

Using Contractors' Test Results in the Acceptance Decision

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Contractors Viewpoint

- ◆ The most important test results are those that are used to determine pay!
- ◆ Contractors are more comfortable when results used for pay have been generated “in-house.”
- ◆ Using contractor test results can:
 - reduce time between obtaining test results and making production changes.
 - reduce duplication of testing.

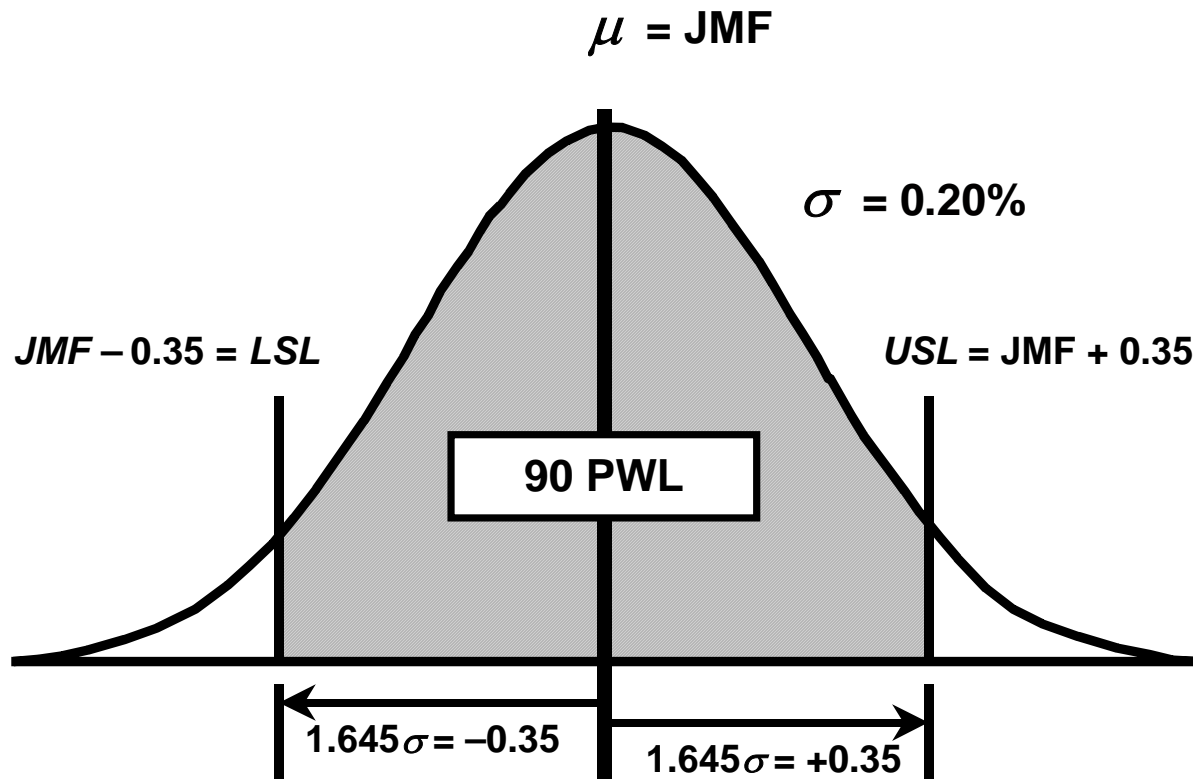
Risks

- ◆ Acceptable Quality Level (AQL) – Minimum level of actual quality at which material can be considered fully acceptable.
- ◆ For example, based on PWL, the AQL is that actual (not estimated) PWL at which the quality characteristic (AC%) can just be considered fully acceptable.
- ◆ For HMA, an AQL of 90 PWL is a consensus value.

Risks (Continued)

- ◆ This means that 10% of the product can be outside the spec limits and still be considered acceptable.
- ◆ Also, an acceptance plan should be designed so that AQL material will receive an Expected Pay of 100%.

