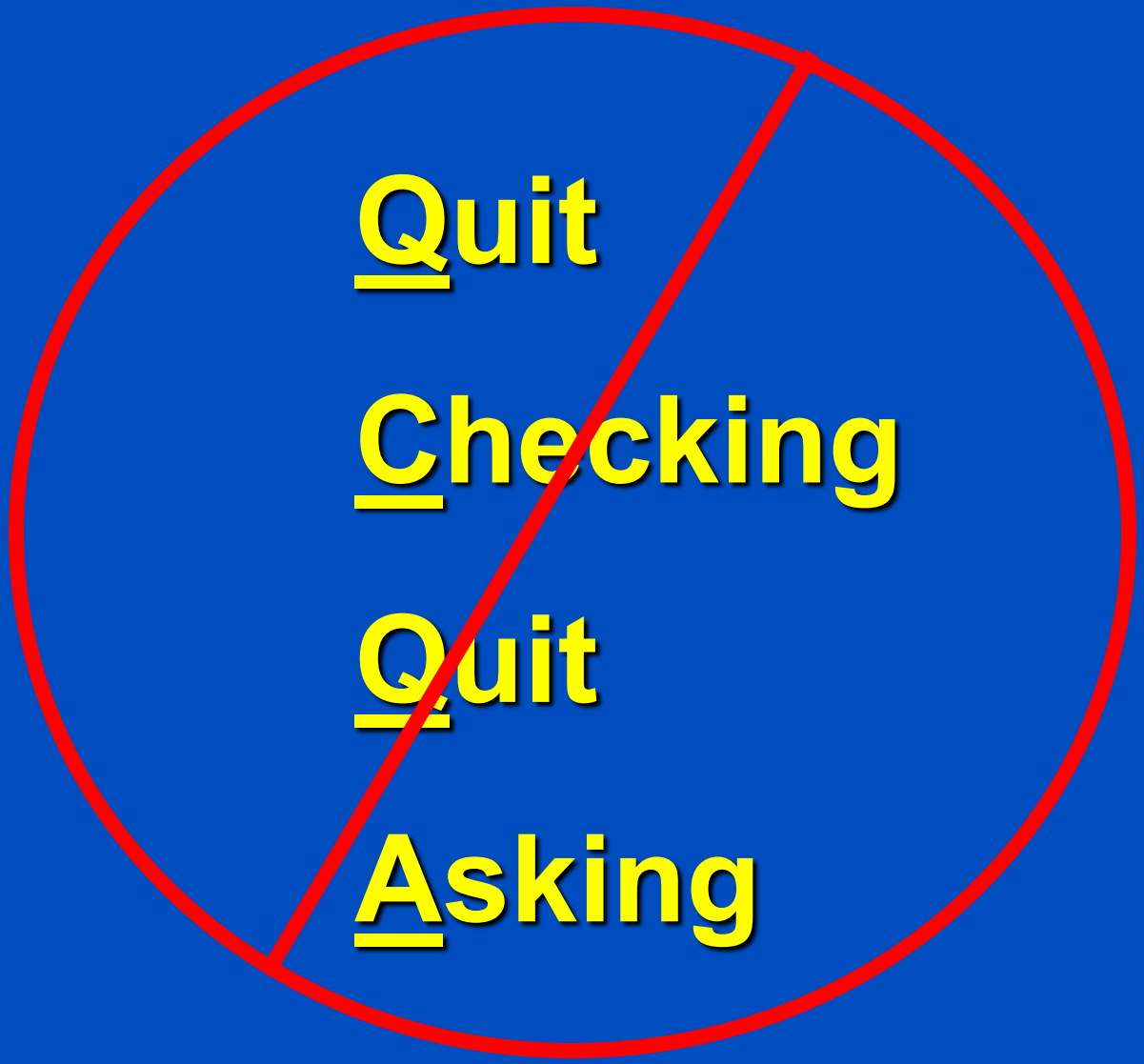
Superpave QC/QA

Who's Doin' What

What is QC/QA?



What is QC/QA?

- Actually performing Quality Assurance
- AASHTO R 10 definition of Quality Assurance:

"All those planned and systematic actions necessary to provide adequate confidence that a product or facility will perform satisfactorily in service. Making sure the quality of a product is what it should be."

