

56th Illinois Bituminous Paving Conference

Clarifying **Quality Control**

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Defining Quality Control

*“Inspection, analysis, and action applied to a **portion** of the product in a manufacturing operation to estimate overall **quality** of the product and determine what, if any, **changes** must be made to achieve or maintain the **required** level of **quality**.”*

McGraw-Hill Dictionary of Science and Engineering

Defining Process Control

“Activities involved in ensuring a process is predictable, stable, and consistently operating at the target level of performance with only normal variation.”

BusinessDictionary.com

How Do You Define QC?

- It's not **just** sample testing by **QC** personnel!
- **Everyone** plays a role
 - **Quality Control**
 - **Production**
 - **Placement**
- **Inspection**
 - Individual materials
 - Mixture
 - Processes
 - Equipment
- **Analysis**
 - What's wrong?
 - What needs fixed?
- **Action**
 - Proactive vs. Reactive

QC – Misperception

- It's not just *mixture* testing!
 - Mix results *may* predict pay, but...
 - For unacceptable results, what's the next step?
- Constantly testing mix samples, challenges us in performing actual “**Quality Control**”
- Today, we are asking more of our **QC** personnel than ever before
- Trained, staffed and equipped?



QC Personnel

- Must be:
 - Trained
 - Equipped
- Over time they gain:
 - Knowledge
 - Experience
- If managed correctly, they'll become invaluable!

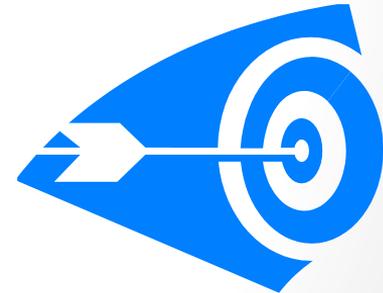


QC Personnel

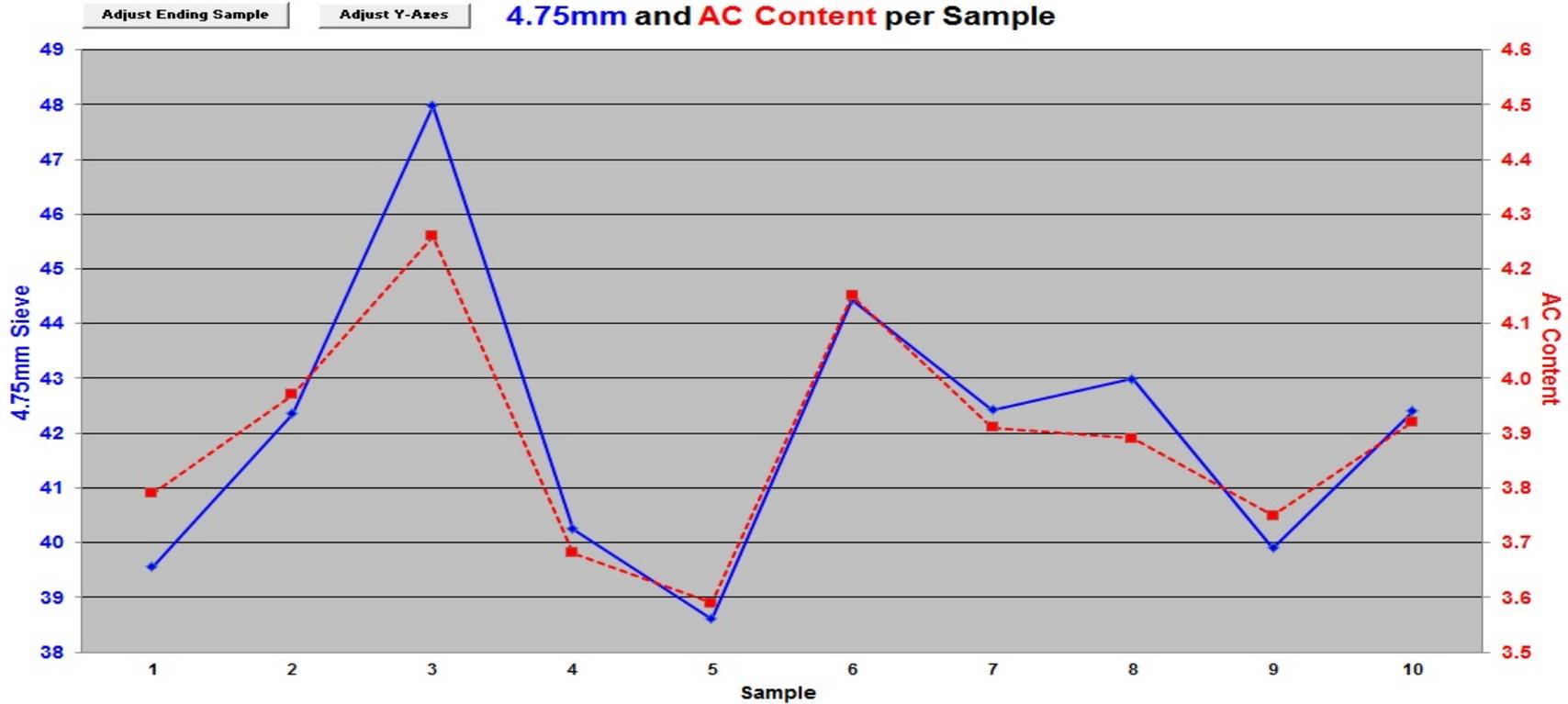
- Must be trained in numerous subjects:
 - Materials properties
 - Materials testing:
 - Operation, calibration and maintenance of equipment
 - Specification requirements
 - Etc.
- Must work closely with:
 - Production & Placement personnel
 - Requires knowledge of those operations

