Mod C.

Benefits of Modified “C” grading in unbound and stabilised pavements

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Our Future State
Advancing Queensland’s Priorities

- Create jobs in a strong economy
- Give all our children a great start
- Be a responsive government
- Protect the Great Barrier Reef
- Keep Queenslanders healthy
- Keep communities safe

Queensland Government’s objectives for the community
Agenda

1. Issues with our current specification
2. Background
3. The changes
4. Confirmatory testing
5. Completion
What are the issues with our current specification?

• When we reviewed the specifications and products used by districts we found a number of issues.

• The materials typically followed the bottom of the grading curve giving a very bony permeable material. Such material is prone to fail when it gets wet, that is, it is not resilient.

• Most contracts specify Linear Shrinkage (LS) rather than Plasticity Index (PI). The precision of LS is much better at low values than PI.

• In the south east districts they only specify a minimum LS in about 30 percent of projects, while in the remainder of the state a minimum LS of 1.5 percent is routinely required (> 80 percent of projects).
Background

• Mod C is an outcome from the NACOE Project “P4 structural performance of Unbound Granular Materials.”

• The object of the Mod C work is to improve the specification to provide a more resilient paving material, by increasing the fines content of the standard C grading and significantly narrowing the grading envelope.

• Associated with this work, a number of other changes are proposed; linear shrinkage only (not PI), 100 percent modified compaction (rather than 100 percent standard) compaction.

• As a consequence of this work some other changes will be required, for example, what is the Degree of Saturation (DOS) value for a pavement compacted to modified compaction.
“C” and Mod C grading envelopes
Consequential changes

As a consequence of this work some existing requirements will be removed.

- Due to the narrower grading envelope the 1/3 rules will no longer be relevant, so will be removed.
- All references to PI will be removed and replaced with equivalent LS requirements.
- California Bearing Ratio (CBR) is no longer required for Mod C compliant material when programmed to be compacted to 100 percent modified compaction.
The other issues

As a consequence of this work some other changes will be required.

• What is the appropriate DOS value for a pavement compacted to modified compaction?

• What is the appropriate minimum LS value. (1.5 percent, 1.0 percent, 0.5 percent, or no limit).

• Currently under the Quarry Registration System (QRS), quarries are not permitted to import fines, this will now be permitted. Some changes to QRS are required.
Benefits to the department

• The major benefit of using Modified C material is a very significant (30-50 percent) reduction in pavement maintenance costs.
• Modified compaction with Mod C results in reduced permeability, increased strength and improved surface life.
• In the long term, a significant improvement in strength when the pavement requires rehabilitation using foam bitumen stabilisation.
Testing programme

• The appropriate DOS value for a pavement compacted to modified compaction is 70 percent (that is an increase of 5 percent).

• What is the appropriate minimum LS value for a specification grade materials (1.5 percent, 1.0 percent, 0.5 percent or no limit).
  - The quarry industry would like no limit.
  - We are currently undertaking further testing, but likely outcomes are still open.

• As specification compliant Mod C material compacted to 100 percent modified compaction will always easily meet the specification CBR requirements, CBR testing requirements will be removed for such materials.
Work to be done to complete on time (end of 2019)

- Testing completed in May 2019.
- To publish in November 2019, we must have a completed and agreed final specification by early October 2019.
- A final exposure draft is expected to be complete by early June, for final review.
- Review Process
  - 1st Internal PNG Review
  - 2nd Internal TMR Review (Districts, Engineering & Technology, RoadTek)
  - 3rd Wide Industry review (Quarry, Consultants, Local Authorities)
- Final consultation June to October 2019 - Districts, Consultants, Contractors, Peak Bodies, Quarries, Local Government Authorities.
Thank you
and stay connected

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