Asphalt Harmonisation Workshop

Presented by

Hyder Consulting

With

DTMR – Engineering & Technology

And

AAPA Qld

Asphalt Harmonisation Workshop

- Opening address by Peter Evans, PMG
- Overview and direction by Rob McGuire, AAPA
- Workshop structure & format by Rob Brown, Hyder

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❑ *Workshop Purpose:*

To inform AAPA members about the purpose, scope, benefits and status of ICDCS Project 3.1 so that they are subsequently able to assist DTMR to harmonise their and RMS's Asphalt Procurement Model (APM).

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❑ *Workshop Objectives:*

- Describe the journey that DTMR has embarked upon to deliver more for no more;
- Clearly establish the intended benefits and the issues & risks associated with harmonising DTMR's & RMS's Asphalt Procurement Model (APM).
- Align on an approach that will deliver the required project outcomes and benefits, outstanding project issues and risks;
- Discuss the timetable and resources required to implement the proposed APM changes;
- Set up an agreed (collaborative) framework for future meetings and activities;

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❑ Workshop Structure & Format

- ➢ Information will be presented on power point slides
- ➢ Questions and discussion are encouraged
- ➢ The timetable for this workshop is as follows:

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Time	Activity	Expected Outcomes
1.00pm	• Set up: o Logistics o Introductions o Welcome & opening comments by Peter Evans o Overview and direction by Rob McGuire AAPA Q Chairman & Strategic Alliance Board Member o Robert Brown regarding the workshop structure & format	• **Clear expectations for the Session** • **Everyone knows how they can contribute**
1.20pm	• Peter Evans to summarise the journey that DTMR has taken in 6 months with ICDCS Project 3.1 • Andrew Cramp to explain Hyder's role in ICDCS program and APM Project 3.1. • Greg Wright to overview the project outputs that Hyder has delivered during the past 6 months.	• **Everyone is up to speed** • **Shared understanding of the project**
2:00pm	• Greg Wright to present: o An overview of RMS's Asphalt Procurement Model o The anticipated project benefits and outcomes o The project stakeholders o The project risks o The outstanding project issues	• **Expected project participants, benefits, outcomes, risks and issues are clearly understood**
3.00pm	Afternoon Tea	
3.30pm	• Work groups to discuss selected project issues. • Work groups to workshop and report on: o Stakeholder Engagement and Interaction o Project Delivery Timetable o Project KRA s and KPIs o Resources required to close out issue	• **Focus areas established** • **Ownership of issues established** • **Action Plan Developed**
	• Where to from here	• **Clear way forward**
5.00pm	**Close**	

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What is ICDCS?

Overview by Andrew Cramp, Hyder

ICDCS?

Independent – exemption from reliance on, or control by others

Catalyst – someone that encourages progress or change; creates a reaction without being consumed in the process

Differential – making a distinctive difference

Cost Savings – through innovation, revised TPSGs or cost avoidance

ICDCS Project 3.1 – Asphalt Procurement

Hyder Catalyst Greg Wright Principal Engineer **DTMR Project Lead** Peter Evans DCE Pavements, Materials & Geotechnical	**Description** Prepare a business case & identify benefits, limitations and risks associated with DTMR adopting RMS's asphalt procurement model. Technical comparison of QLD & NSW test methods. Comparison of IMU and HEA mix designs & insitu AC.
Cost Savings	
NSW typically 10% less. More than $20m (estimated) over three years.	Ownership of mix design passes from DTMR to supplier Reduced pavement permeability Harmonisation between QLD & NSW specifications
Key Elements	
Agreement with AAPAQ by June 2013	1. Extended warranty on asphalt (90days -> up to 2 yrs) 2. Incentives/penalties for increased compaction 3. Paving efficiencies through removal of waterproofing seal

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RMS ASPHALT

PROCUREMENT MODEL

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WHAT DO WE MEAN BY THE WORDS:

“ASPHALT PROCUREMENT MODEL”?

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Asphalt = Bituminous binder mixed with mineral aggregates.

Procurement = The act of obtaining or buying goods or services.

Model = A legal framework or business system.