QC Personnel

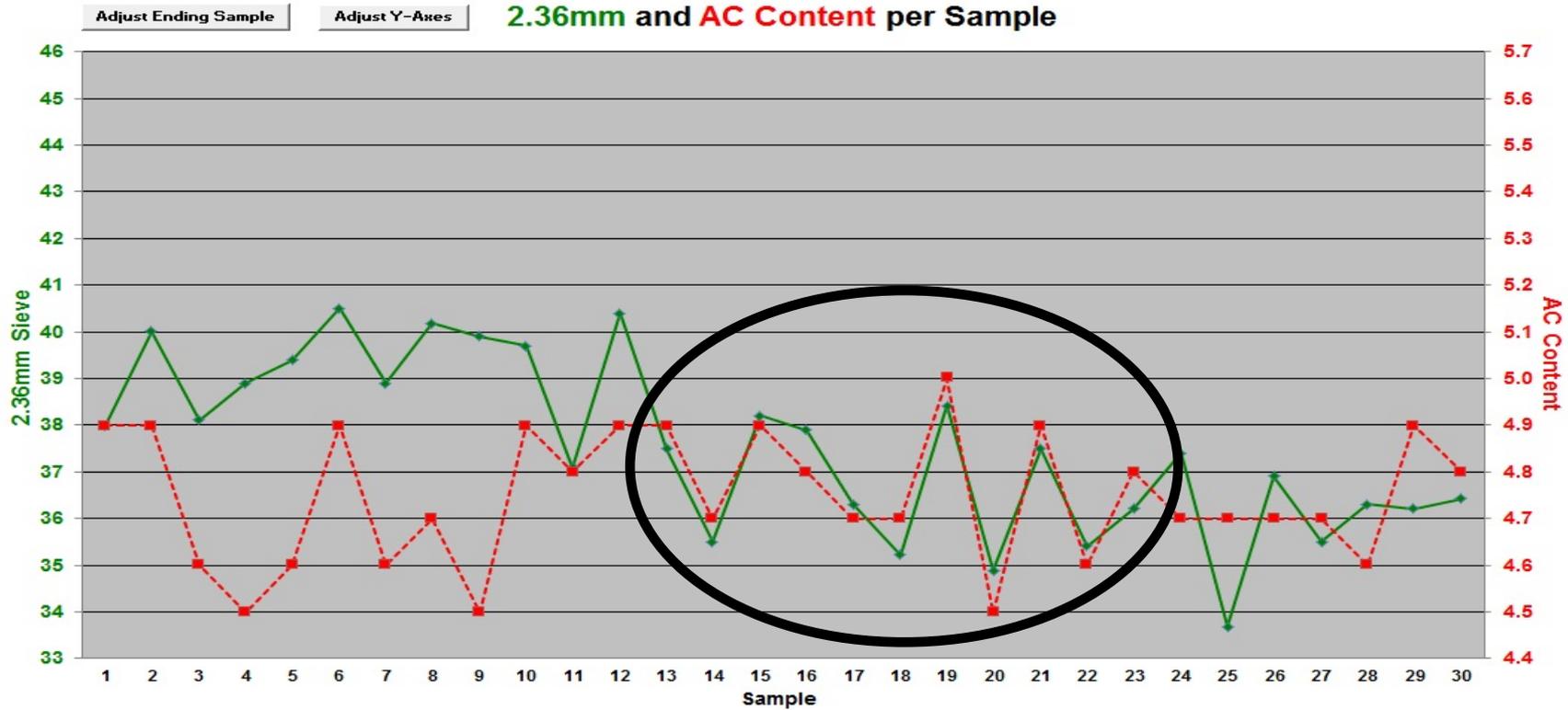
- Sample (Stockpiles & Mix):
 - Obtain, handle and test
 - Do it accurately and consistently
 - Do it at the “right” frequency
- Manage materials
- Understand the mix:
 - Mix adjustments
 - Impact on production and placement?
- Snapshot of **QC effectiveness**
- Recognizing segregated samples