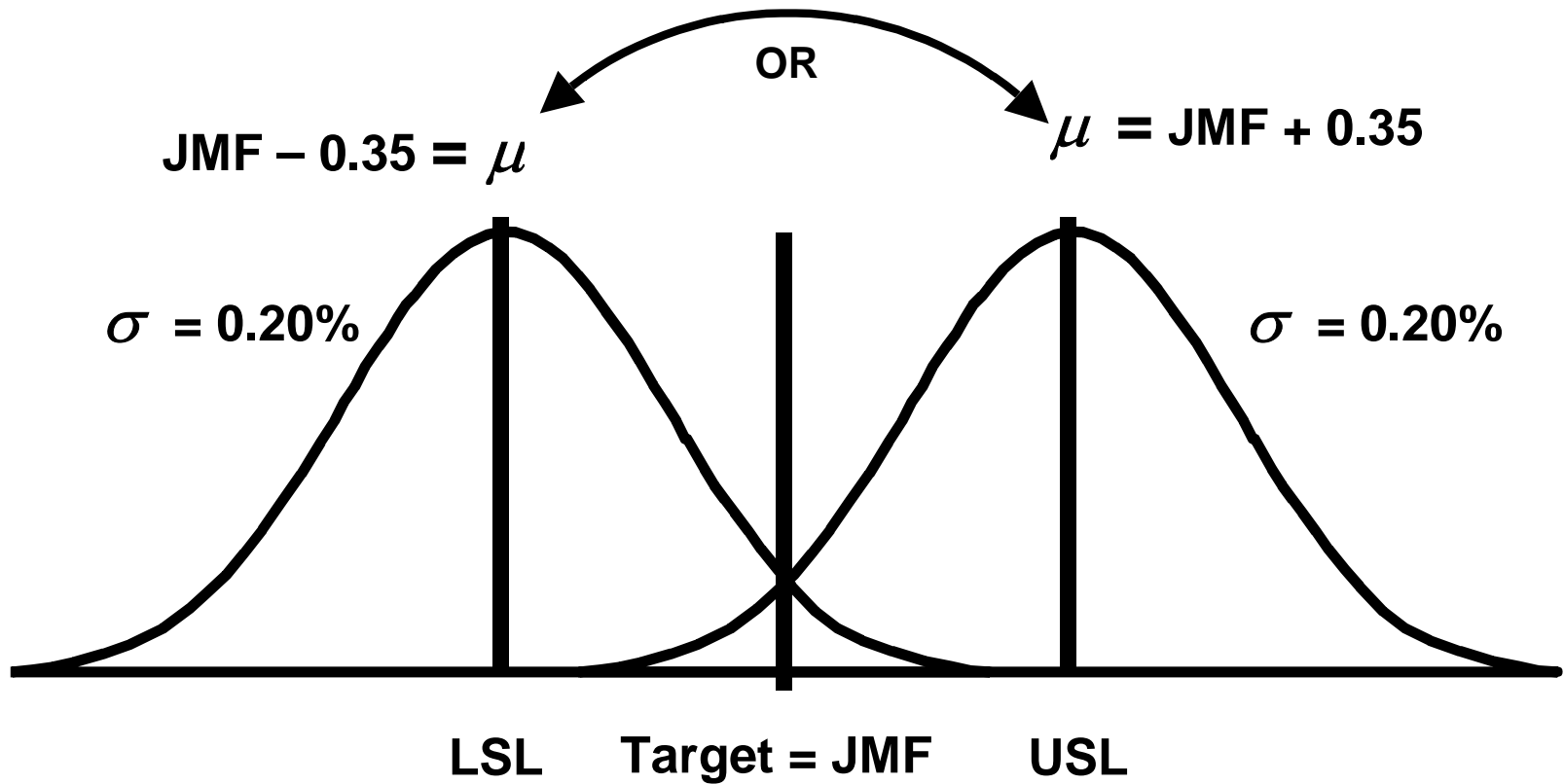
Example AQL



Risks (Continued)

- ◆ Rejectable Quality Level (RQL)- The maximum level of actual quality at which the material can be considered unacceptable (rejectable).
- ◆ For example, based on PWL, the RQL is the actual (not estimated) PWL at which the quality characteristic (AC%) can just be considered fully rejectable.
- ◆ Also, RQL material is usually required to be removed and replaced, corrective action taken, or a relatively low pay factor assigned.

