

# Cold Weather with Hot and Flat Concrete

Honoring Bruce Suprenant Concrete  
Construction Contributions

# Meeting your Heroes

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- ◉ Bruce and Ward
- ◉ Read them when I was a kid (Father was also a concrete addict)

# Contracting is very easy

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- Only need to do 2 things
  - 1. Win Bids
  - 2. Perform work at a profit



# Unwritten Owner Requirements

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- ◉ Shrinkage
- ◉ Curling
- ◉ Cracking
- ◉ Appearance
- ◉ Longevity

# Constructor Requirements

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- ◉ Workability
- ◉ Finishability
- ◉ Setting Characteristics
- ◉ Strength Gain for Stripping and Stressing
- ◉ Cold and Hot Weather

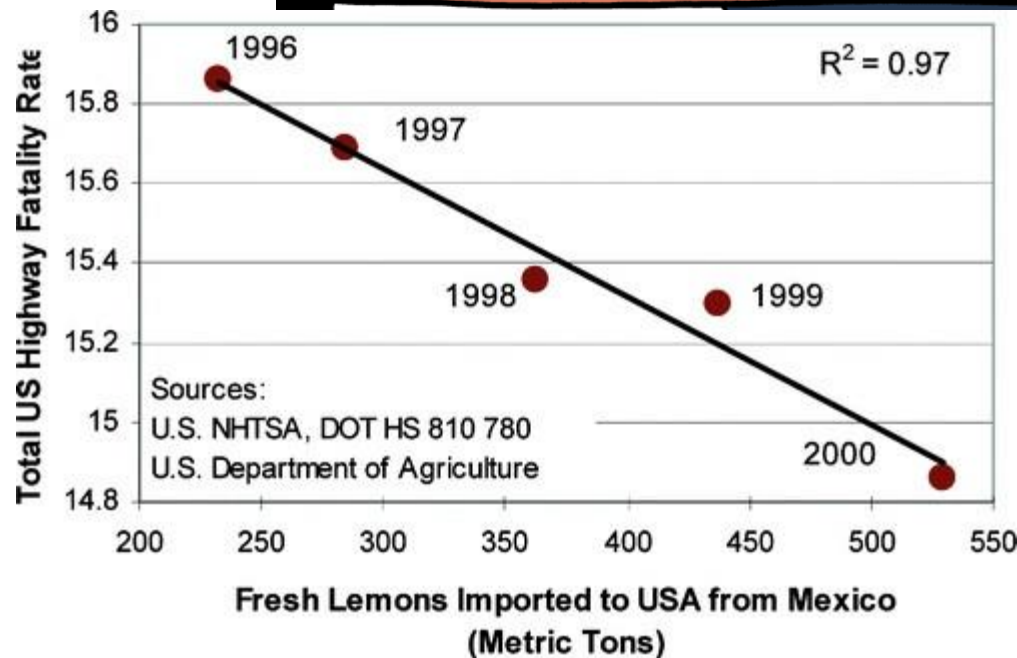
# Managing Risk -

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- ⦿ Repair / Betterment
- ⦿ Design code requirements passed to the Contractor

# The Plural of Anecdote is not data

HOW TO MAKE A SCIENTIST'S HEAD EXPLODE:







# Failures

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- ⦿ A failure occurs for only 2 reasons:
- ⦿ The contractor did not follow the specification,  
or
- ⦿ The specification was in error

Bryant Mather



# “Green Concrete”

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- Producing concrete with a very low carbon footprint has become one of the major goals of the "green" movement. That requires minimizing the amount of portland cement used per cubic yard and using larger than normal amounts of supplementary cementitious materials including slag, fly ash and silica fume.
- Some high profile structures have been successfully built using only a few hundred pounds of portland cement per cubic yard. But the success of some lean mixtures has also lead to one of the most prevalent misunderstandings: The belief that because some concrete producers can supply very lean concrete with acceptable properties in both the plastic and hardened states, all concrete producers can do it.