- QC and QA are activities of performing Quality Assurance

Benefits of Meeting Quality Requirements

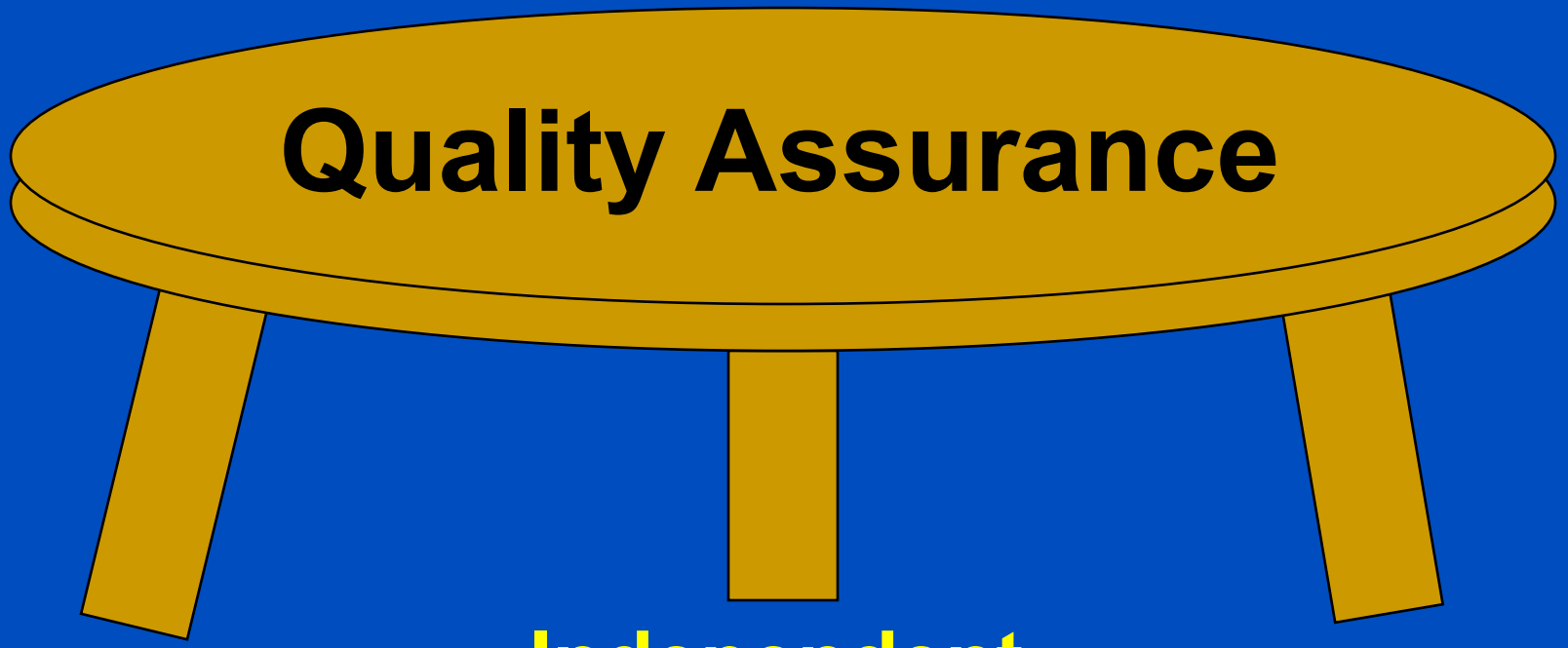
- If meet or exceed quality requirements:

- Pavement/Material will perform satisfactory during its design life.
- Require less maintenance to maintain
- Better use of highway funds
- Driver satisfaction

Quality Requirements

- Contract Documents contain the specification
- Asphalt Mixture Tests
  - Air voids, VMA, % asphalt, density, and **TSR**
- Mostly using performance related
- Moving towards performance tests
  - Balance mix design using Ideal CT and Hamburg

Parts of Quality Assurance



Quality Control (QC)

Independent Assurance Samples (IAS)

Quality Acceptance (QA)

Independent Assurance Samples(IAS)

- Being performed by MoDOT on behalf of the federal government

- MoDOT personnel not directly involved with acceptance testing

- Performed on all project with federal funds
- Ensures that those performing acceptance testing, on the project, are sampling and testing properly. Also ensure testing equipment functioning correctly.
- EPG, Section 123 Federal-Aid Highway Program

Quality Control (QC)

- Being performed by the contractor
- Sum-total of the activities performed by the contractor to make sure that a product meets contract quality requirements.
- The party producing the product is in the best position to exercise process Quality Control. [i.e., Contractor]

Quality Control (QC)

- Activities performed:

1) Testing Material

2) Inspecting Operation

Quality Control (QC)

