



# ***HOT-MIX ASPHALT QUALITY***

## ***“A Contractor’s Perspective”***

James M. (Jay) Winford, Jr., Ph.D., P.E.  
Prairie Contractors, Inc. – Opelousas, Louisiana USA

LTRC/DOTD – Lafayette, Louisiana – November 2008



**Louisiana Transportation Research Center**

Sponsored jointly by the Louisiana Department of Transportation and Louisiana State University



# *PREFACE STATEMENTS*

- I AM ONLY ADDRESSING QUALITY, AS IT RELATES TO HOT-MIX ASPHALT MATERIALS, PROCESSES AND PAVEMENTS.
  
- THE ONLY MOTIVE OF THIS DISCUSSION IS TO CONVEY TO YOU MY PERSPECTIVE ON QUALITY AND WHY I THINK ABOUT IT THE WAY I DO.

# *PREFACE STATEMENTS*

- 99 PERCENT OF PRAIRIE'S ASPHALT WORK IS BY "LOW BID METHOD". THIS IS TYPICAL FOR INDUSTRY.
- LOW BID METHOD DOES NOT REWARD (OR AWARD) WORK BASED ON QUALITY.
- WE HAVE A METHOD SPECIFICATION THAT COMMODITIZES MY PRODUCT AND PROCESSES.

# *WHAT DOES COMMODIFY MEAN?*

- **COMMODYFY** - to render (a good or service) widely available and interchangeable with one provided by another company.
- So, the DOTD is setting a minimum standard. What is my motive for spending extra dollars to exceed these requirements?

*SO, WHAT DOES QUALITY MEAN  
TO ME (working in the Low Bid  
Environment)?*

**-CONSISTENCY**

**-THAT'S SIMPLY HOW I DEFINE IT.**



# *WHAT NEEDS TO BE CONSISTENT:*

- Incoming Aggregate (gradation and Gsb's).
- Cold Feed Bins Calibrations (weigh bridge and asphalt metering system included).
- Correct Moisture Inputs.
- Consistent Plant production rates.
- Consistent load out processes.
- Consistent silo "holding" times.
- Consistent haul times/durations.
- Consistent discharge from truck to MTV/paver.

# *WHAT NEEDS TO BE CONSISTENT:*

- Consistent Paver Speeds.
- Consistent Roller patters and speeds.
- No stops!
- CONSISTENT TEMPERATURES (PLANT, HAUL, MTV, PAVER, SCREEN AND COMPACTION).

-The Orchestra needs to keep playing together!

- Let us use our “common sense” – can’t test some of these.



## *IF I AM CONSISTENT, THEN*

- I CAN, WITH A GOOD HMA JMF, MEET YOUR SPECIFICATION AND GET PAID!
- THAT'S MY JOB AND THAT'S WHY I'M HERE!



# ***“ECONOMICS 101”***

## ***and How it Relates to Quality:***

- WHERE THERE IS RISK, THERE IS REWARD.
- WHEN RISK IS INCREASED THEN EXPECTATION OF REWARD INCREASES AND VISA VERSA.
- A CONTRACTOR, JUST LIKE THE OWNER, IS GOING TO BE RISK ADVERSE.

# *“ECONOMICS 101”*

- EXAMPLES OF RISK FOR US:
  - How many Accidents can I anticipate?
  - Am I going to get paid (how long will it take to find out? – Timeliness and Transparency of Acceptance).
  - How long will it take for me to get paid.
  - How stringent are the specifications?
  - Will I meet the specifications?
  - Is there a guarantee?
  - What are the unknowns for me?
  
- The level of Risk, over the long haul, will determine the expected return on investment.

# *HOW TO WE (DOTD AND PRAIRIE) MEASURE QUALITY?*

- WE MEASURE THINGS (ENGINEERS ARE VERY GOOD AT MEASURING THINGS)!
- WHAT KINDS OF THINGS DO WE MEASURE:
  - Temperature.
  - Gradation.
  - Aggregate Properties.
  - Laboratory Volumetrics.
  - Pavement Density.
  - Pavement Smoothness and a whole bunch of other things.

# *WHAT DO I THINK IS IMPORTANT TO MEASURE:*

- PAVEMENT DENSITY.
- NOMINAL THICKNESS.
- MICRO AND MICRO SURFACE TEXTURE.
- SMOOTHNESS (But, do we place too much emphasis on this? WHAT IS THE PUBLIC WILLING TO PAY FOR?)
- DURABILITY.

A SMOOTH, WELL COMPACTED PAVEMENT LEADS TO GOOD PERFORMANCE – QUALITY.