Example RQL



Risks (Continued)

- ◆ For accept/reject plans Contractor's risk is probability of having AQL product rejected.
- ◆ When pay factors are used, Contractor's risk is probability of receiving less pay than should be received.

Risks (Continued)

- ◆ For accept/reject plans, Agency's risk is probability of accepting RQL product.
- ◆ When pay factor's are used, Agency's risk is probability of paying more than should be paid.

Philosophical Differences Between AQL and RQL

- ◆ Being exactly at AQL can result in either penalty or bonus.
- ◆ This is because the PWL is an estimate.
 - Thus, sometimes the estimate will be high, sometimes it will be low.
- ◆ Being exactly at the RQL can result in R&R or penalty.
- ◆ For same reason as above.
- ◆ But consequences are different.

AQL and RQL

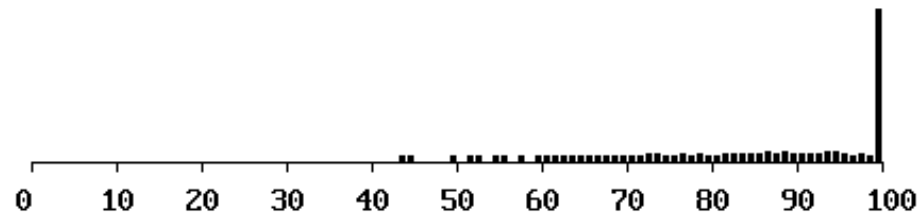
- ◆ Using the AASHTO Pay Equation may be the easiest way to explain what happens at the AQL and RQL:
 - ◆ $\text{Pay Factor} = 55 + 0.5 \text{ PWL}$
- ◆ When at the AQL, the PF should be 100%.
- ◆ When at the RQL, the PF should be 80%.
- ◆ Also, there's a bonus of 5% when the PWL is 100.

PWL Estimates When Exactly at AQL (n=4)

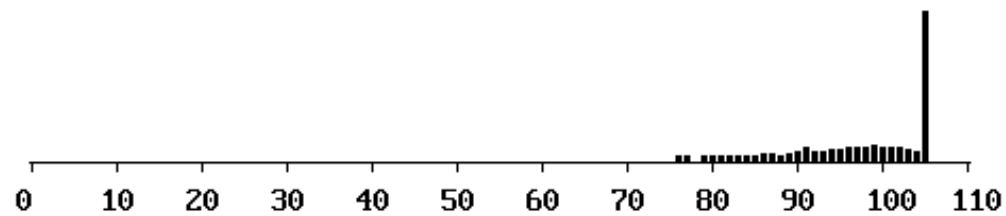
PWL(AQL) = 90

PERFORMANCE AT AQL

PWL ESTIMATES



PAY FACTORS



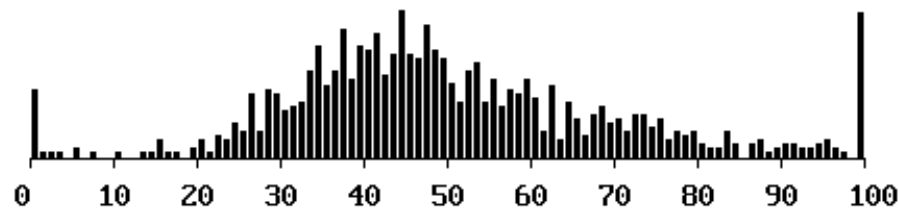
AVERAGE PAY FACTOR = 100.0

PWL Estimates When Exactly at RQL (n=4)