- Testing Material

1) Required Testing

- Minimum number required
- Samples random & designated by engineer
- Do not provide to much advance notice about random sample locations
- Test results shall comply with the specifications

Quality Control (QC)

- Testing Material *(continued)*

2) Self Testing (e*xtra testing*)

- Contractor's decision
- Sample location not required to be random
- Not used in pay factor determination
- Test results used to control the process

Quality Control (QC)

- Testing Material *(continued)*

3) Optional Testing

- Contractor's decision
- Doing non-required test to check quality
- Most likely will encounter with concrete (i.e., unit weight)

Quality Control (QC)

- All ‘Required Test’ results need to be furnished to the engineer

- ‘Self Test’ and ‘Optional Test’ results do not have to be furnished to the engineer

Quality Control (QC)

- Inspecting Operation

1) Monitoring Materials

- Testing delivered aggregates

- Reviewing bill of lading or certifications

(i.e., asphalt binder, antistrip, rejuvenator, etc.)

- Review condition of material

(i.e., contamination, segregation, etc.)

Quality Control (QC)

- Inspecting Operation *(continued)*

2) Plant Setting

- Producing Job Mix Formula
- Responsible for plant adjustments

3) Monitoring Production Facility

- Stockpiles
- Loading of material
- Equipment

Quality Control (QC)

- Inspecting Operation *(continued)*

4) Monitoring Placement

- Aggregate base compaction
- Tack/Prime coat application
- Check mat appearance (i.e., Segregation)
- Work zone and PPE usage
- Mat temperature
- Cross slope

Quality Control (QC)

- Communication is critical
- Advising QA Inspector about:

- All test results
- Mix design adjustments
- Production schedules
- Changes in production

Quality Acceptance (QA)

- Being performed by the MoDOT
- The sum total of the activities performed by MoDOT to accept the Quality Control (QC) data and to confirm that the product provided meets the specification requirements.

Quality Acceptance (QA)

- Activities Performed:

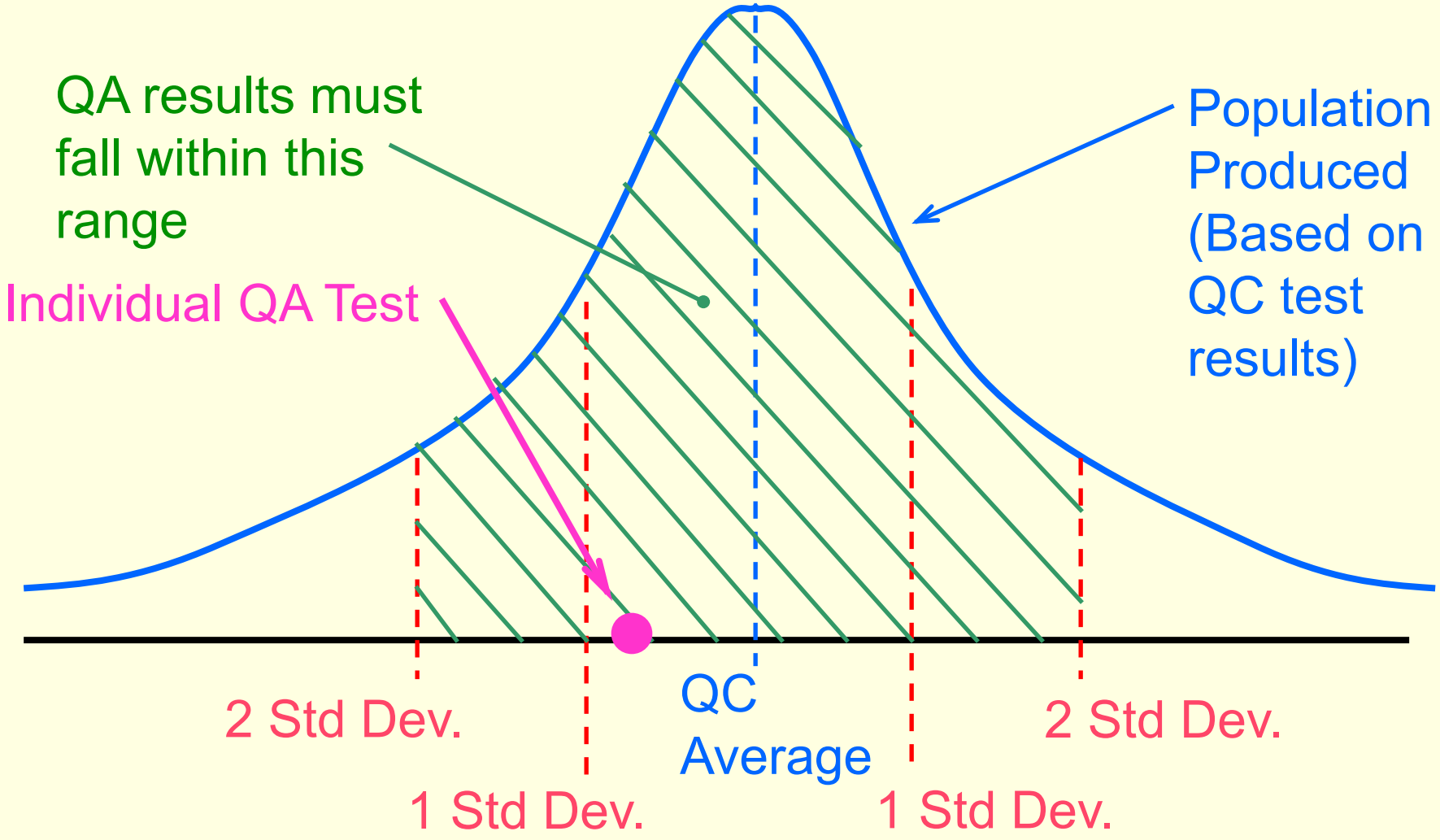
1) Acceptance Testing
2) Assurance Testing
3) Inspection