RMS's **A**sphalt **P**rocurement **M**odel involves the following activities:

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1. Scoping the work

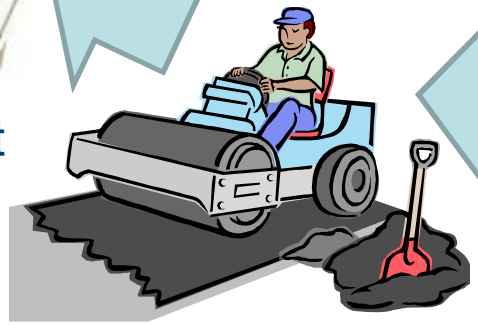
2. Value Engineering

3. Inviting Tenders

4. Tendering

5. Contract Award

6. Mix Design



7. Supplying Asphalt

8. Payment

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1. Scoping the asphalt paving work which involves defining:
   - What has to be done where
   - The what and where are usually defined on drawings and specifications
   - We will overview and contrast RMS's heavy duty dense graded asphalt specification (R116) with MRS31 and MRTS31 later today.
2. Inviting suppliers to price the work via one of the following methods:
   - Advertising the work in the press and on the NSW eTendering site
   - Seeking EOI from suppliers and shortlisting a few to submit bids
   - Preselect 3 suppliers to submit tenders for the work
   - Choosing one supplier (either the local Council or RFS) to price the work

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3. Tendering for the Work

- If the project has been designed before bids are invited, the supplier will be given a bill of quantities and design drawings and specifications that define **what** has to be done **where** using **which** processes and work methods.
- If the project is either D&C or DCM, the supplier will normally be required to develop a tender design so that it can accurately price the project and RMS knows what it will receive from each tenderer.
- If the project scope is not defined or there is not enough time to procure the project via the above methods, RMS will seek partners to help it develop a concept design and estimate the cost of the project and deliver the project.

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4. Selecting the Preferred Supplier
   - The preferred suppliers may be either:
     - An RX prequalified contractor (if the project involves building a new road)
     - A Class A paving contractor (if the project is predominately AC paving)
     - RFS or a Council or a developer if the contractor is sole sourced
   - The procurement process is slightly different for each of the above supplier types

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5. Awarding the work
   - ❖ The form of agreement depends on the supplier and the type of work:
     - ➢ If the supplier is a Council and the work is carried out on a regional road then the agreement will be in the form of a Regional Road Funding Agreement)
     - ➢ If the supplier is sole sourced then the agreement will in the form of a single invitation contract.
     - ➢ If the work is to be carried out by a contractor then the agreement will be in the form of a major (C61) or minor (C62) work agreement.

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6. Project Delivery
   - ❖ it is very rare In NSW for a Paving Contractor or an Asphalt Manufacturer to be the principal contractor.
   - ❖ Accordingly, it is common for asphalt manufacturers and paving contractors are invariably subcontractors.
   - ❖ Approximately half of the asphalt procured by RMS is delivered by RX contractors who subcontract asphalt paving work to asphalt suppliers.
   - ❖ About half is delivered by RMS's commercial division, RFS, which purchases ex bin asphalt and also subcontracts paving work to asphalt panel members
   - ❖ 5 to 10% of the asphalt procured by RMS is delivered by Councils and developers who also subcontract asphalt paving work to asphalt suppliers

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- In NSW:
  - Asphalt manufacturers are not registered by RMS
  - The asphalt manufacturer certifies the design mix conforms to specification
  - The principal considers and approves the nominated mix design
  - Asphalt pavers must be prequalified to class A
  - Pavers must warrant their work from the date the work is completed for the period stipulated in the contract.

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WHAT ARE THE MAIN DIFFERENCES BETWEEN MRTS31 & R116?

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OUTSTANDING PROJECT ISSUES

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- Should DTMR adopt the criteria in R116 or retain its existing criteria?
- Some DTMR registered mixes do not conform with the mix design criteria in R116.
- Should DTMR continue to perform limit testing and/or register mixes?
- Should DTMR switch to AR450 binder as RMS has done?
- Do mixes that conform to R116 outperform those that conform to MRTS31?
- Some suppliers have had no exposure to R116.
- Which Q tests are to be retained and which are to be aligned with the corresponding AS or AG:PT test method specified in R116?

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- Few Queensland laboratories are NATA accredited to perform all the AS and AG:PT test methods specified in R116
- Does test method Q311 return the same air void content as AS2891.8?
- Some quarries may not be able to supply aggregate if DTMR adopted RMS's aggregate requirements.
- Mixes compacted with 50 blows of the Marshall hammer contain fewer air voids than those compacted using 120 cycles of gyratory compaction.
- Does DTMR's mix design method return lower binder contents and lead to higher insitu air voids than the mix design method specified in R116?

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PROJECT OUTCOMES

Project Outcomes

- A fourfold increase in the defect liability period.
- Lower insitu air void content of dense graded asphalt.
- A sustainable improvement in the quality and durability of asphalt paving.
- A sustainable reduction in the cost of maintaining the asphalt pavements.
- A sustainable reduction in the insitu permeability of compacted DGA.
- Immediate deletion of the waterproof seal below DGA wearing courses.
- Improved savings through consistent testing methods between states.
- Alignment of DTMR procedures with current resource constraints.
- Opening up of the asphalt supply markets as harmonisation progresses.