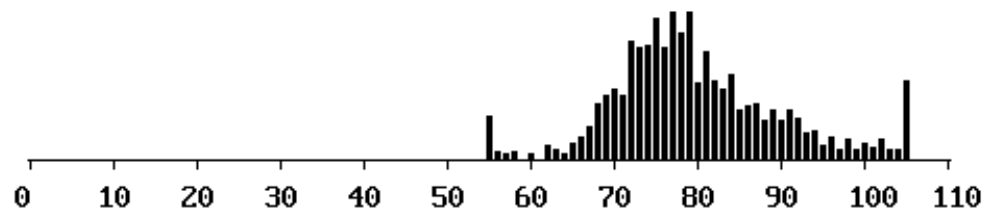
PWL(RQL) = 50

PERFORMANCE AT RQL

PWL ESTIMATES



PAY FACTORS

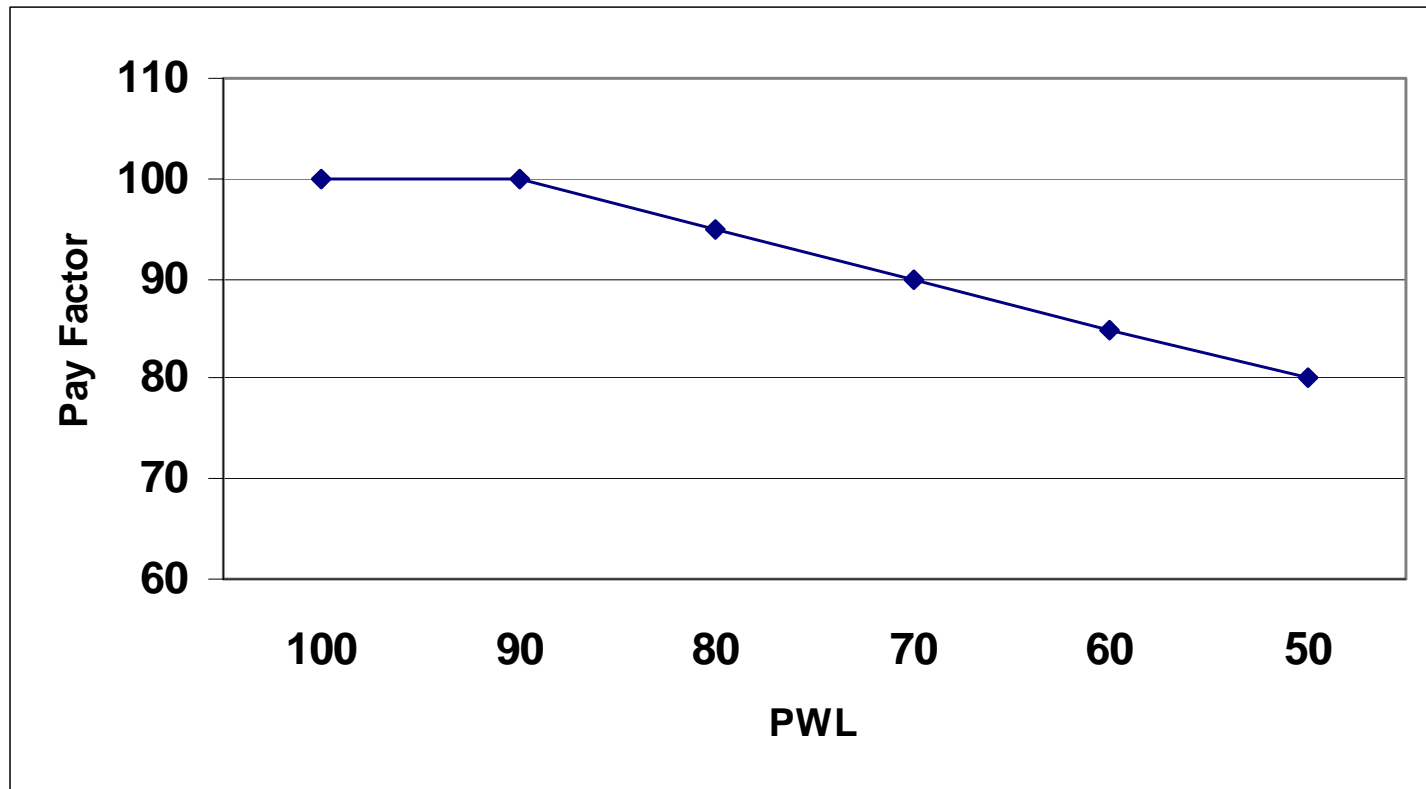


AVERAGE PAY FACTOR = 80.0

Bonus

- ◆ If the maximum Pay Factor is 100% , there's no way the contractor can average 100% pay.
 - When the contractor is at the AQL (90 PWL), sometimes the estimate will be that the AQL is higher and the Pay Factor will be 100%. But sometimes the estimate will be that the AQL is lower and the Pay Factor will be less than 100%. This makes it impossible to average 100% pay.