Quality Acceptance (QA)

- Acceptance Testing

- Performing to accept QC test results
- Test performed on independent samples
- Minimum number of test required; perform as many test needed to ensure the quality
- Random sample location
- Favorable comparison required for each tested sample

Favorable Comparison Lot by Lot Basis



Quality Acceptance (QA)

- Acceptance Testing *(continued)*

- If sample(s) do not compare, QC test results may not used to determine pay factors; need to resolve discrepancies

- If unable to resolve disputes in the field

1) Resolve by an independent third party

2) Use QC and QA test results to determine the pay factor (n = 5)

Why is Acceptance Testing Important?

- Critical because of the incentive and disincentive aspect of the QC/QA program.
- Pay Factors based on percent within limits total (PWL_t):

If $PWL_t >= 70\%$; $PF = (0.5 * PWL_t) + 55$

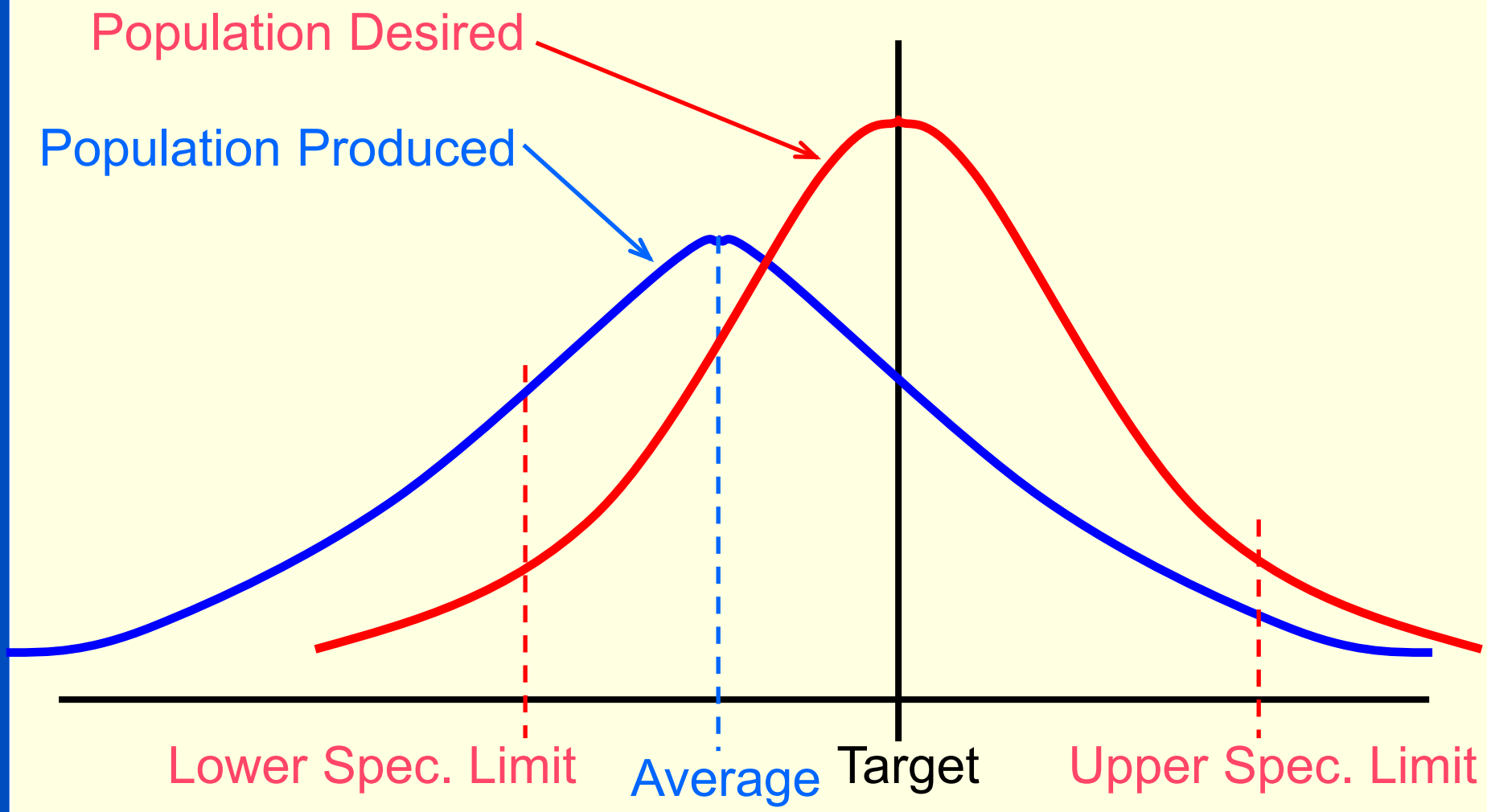
If $PWL_t < 70\%$; $PF = (2 * PWL_t) - 50$