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KEY RISKS

HARMONISATION PROJECT RISKS

- Suppliers may increase prices to cover the cost of warranting mixes that conform to DTMR mix design requirements.
- DTMR may not achieve the savings that it hopes to make because it retains parts of its existing asphalt procurement model e.g. mix design
- Mixes that conform to MRTS31, Cl. 10.3 may rut more than mixes that comply with R116, Cl.2.2.2
- DTMR may not be able to resource the design mix testing program demanded of it by industry resulting in project delays

HARMONISATION PROJECT RISKS

- DTMR may not be able to resource the administrative functions required of it to register and monitor the performance of asphalt
- Allowing suppliers to continue practices such as adding lime to fillers prior to testing them is likely to result in poor mix performance .
- The proposed changes may not lead to the lower insitu air voids
- Deletion of the waterproofing seal may lead to stripping due to ingress of water through permeable asphalt wearing courses.
- The changes may cause some suppliers to withdraw from the market which would reduce competition and potentially lead to higher asphalt prices

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AFTERNOON TEA BREAK

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ISSUE: MIX DESIGN

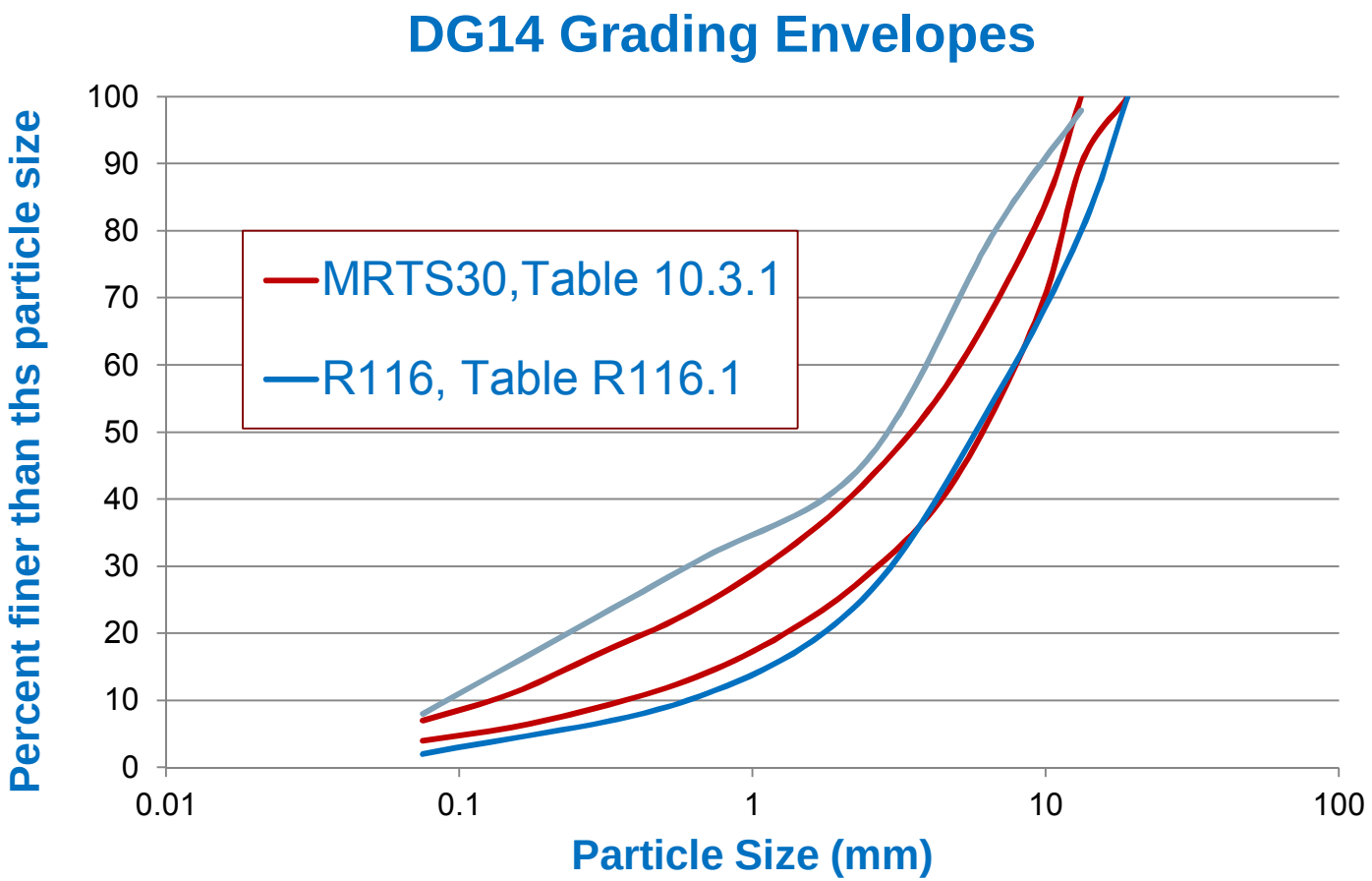
DTMR's Volumetric Mix Design Criteria:

Organisation	DTMR
Specification	MRTS31A
Mix Description	DG14HP
Binder Type	A5S
Effective Binder Content	≥ 10% by volume
Sample Preparation	Q305 (50 blows)
Air Voids in Design Mix	3.5% to 4.5%
VMA in Design Mix	13% to 17%
VBF in Design Mix	63% to 83%

Let's compare the above volumetric criteria with RMS's

Organisation	DTMR	RMS
Specification	MRTS31A	R116
Mix Description	DG14HP	AC14 Binder Course
Binder Type	A5S	AR450
Binder Content	≥ 10% by volume	4.8% to 6.2% by mass
Sample Preparation	Q305 (50 blows)	T662 (120 cycles)
Air Voids in Design Mix	3.5% to 4.5%	3.0% to 6.0%
VMA in Design Mix	13% to 17%	≥ 15%
VBF in Design Mix	63% to 83%	Not specified
Binder Film Index	Not specified	≥ 7.5µm
Filler to Binder Ratio	Not specified	0.8 to 1.2

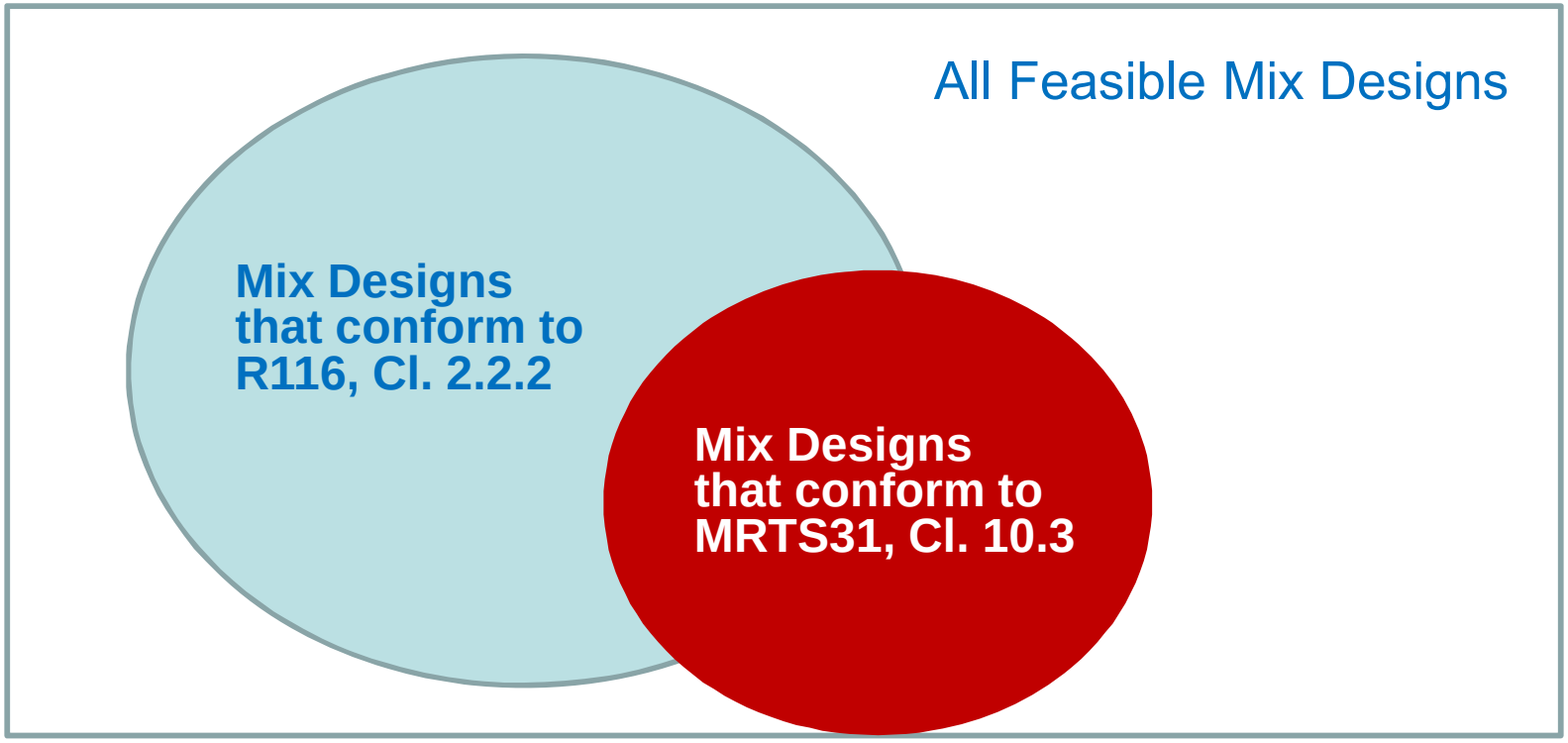
Issue: Design Mix Grading



What does this slide and the previous suggest?