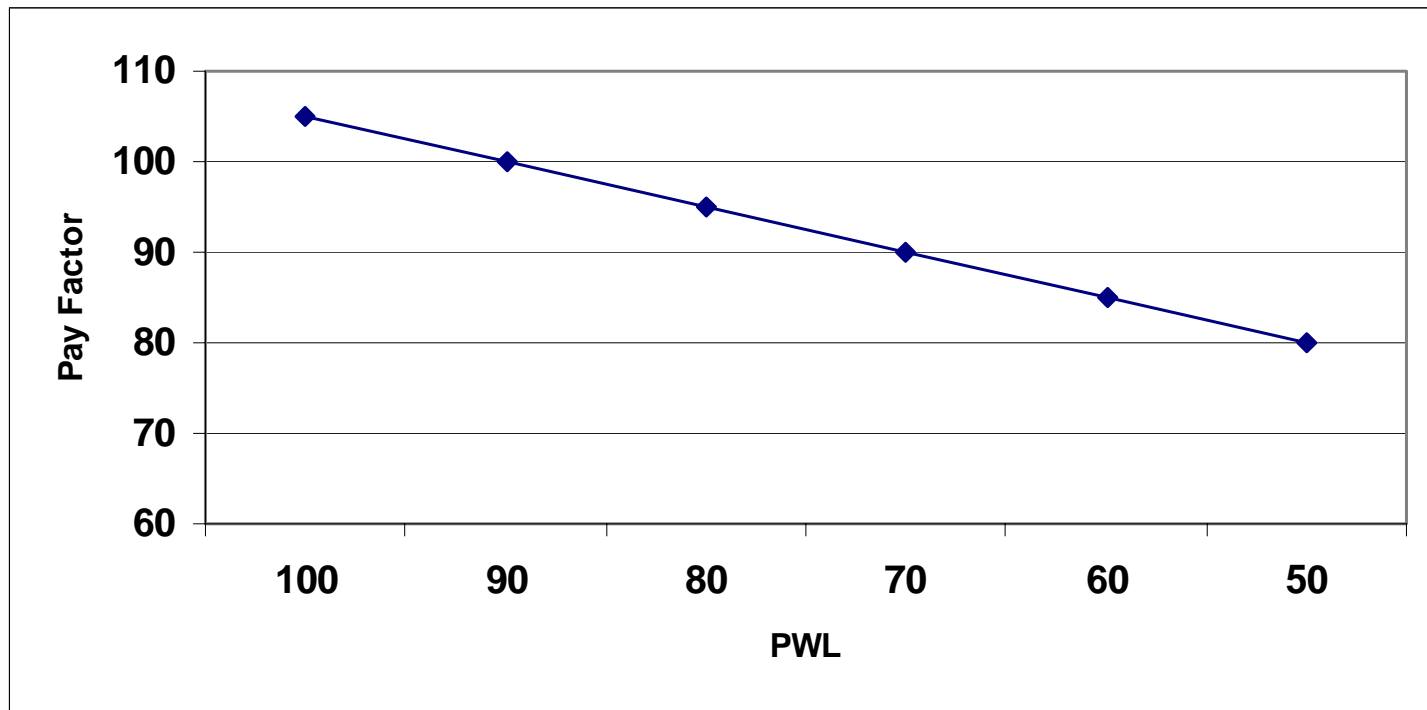
Pay Factor Equation with Maximum Pay of 100%



Bonus (Continued)

- ◆ The only way to assure that the Pay Factor will average 100% when at the AQL is to allow a bonus.
- ◆ This will balance estimated lower PWLs and lower Pay Factors with higher PWLs and higher Pay Factors.

Pay Factor Equation





Summary



- ◆ Contractors want to generate their own test results used for pay determination.
- ◆ Contractors want a pay schedule that is fair.