ASCC and NRMCA

# Checklist for Concrete Producer- Concrete Contractor Fresh Concrete Performance Expectations

Prescription to Performance (P2P) Initiative





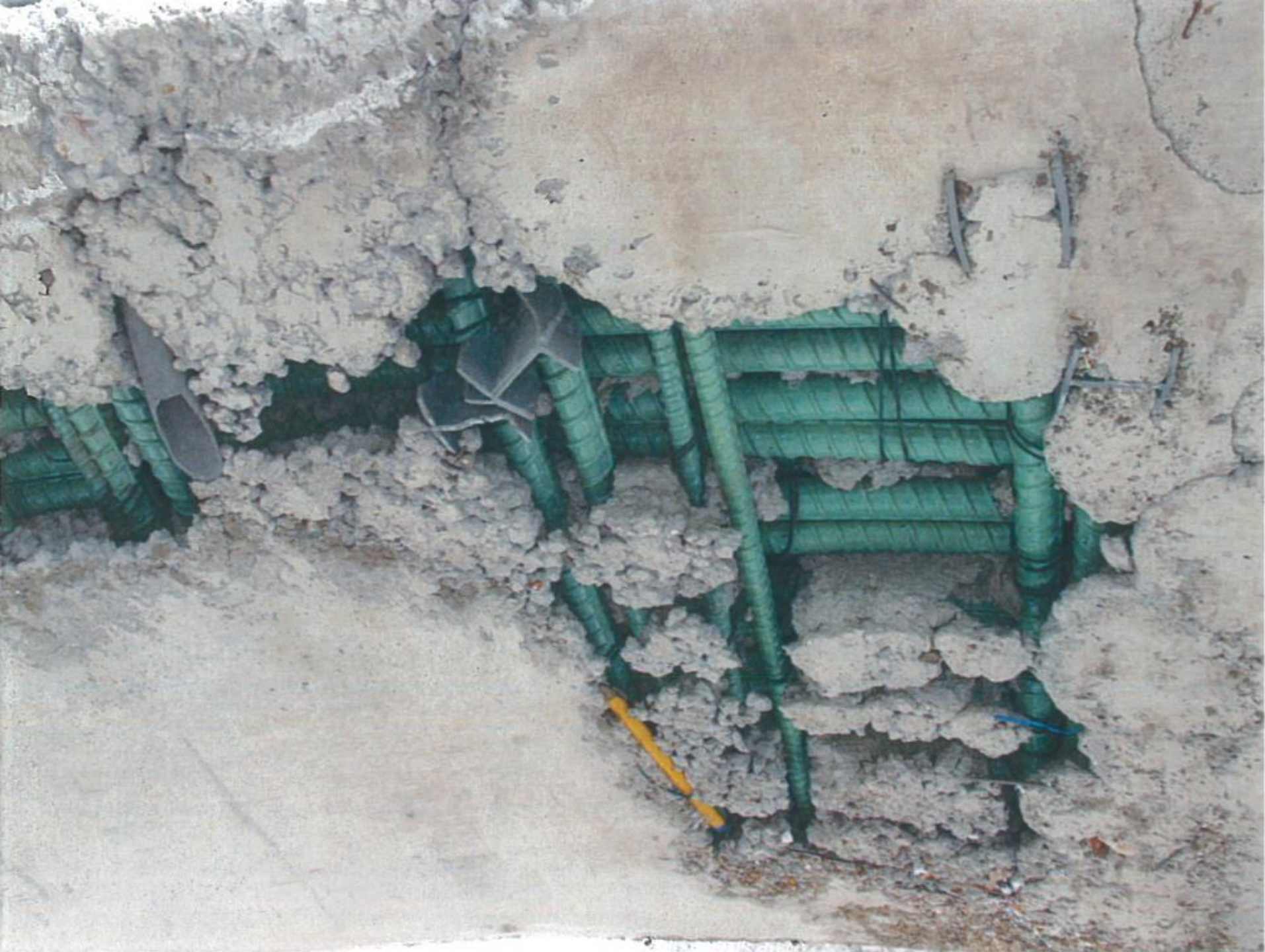
Slump Test

Slump Limits: All concrete shall have a maximum slump of 4 inches, except concrete containing HRWR admixture (super plasticizer): Not more than 8" after addition of HRWR to site verified 2"-3" slump concrete.