Did you know?

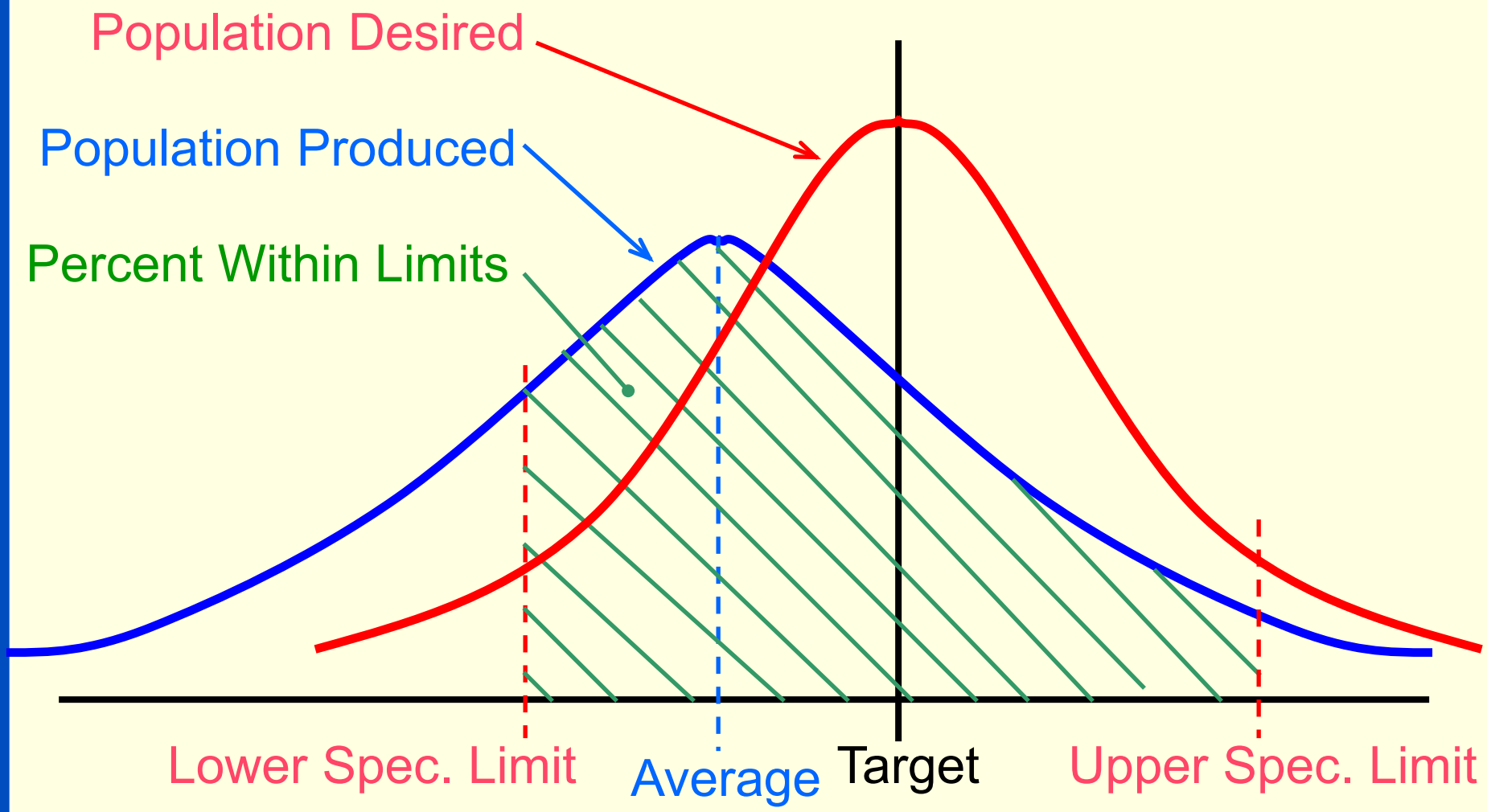
- Can sample material at anytime anywhere
- “Material will be subject to inspection or test at any time during production or manufacture or at any subsequent time prior to or after incorporation into the work. Material for sampling will be selected by the engineer.”