# *WHAT IS PWL?*

- PERCENT WITHIN LIMITS (We use to examine our statistical standard deviations.)
- USE OF STATISTICS IS A GOOD THING! (It lets me compare myself to other plants/producers.)
- USE OF PWL IN VALIDATION PROCESS IS NOT A GOOD THING. (Why? I have to have “latitude” to control my materials and process. The incoming materials do vary.)



# *FUTHER COMMENTS ON PWL?*

- YOUR BEST PERFORMING PAVEMENTS HAVE THE BEST PWL VALUES. HENCE, THEY ARE CONSISTENT.
- YOUR BETTER AND MOST PROFITABLE PRODUCERS/CONTRACTORS HAVE THE BEST PWL VALUES. WHY? THEY KNOW THEIR PRODUCT AND PROCESS(es) (AND NOW TO CONTROL THEM) BETTER THEN THE REST.



# *WHAT DOES THE FUTURE HOLD?*

- NCHRP STUDY ON “ALTERNATIVE CONTRACTING METHODS”. USE OF THE FOLLOWING TO AWARD PROJECT:

- BID PRICE.
- HISTORIC COMPLETION RECORD.
- HISTORIC SAFETY RECORD.
- HISTORIC STATISTIC RECORD.
- OTHER QUANTATIVE HISTORY.

*HOW TO SELECT YOUR ROOFING CONTRACTOR?*

# *WHAT DOES THE FUTURE HOLD?*

- P.E. APPROVED HMA JMF WITH LATITUDE TO CONTROL MATERIAL AND PROCESS.
- PRODUCER WILL DEVELOP OWN QUALITY CONTROL PLAN.
- OWNER WILL “GO TO END RESULT”.

*‘Make it in China and bring it over in a wheel barrow!’*

# ACCEPTANCE OF RAP (for Quality):

- We can (and do), for instance, accept RAP at the plant and stockpile separately according to:

- Aggregate Type
- Aggregate Size (Maximum and NMAS)
- Asphalt Content
- Uniformity
- Gradation (from a specific project)
- Size of “milled” particles
- Consistency of AC and Gradation (Standard Deviations)

# WHAT DOES FACTIONATING LOOK LIKE?



RAP Sizing Plant



# WHAT DOES FACTIONATING LOOK LIKE?



RAP Sizing Plant

# *What is Black Base?*





# *What is Black Base?*

- All Virgin = 80 percent 610 road base + 20 percent concrete sand + 2.0 to 3.0 percent 64.22.
- Can Replace up to 50 percent of virgin aggregate with RAP!
- Black Base Pavement Base Section can be thin (as compared to virgin 610 base).
- Faster Construction!
- Great Place to put large RAP particles and they work “great” in this thicker section.

# *What is Shoulder Hot-Rap?*





# *What is Shoulder Hot-Rap?*



## *What is Shoulder Hot-Rap?*

- All Virgin = 80 percent 610 road base + 20 percent concrete sand + 2.0 to 3.0 percent 64.22.
- Can Replace up to 50 percent of virgin aggregate with RAP!
- Material STAYS IN PLACE!
- Fewer accidents = FEWER LAWSUITS!
- Great Place to put large RAP particles and they work “great” in this thicker section.

# *USE OF BLACK BASE AND HOT-RAP SHOULDERS CAN?*

- INCREASE THE QUALITY OF OUR PAVEMENTS AND PROMOTE SAFETY AND LONG TERM COST SAVINGS.
- REMEMBER WE, AS ENGINEERS, MUST WEAR THREE HATS:
  - FINANCIAL ENGINEER.
  - MATERIALS ENGINEER.
  - PAVEMENT ENGINEER.
- LCCA OF ENTIRE SYSTEM TO INCLUDE (1) QUALITY AND (2) ENVIRONMENTAL IMPACT!

## *Remember:*

*I have to know how to do 3 things:*

1. Know specs better than you.
2. Know how to make the “widget” better than you.
3. Plus, figure out how to do the above two while still making a profit!



*So, allow me the following:*

1. Give me “professional” control over HMA JMF’s (with RAP).
2. Let me control my own process (while being checked by you).
3. Let me tell you how to make my product better!

*So, allow me the following:*

4. Help determine the Benefit-Cost Ratio of each Specification Requirement.

*LET ME LEAVE YOU WITH SOME  
PROVOCATIVE THOUGHTS:*

Quality is never an  
accident; it is always the  
result of intelligent efforts.

*John Ruskin 1819-1900, English author and social critic*

***LET ME LEAVE YOU WITH SOME  
PROVOCATIVE THOUGHTS:***

**Quality is free, but only to  
those who are willing to  
pay heavily for it.**

*Philip Crosby 1926 2001, American business philosopher and writer on quality*



# QUESTIONS?

*Jay Winford – Prairie*

[Jay@Prairie.ws](mailto:Jay@Prairie.ws)