- Can't the slumps be as required and proportioned?
- 4" maximum slump is too restrictive.
- Most HRWR are not site added.
- Why is there an 8" maximum if testing confirms the mix performs properly?
- Who know what workability is required best?













# Challenging Orthodoxy with Data

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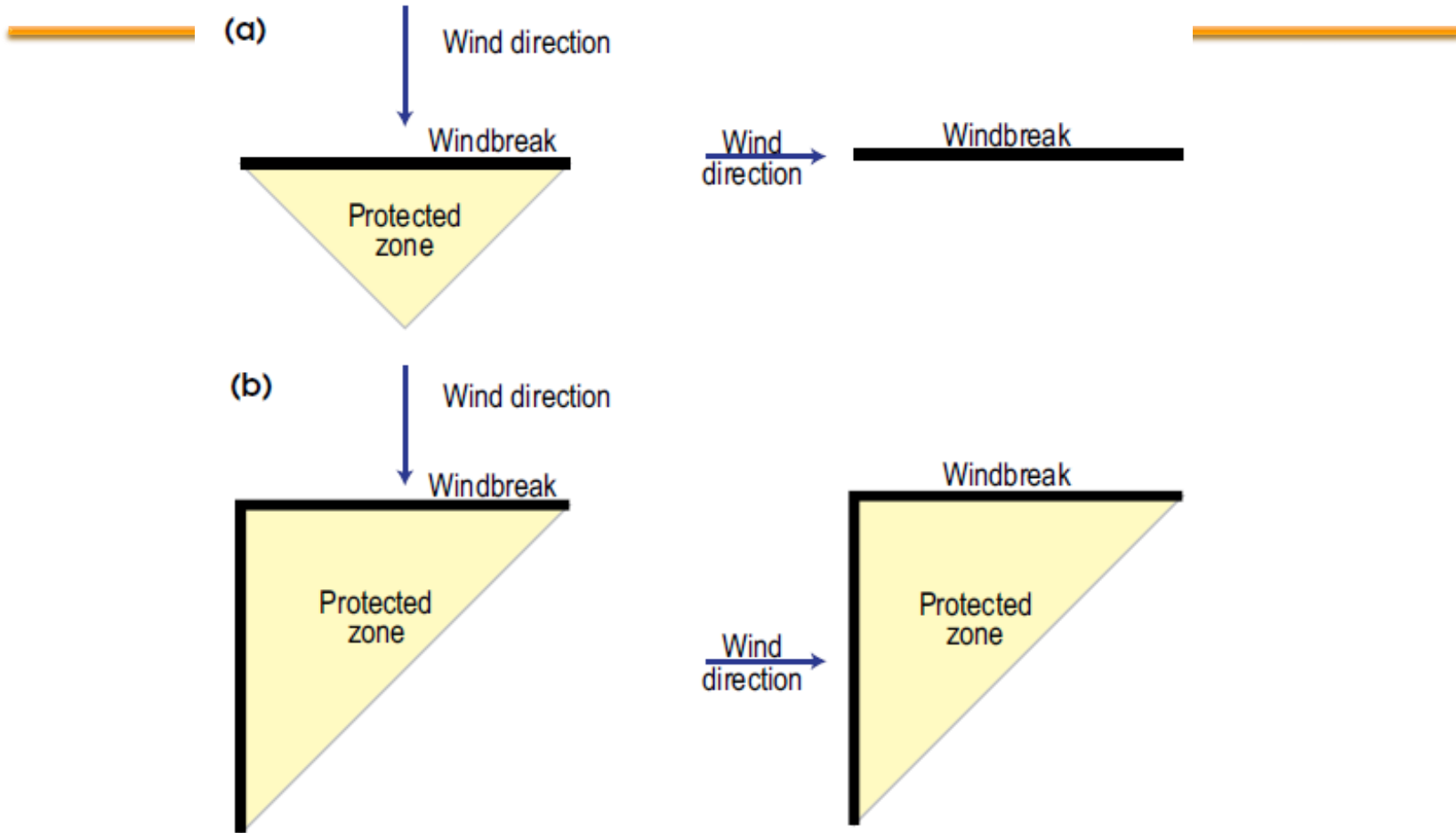