(Standard Specification 106.1.4)

Percent Within Limits



Percent Within Limits

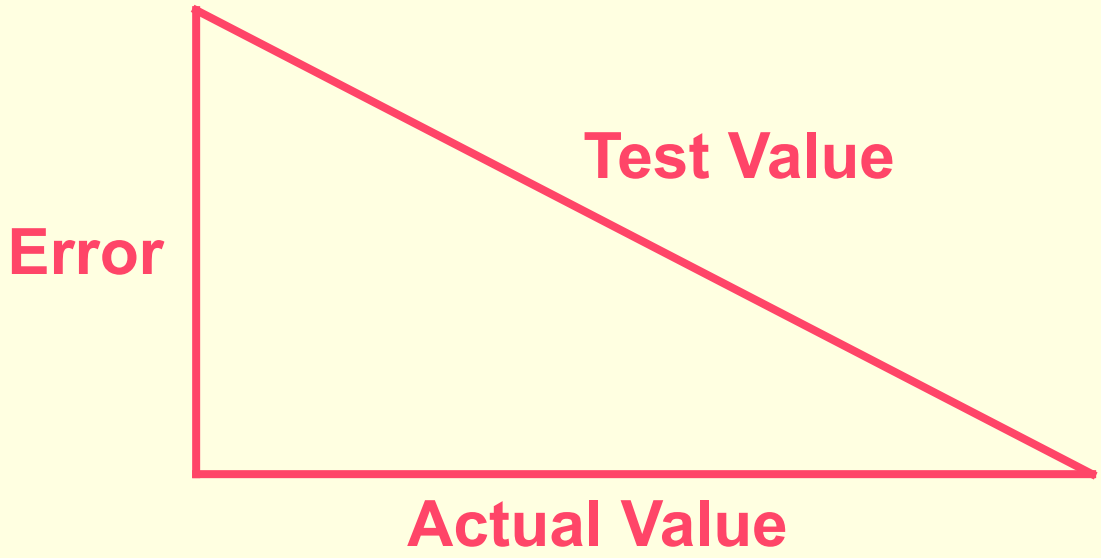


Quality Acceptance (QA)

- Assurance Testing

- Performing to confirm (1) QC sampling and testing correctly and (2) using proper operating equipment
- Test performed on split samples
- Test performed on retained samples
- Minimum number of test required
- Should perform early in the project to ensure QC is performing test properly
- Favorable comparison required
- If not comparing need to resolve difference

Why Assurance Testing?



