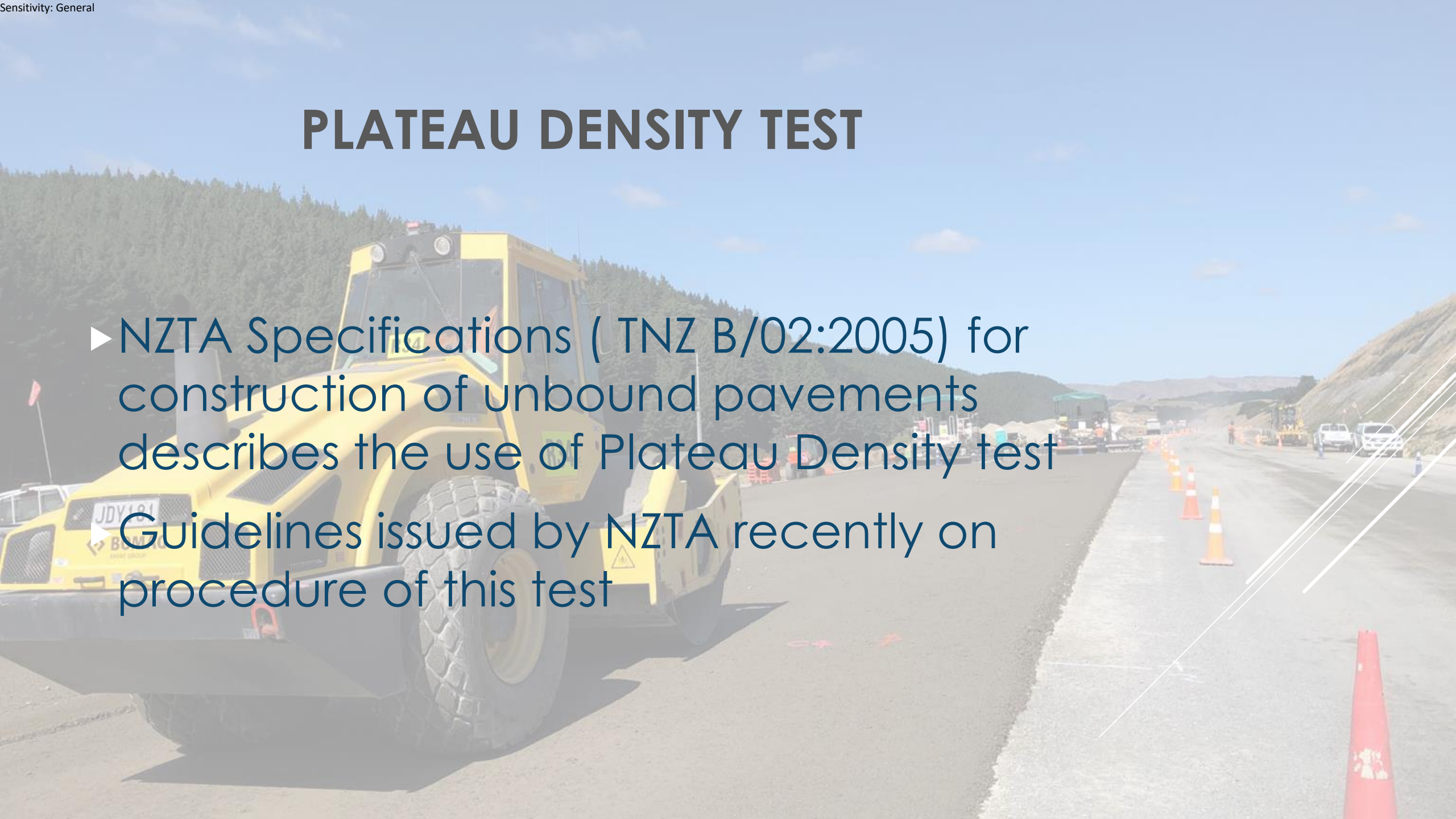
8.1 Conclusions

The results of this research have proven that the natural variability associated with the New Zealand vibrating hammer compaction test is a lot higher than international experience has shown. Repeatability values stated in the USA and UK standards for the vibrating hammer compaction test method are 0.05 t/m³ and 0.033 t/m³ respectively. In comparison to this study's repeatability value of 0.086 for 5% Water Content, UoA repeatability values are significantly larger than those obtained in international standards.

DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING, UNIVERSITY OF AUCKLAND

Investigation of the Variability in the Results of the NZ Vibrating Hammer Compaction Test