## How to Plan for a Cold Weather Concrete Pour

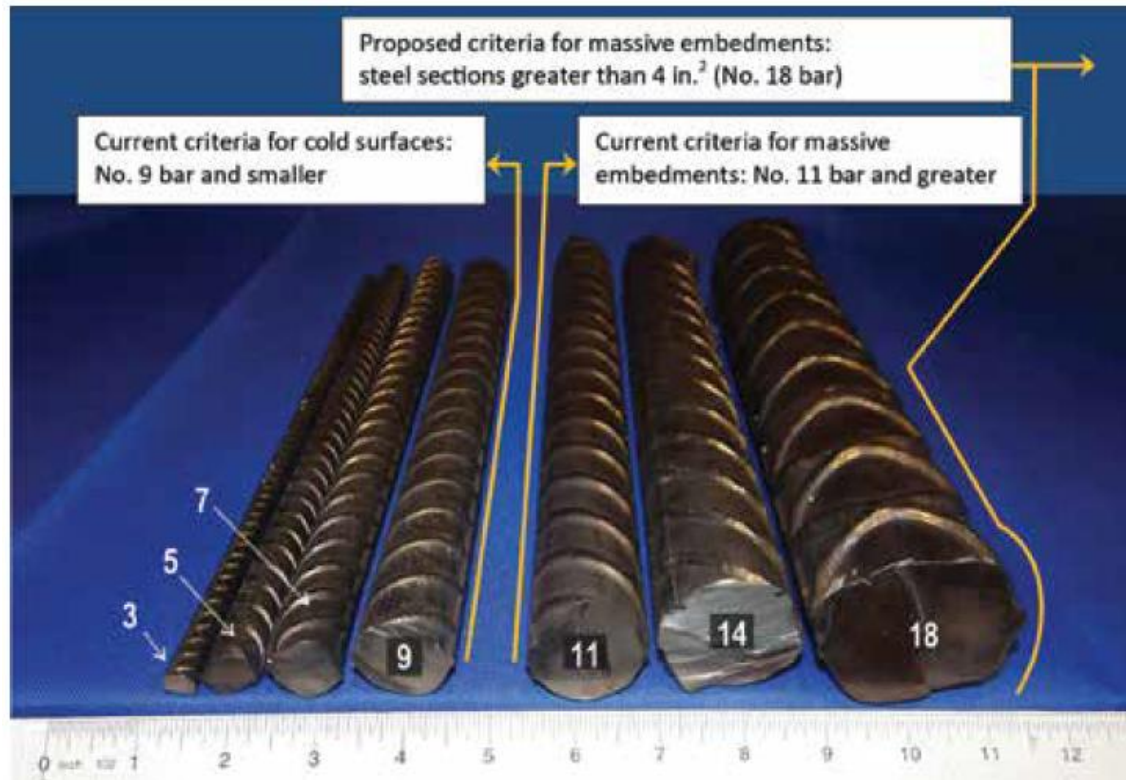
Free Fall of Concrete T

# Tackling Assumptions in ACI Documents

Windbreak type	Leeward wind speed, % of open-field wind speed	Required windbreak height $H$ as a function of protected zone width $W$
Solid	40	$W/4$
	50	$W/7$
	60	$W/13$
20% porous	40	$W/4.5$
	50	$W/6$
	60	$W/13$
40% porous	40	$W/8$
	50	$W/10$
	60	$W/12$
60% porous	40	$W/7$
	50	$W/8.5$
	60	$W/11$



