

The Perfect Specification... (and other myths)

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Overview

- Why do we write specifications?
- What do we want?
- How do we know we got it?
- Philosophy of testing
- Trust but verify



Why do we write specifications?

- To establish expectations
- To make sure we get what we want
- To decide whether to pay
- To set up remedial actions



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What do we want?

- Sustainable and resilient
- The right dimensions
- Stable
 - Support system
- Long lasting for the:
 - Environment
 - Loading
- Value for money



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RGV Aerial Photography

What do we want?

- All of the above from a material that:
 - Is manipulated on site
 - Changes properties over time
 - Moves with water and heat
 - Is abused all through its life



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Source unknown

What then is important...

- Design and details
- Materials and mixture
- Workmanship



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Materials and mixture

- Materials and Proportions
 - Constructability
 - Long life

- Performance Engineered Mixtures
 - Workability
 - Transport
 - Aggregate stability
 - Cold weather
 - Strength
 - Shrinkage



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Mixture – Affected by...

	Transport	Strength	Cold weather	Aggregates	Shrinkage	Workability
Lab	w/cm, Binder	w/cm	AVS, SCM	Mineralogy, SCM	Paste content	Water, WRA
In front	w/cm, Binder	w/cm	AVS	-	-	Water, WRA
Behind	-	-	AVS	-	-	-
Later	-	-	-	-	-	-

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Mixture – Indicated by...

	Transport	Strength	Cold weather	Aggregates	Shrinkage	Workability
Lab	Resist	Comp / Flex - w/cm	SAM, Pot, SCM	R80	Paste content	Vkelly, Box
In front	Resist, w/cm	Comp / Flex - w/cm	SAM, Pot	-	Paste content	Slump
Behind	Water and air					
Later						

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The Slab – Affected by...

	Consolidation	Segregation	Cracking	Skid Resistance	Smoothness
Lab	Workability	Workability	Shrinkage	-	Paste content
In front	Workability	-	-	-	-
Behind	Vibration	Vibration	Curing	Texture	Speed / vibration
Later	-	-	Sawing	-	-

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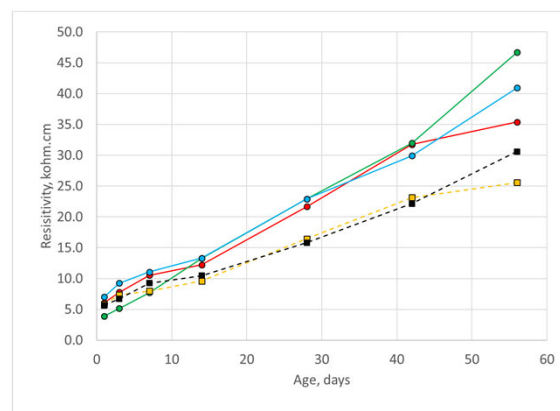
The Slab – Indicated by...

	Consolidation	Segregation	Cracking	Skid Resistance	Smoothness
Lab	Ruler, Float	Eye	Paste content	-	Proportions
In front	-	Need	-	-	-
Behind	Need	Need	Need	Need	RTS
Later	-	-	UPV, MIRA	-	Many

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Philosophy of testing

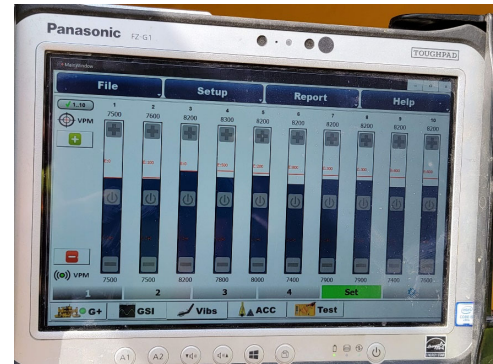
- Pre-construction
 - Will this mixture survive?
 - Extrapolation
 - Calibration
 - Sensitivity to variation
 - Can we get it in place?
 - “Workability”



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Philosophy of testing

- During construction
 - Is this the same stuff
 - Ingredients
 - Dosage
 - What do we measure?
 - Air
 - Water
 - Vibration



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Philosophy of testing

- Post-construction
 - Did we get what we wanted?
 - What about effects of:
 - Sawing
 - Smoothness
 - Curing



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The perfect test

- Fast
- Cheap
- Representative
- Repeatable
- Right

- Meaningful



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Inspection

- Because process matters

- Or is there a test?
- And is it worth it?



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Performance/Prescriptive

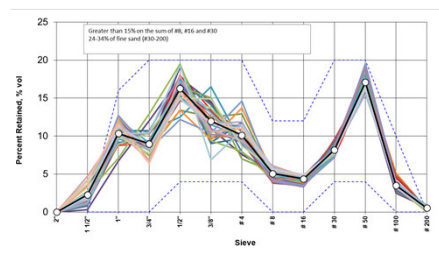
- We want performance
- But sometimes prescriptive is more cost / time effective
 - e.g. w/cm
- Don't do both!
 - e.g. fixed water, cement, admixture dosage and slump



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Performance/Prescriptive

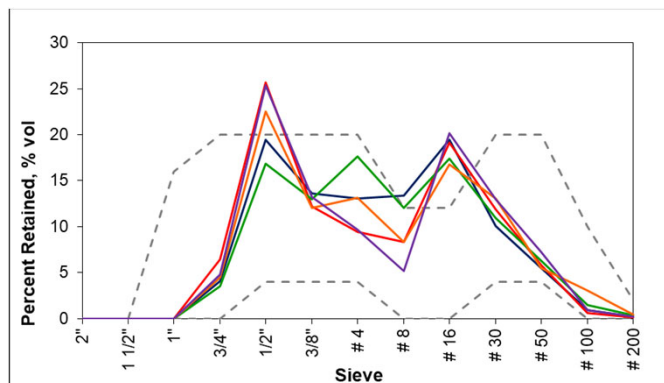
- Do we monitor everything?
- Who owns the risk?
- Is “good enough” good enough



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Performance/Prescriptive

- Do we monitor everything?



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The art of specifications

- Allowing freedom to the trustworthy
- Protecting from the unreliable
- Delivering “nominal” pavements
- Discuss...



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