Issue: Mix Design Criteria

Venn Diagram of Mix Designs



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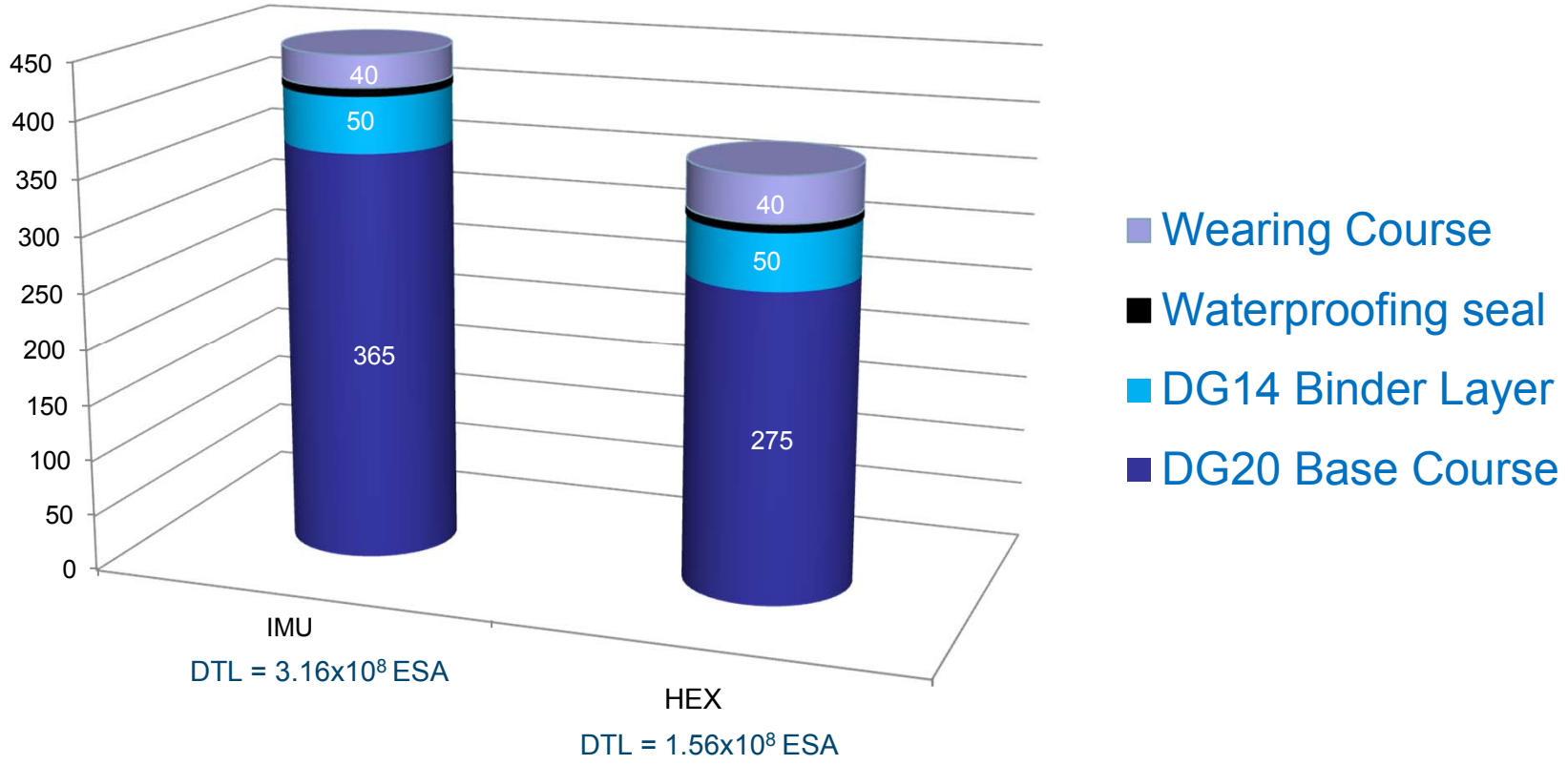
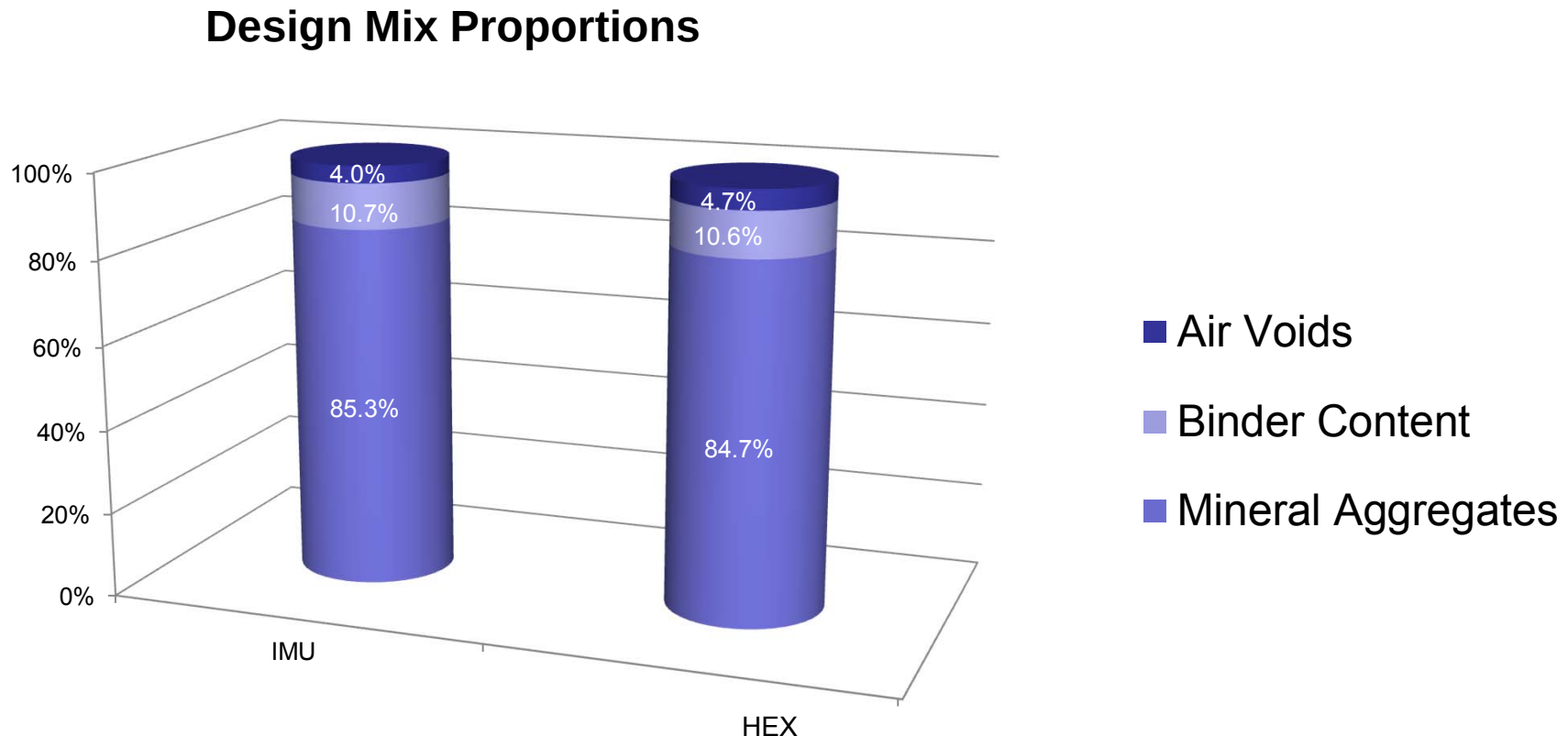
A TALE OF TWO MIXES