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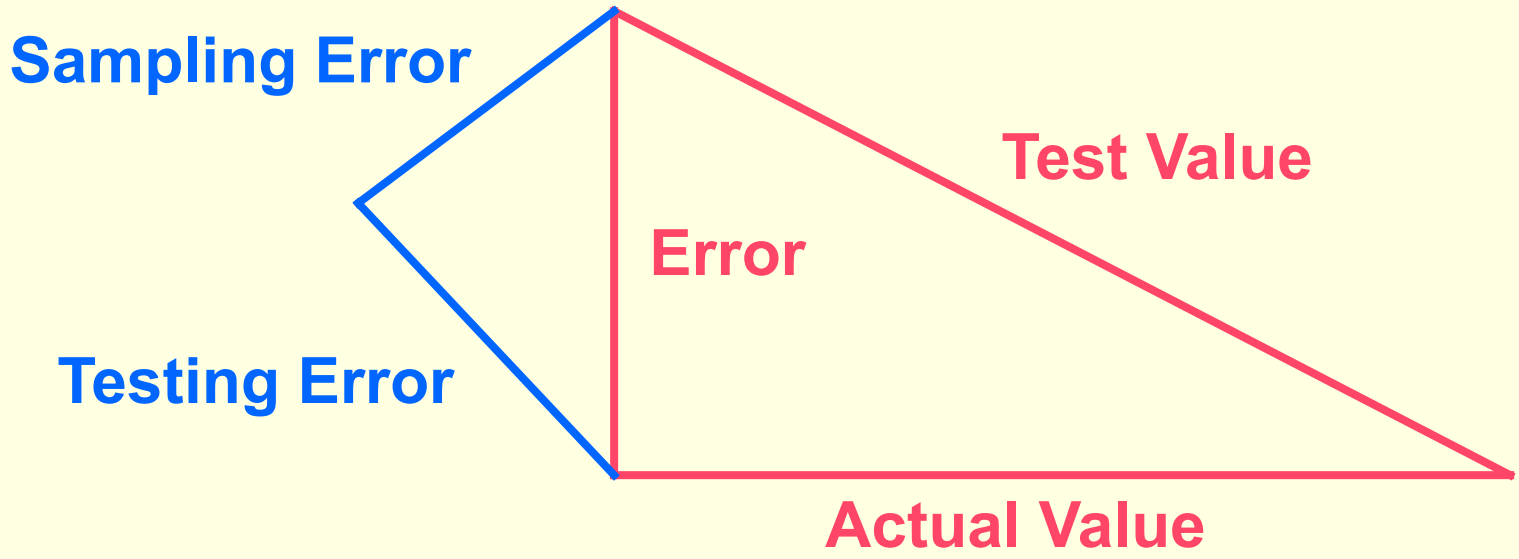

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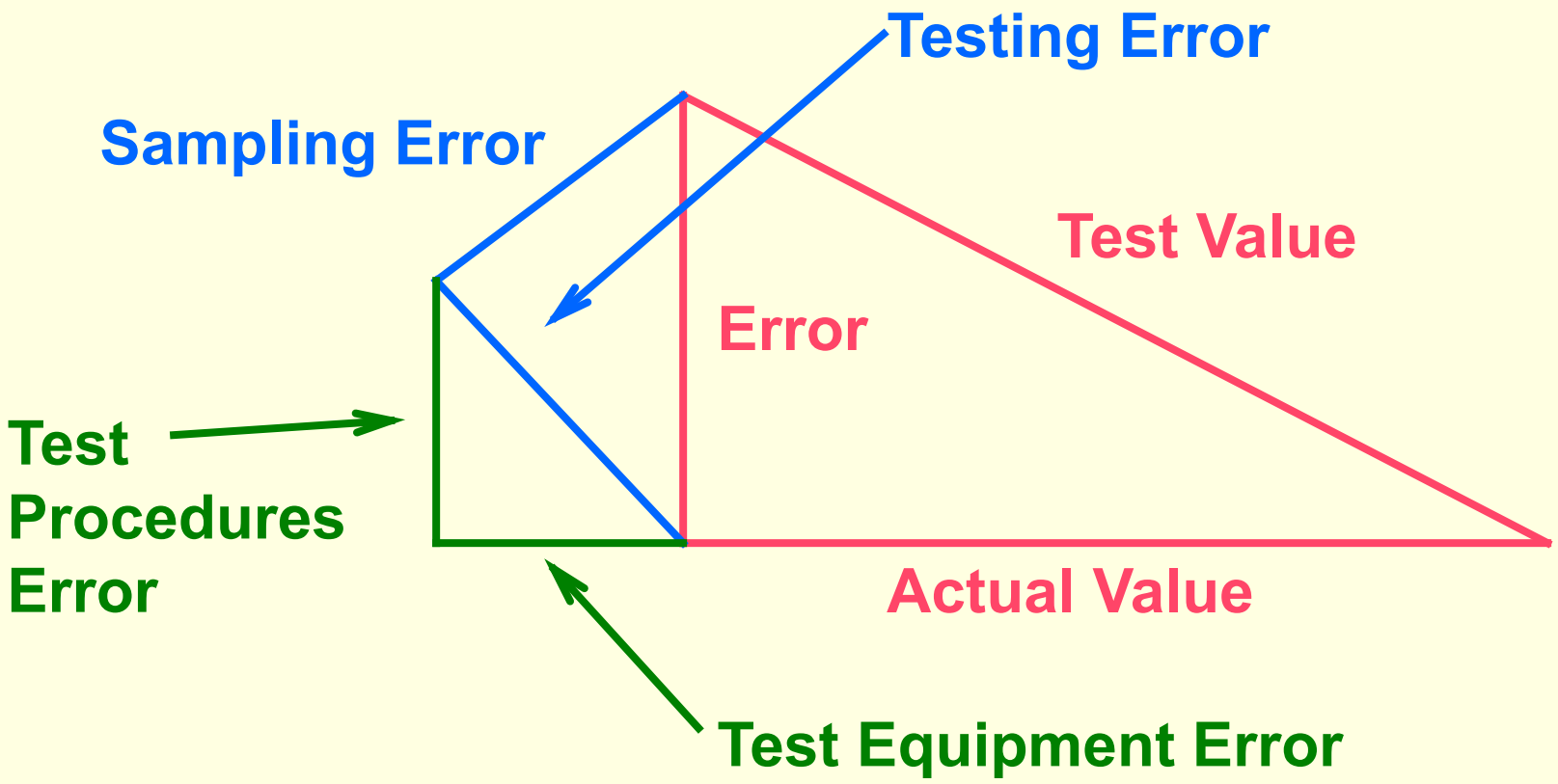


