

# Region 3 Materials

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Deserts & Mountains

Interstate and Low Volume Roads

Independence Pass at 12,096'

I-70 near Mack at 4,447'

Colorado River





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Project Examples of the Good and Bad

One Randomly Selected Project from the last few years and one project with a good lesson. A period of good paving and bad paving was identified for the random project. Here are values that I typically track:

- Dust to Asphalt Ratio (D/A)
- Asphalt Film Thickness
  - Theoretical Surface Area
- Voids
  - Between 3.0-3.5% Depending on Traffic and Relative Asphalt Content
- Asphalt Content
  - Relative to Voids Target from Design
- VMA
  - Relative to Asphalt Content from Design
- Quality Levels
  - Based on Accuracy & Precision
  - Compaction-Mat and Joint Density
  - Asphalt Content
  - Voids or Gradation
  - Possibly VMA





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### Project No. 1

Job Mix Formula values determined from the Contractor's Mix Design

- 5.7% AC
- 3.5% Voids
- 15.7% VMA

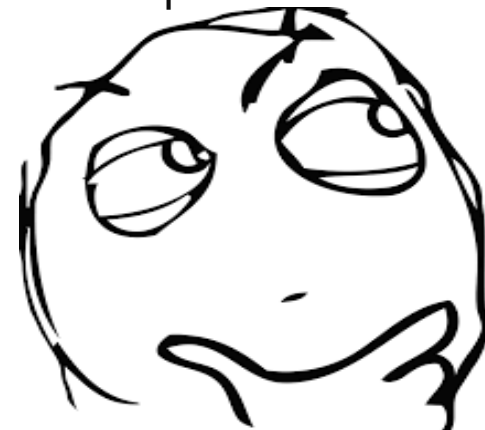
Values that I track determined from the mix design

- 9.0% AFT
- 1.21 D/A

### The Bad

- The largest disincentive was from a period of low compaction resulting in a Quality Level of 53-**CONDITION RED**

What went wrong?





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Project No. 1-The Bad

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## What went wrong-The Bad

### Production Results vs Job Mix Formula Targets

- 5.6% AC vs 5.7%
- 2.3% Voids vs 3.5%
- 14.2 VMA vs 15.7

### Additional Values that I track

- 8.1% AFT (Barely acceptable according to other state agencies) vs 9.0%
- 1.28 D/A vs 1.21

## Outcome

- Every value tracked was worse than the mix design values or targets

## What about the good?

The largest incentive was from a period of precise and accurate asphalt contents resulting in good compaction-**Condition Green**

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Project No. 1-The Good

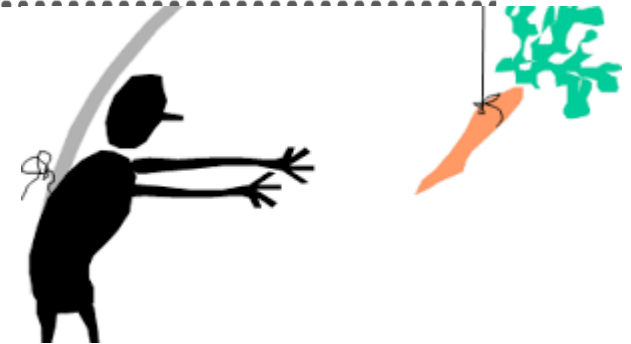
## What went right-The Good

### Production Results vs Mix Design Values and Targets

- 5.8% AC vs 5.7%, Above Optimal
- 3.1% Voids vs 3.5%, Closer to Optimal
- 14.0 VMA vs 15.7, Worse than the Bad Example

### Additional Values that I track

- 7.7% AFT (Not acceptable according to other state agencies) vs 9.0%
- 1.53 D/A vs 1.21



## Outcome

- When AC was at or above optimal the Quality Levels were higher. Lower fines would result in lower D/A, more Film Thickness, and better Voids value.
- We strive for optimal AC values because the data shows that higher Quality Levels are achieved when optimal AC is achieved.



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The Good and The Bad

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Some mixes could be good and bad.



Just depends how you make it.

**AMAZING**  
**RESULTS**

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Project Example No. 2 of Good and Bad

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## Project No. 2

Job Mix Formula values determined from the Contractor's Mix Design

- 5.7% AC
- 3.0% Voids
- 8.4% AFT

Values that I track determined from the mix design

- 1.08 D/A
- 14.6 VMA

## The Bad

- The largest disincentive was from a period of poor gradation values early in the project resulting in a Quality Level of 56-**CONDITION RED.**
- Poor gradation values result in low voids and VMA.
- The Project appeared to be headed in the wrong direction.

What went wrong?

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Project No. 2-The Bad

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What went wrong-The Bad

### Communication

When the project was going bad, we requested a sit down with the Contractor. No suggestions were made, but we expressed our concerns about the direction the project was headed.

What about the good?

The Contractor and the Project Team were willing to work together.

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Project No. 2-The Good

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## What went right-The Good Communication

After the sit down with the Contractor, the Quality Levels consistently reached QLs of 100 and the disincentive turned into a significant incentive.

## The Great

- The final results of the project were all good. The Contractor and the Project Team thanked each other after the project for being able to turn what appeared to be a bad project into a good project.





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Lessons Learned

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## Takeaways

- Higher AC Values typically result in better compaction values
  - Target Voids are more attainable when target ACs are achieved
  - Target ACs typically result in higher Quality Levels
  - Communication between Process Control (QC) and Quality Assurance (QA) is Key
  - Communication and Teamwork between Contractor and Project Team is Paramount
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The Good and The Bad

Questions ?