Background

Main Carriageway Pavement Structures



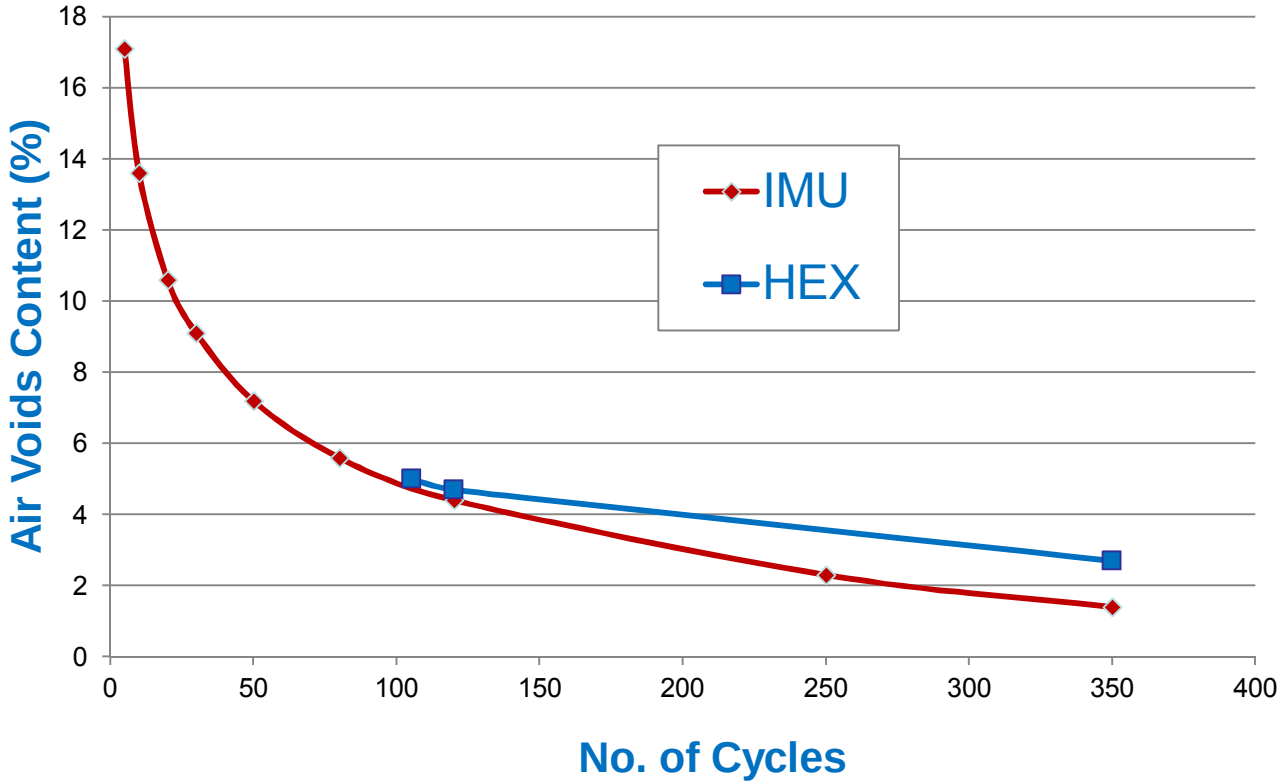
Case Study: IMU versus HEX DG14



Note: RMS would reject the IMU mix and vice versa

Case Study: IMU versus HEX DG14

Gyratory compaction curve



Note: RMS would reject the IMU DG14 mix design as R116, Cl. 2.2.2(a)(ii) specifies ≥ 2% air voids after 350 cycles

Case Study: IMU versus HEX DG14

Property	Units	IMU DG14HP	HEX DG14-AR450
Marshall Stability	kN	15.9	*
Modulus @ 25°C, 5% air void	MPa	1767	4812
Fatigue Endurance @ 400µs	kcycles	240	27
Dynamic Creep	Pulses	3081	*
Wheel Track Rut Depth	mm	2.49	*
Permeability @ 7% air voids	µm/s	8	*
Sensitivity to Water	%	100	96
Binder Film Index	µm	7.5	7.9
Filler to Binder Ratio	-	1.2	1.1

* R116 does not require this test to be performed (so it wasn't)

Case Study: IMU versus HEX DG14

- IMU DTL = 3.16×10^8 ESA. Its pavement comprises:
  - 40mm OG14
  - 50mm DG14HP
  - 365mm DG20HM

- HEX DTL = 1.56×10^8 ESA. Its pavement comprises:
  - 40mm SMA14-A15E
  - 50mm DG14-AR450
  - 270mm of DG20