Quality Acceptance (QA)

- Inspection

1) Witness QC Sampling &Testing

- Ensure proper procedures being used
- Review testing equipment to ensure (1) testing equipment in good working order and (2) confirm testing equipment has been calibrated
- Review Control Charts

Quality Acceptance (QA)

- Inspection *(continued)*

2) Inspecting Plant Operation

- Review stockpiles
- Material Condition
- Material Handling (e.g., loading at plant, hauling trucks, etc.)
- Review plant calibration records
- Facility functioning properly

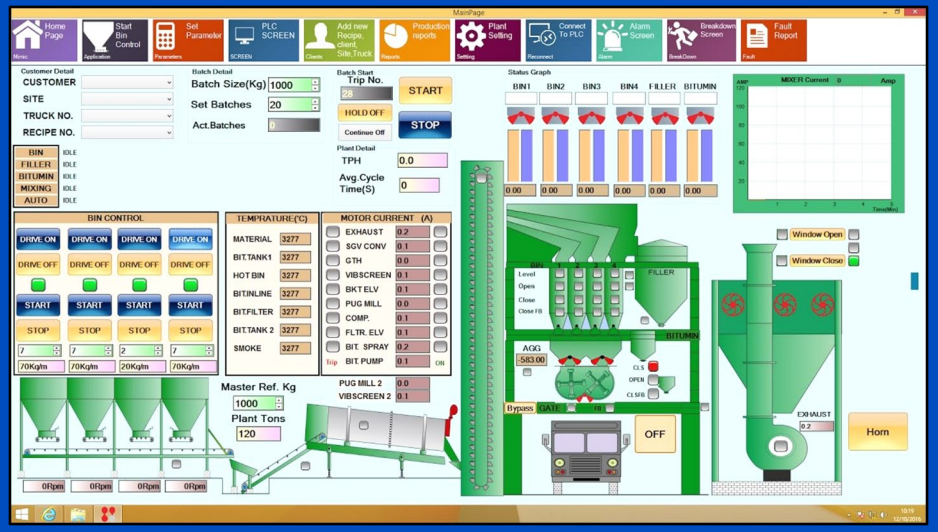
Quality Acceptance (QA)

- Inspection *(continued)*

3) Inspecting Plant Settings

- Ensure plant is set on Job Mix Formula

- Other settings (e.g., bag house return, mineral filler, etc.)



Quality Acceptance (QA)

- Inspection *(continued)*

4) Inspecting Placement Operation

- Check aggregate base compaction
- Check tack/prime application
- Check mat temperature
- Check mat appearance
- Check work zone & PPE usage

Quality Acceptance (QA)

- Communication is critical
- Advising QC Inspector about:

- All test results

- Any items of concerns

- QA inspector needs to keep Resident Engineer and District Construction & Materials Engineer advised of any problems

QUESTIONS