PLATEAU DENSITY TEST

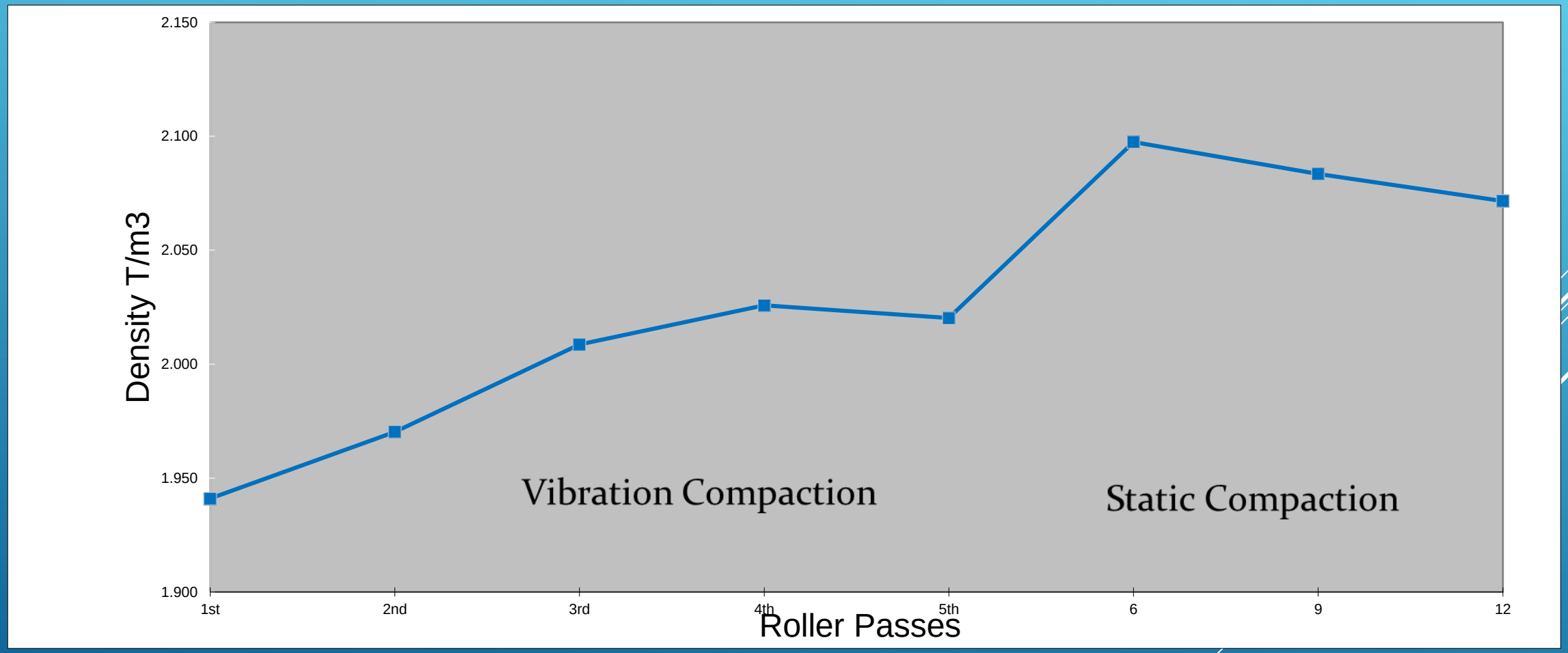


- NZTA Specifications (TNZ B/02:2005) for construction of unbound pavements describes the use of Plateau Density test
- Guidelines issued by NZTA recently on procedure of this test

WHAT IS PLATEAU DENSITY TEST

Plateau density test is a field test which can either be used to determine number of passes required by a roller or combination of rollers to achieve target density, or to determine maximum compactable density of a material under certain construction plant

PLATEAU DENSITY TEST



FACTORS INFLUENCING PLATEAU TEST

- Layer thickness
- Amplitude of Vibration
- Weight of the Roller
- Water content of material

PRIT ANALYSIS

It is a simple numerical analysis which can quantify the interaction between material compactability and rollers .

While Plateau Test gives us maximum density and roller passes, PRIT analysis examines the validity of the test and provides indicators of material performance

HOW TO PERFORM PRIT ANALYSIS ?

P - ANALYSIS

P- analysis is a percentage of plateau density achieved on site to the Solid density or Maximum dry density achieved in the lab

$$P_{sd} = \frac{PLATEAU\ VALUE}{2.7} x\ 100$$

OR

$$P_{mdd} = \frac{PLATEAU\ VALUE}{MAXIMUM\ DRY\ DESNITY} x\ 100$$

R - ANALYSIS

R- analysis is a value obtained by division of Peak density to total roller passes

$$R = \frac{Plateau\ density}{Roller\ passes}$$

I - ANALYSIS

I- analysis is a compaction index increase

$$I = \frac{Plateau\ value - minimun\ \ density\ value}{minimum\ density\ value} x\ 100$$

T - ANALYSIS

R- analysis is a measurement layer thickness reduction due to compaction effort

T = $Uncompact\ layer\ thickness - compactact\ layer\ thickness$

P- PLATEAU

R- ROLLER

I- INDEX OF COMPACTION

T- THICKNESS REDUCTION

RECOMMENDED RANGES

P_{mdd} - 95 to 102

P_{sd} – 80 to 85

R - Any

I - Any

T – approx 50mm if placed according to NZTA granular layer specification

CONCLUSION

- PRIT analysis interprets materials response to compaction in a simple easy to understand numerical figures
- It is a useful tool for Designers and Engineers to evaluate performance of a material under certain rollers
- Designers can request pre construction compaction trials to specify PRIT numbers as density targets
- Recorded information can also be useful in future to understand pavement failures and in pavement rehab designs

QUESTIONS ?