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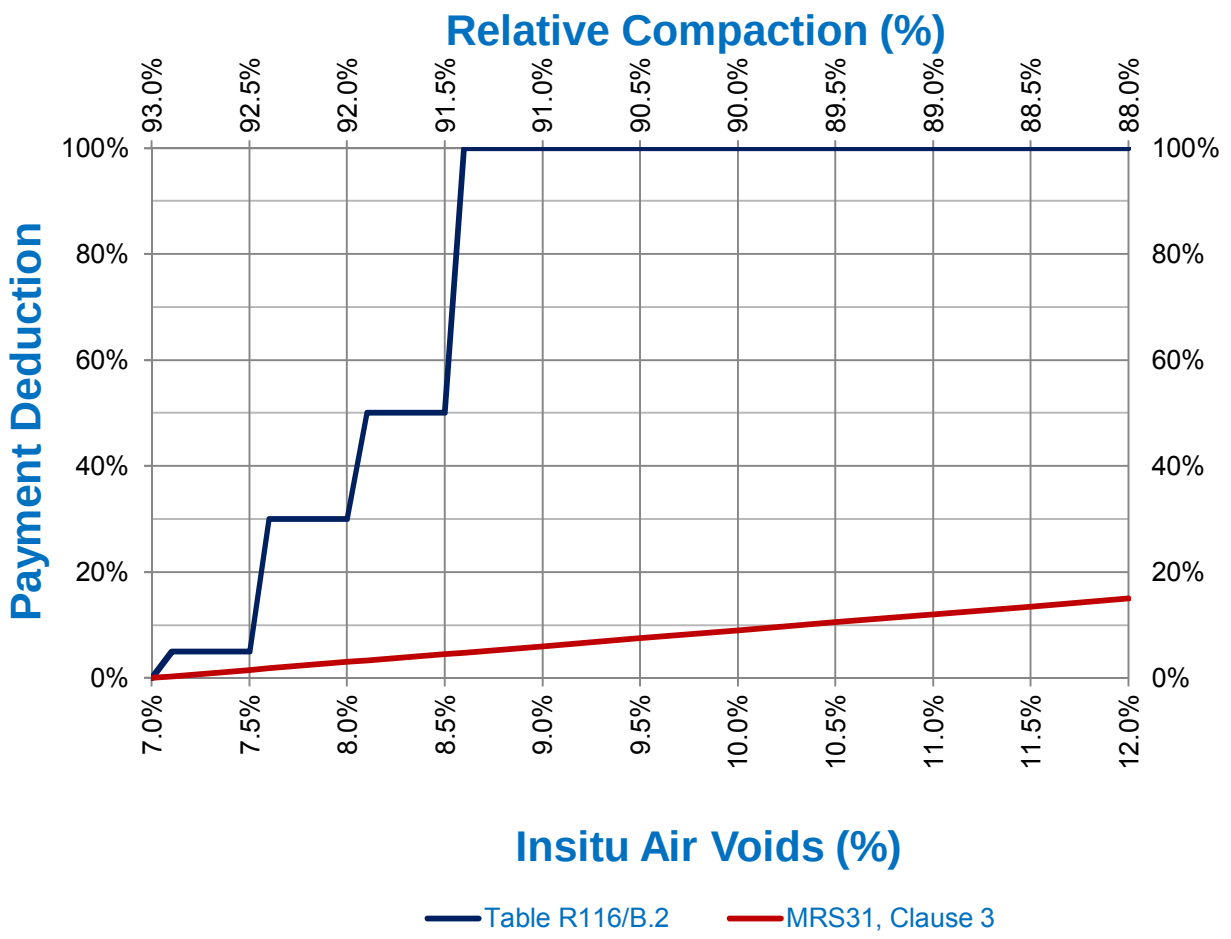
- What did we learn from the foregoing case study?
  1. Some registered mixes do not conform to R116.
  2. Accordingly, some registered mix designs would have to be abandoned if DTMR adopted the criteria in R116
  3. DG14-AR450 has poor fatigue resistance
  4. DG14-AR450 is much stiffer than DG14HP
  5. R116 requires fewer mix design tests than MRTS31

ISSUE: PAYMENT DEDUCTIONS (FOR HIGH INSITU AIR VOIDS)

CHART SHOWING REDUCED LEVEL OF SERVICE DEDUCTIONS



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ISSUE: ASPHALT TESTING PROCEDURES

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ISSUE: AGGREGATE TESTING METHODS

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ISSUE: BINDER TESTING PROCEDURES

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ISSUE: RAP IN WEARING COURSE

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ISSUE: > 15% RAP IN BASE COURSES

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NEXT STEPS?

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- Asphalt technical standards and specifications typically define:
  - Grading, binder type and content
  - Mix and constituent material properties
  - The mix design registration process
  - Manufacturing and paving processes
  - End product conformance requirements
  - Deductions from payments for non conforming asphalt
  - Incentive payments for exceptional paving work
  - Removal and replacement criteria

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- Technical standards and specifications generally do not define:
  - Variations
  - The Quantity of Work to be performed
  - Invoicing and Payment
  - The required completion date
  - Details of the Supplier's Warranty
  - The duration of the defect liability period
  - Etc.

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WRAP UP WORKSHOP