# Massive Embedments - Definition

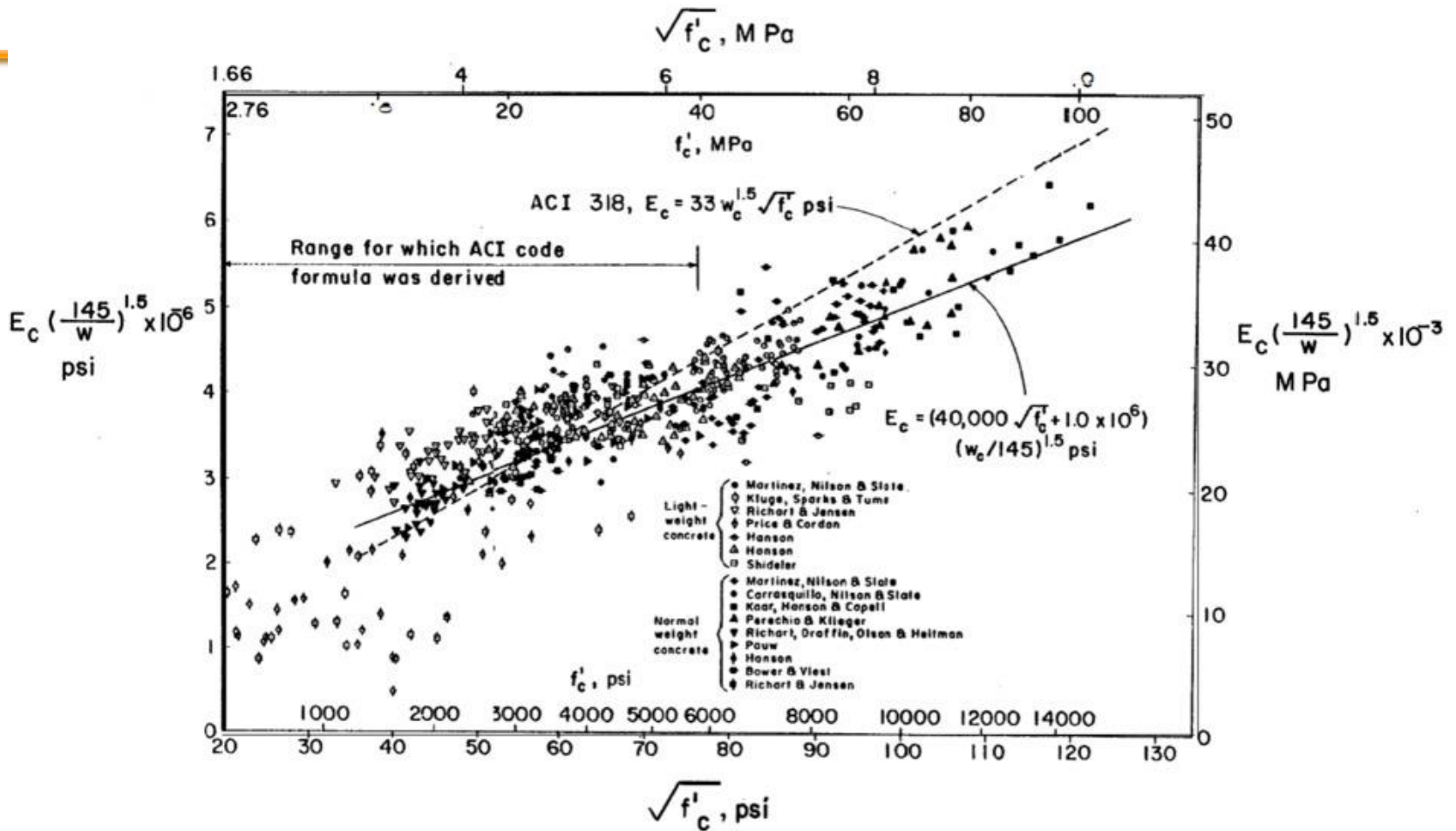




# The Current System for Concrete Specification

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- Specification is prepared which lays out all requirements
- A submittal is prepared to address those requirements
- Testing Laboratories are hired to check what is being supplied is what was submitted.
- There are no problems so everthing is great.











Concrete Exposed to View







**THERE ARE TWO KINDS OF PEOPLE:  
PEOPLE WHO ENJOY HAWAIIAN  
SHIRTS**



**AND BORING PEOPLE**

[quickmeme.com](http://quickmeme.com)