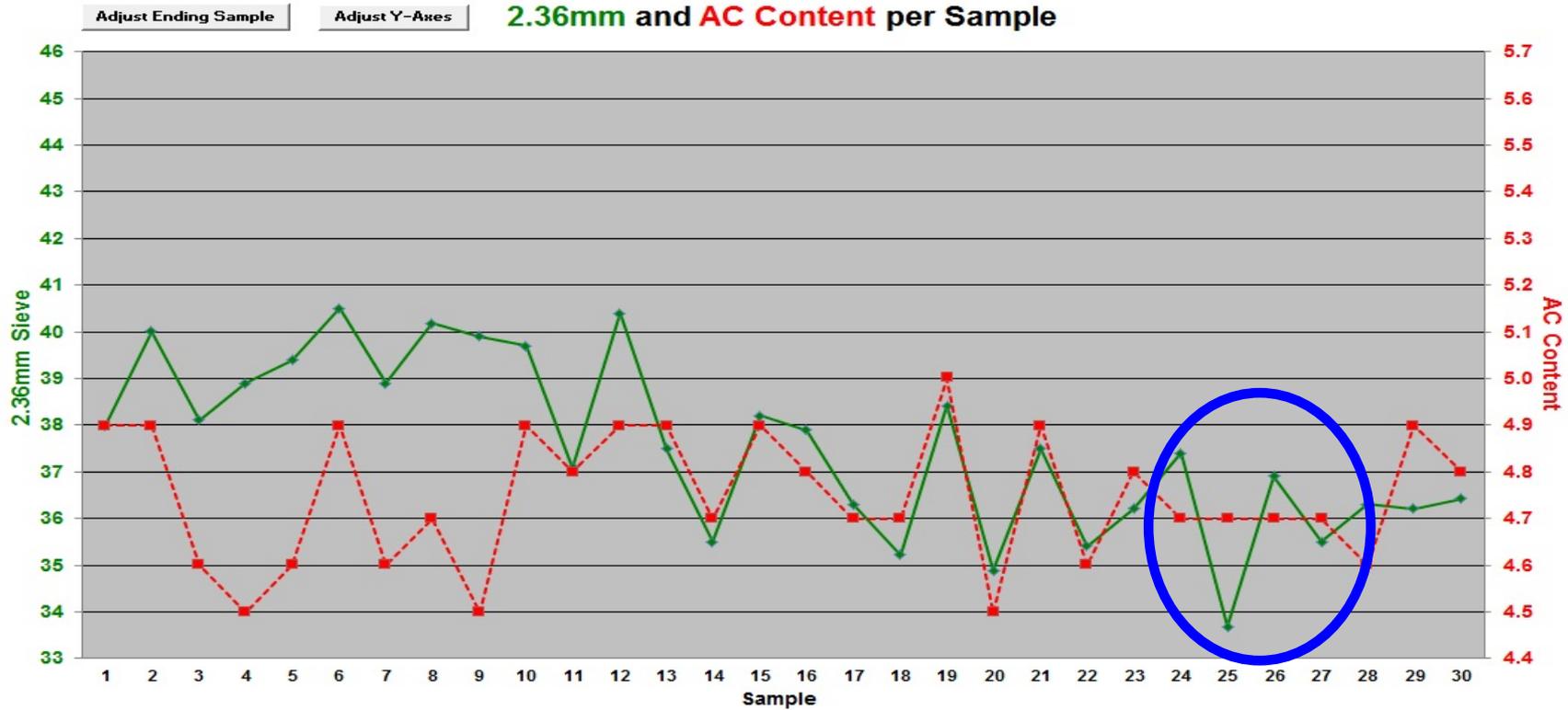
Segregated Mix



Segregated Mix



Non-Segregated Mix



Production QC

- Plant Scheduling:
 - Number of mixes & switchovers
 - Mix verification prior to project start
- Clearly Identify:
 - Stockpiles (virgin and recycle)
 - AC storage tanks
- Stockpile Management:
 - Build them right
 - Prevent intermingling
 - Load out of them right
 - Use as many cold feeds as possible
 - Identify Cold Feeds





Production QC – Plant Calibration

- Do it accurately and often
- Cold feeds
- AC/Binder
- Additives
- Multiple Rates:
 - Low, Medium and High
- Scales used to measure any of the above



Production QC – Plant Operation

- Production rate
- Temperature consistency
- Use and level of silos or surge bins
- Mix segregation:
 - Are there locations where it is occurring?
 - How can they be fixed?
 - Impacts truck and plate samples!
- Maintenance:
 - Regularly scheduled items
 - If it's broke, fix it!



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Production QC

- It's not **just** mix testing!
- Inspection, Analysis and Action:
 - Action occurs **before** sampling or **before** testing
 - We **react** too often – we must be **proactive**
 - Don't **assume** the owner's minimal requirements will suffice
- **QC** personnel seldom have time to test and oversee the process
- **QC** Managers play a vital role

Placement **QC** – Misperception

- It's not just *density and smoothness* testing!
 - Test results *may* predict pay, but...
 - For unacceptable results, what's the next step?
- Many Field **QC** techs are overwhelmed!
 - Lots of locations to test
 - Often utilized for **NON-QC** tasks
 - Sometimes undertrained
- **Someone** has to look at the **BIG** picture.....



Placement QC

- Truck Dump Personnel – Backing Up and Unloading Trucks:
 - Safely, Timely and Efficiently
 - Communicate with truck driver, MTD and/or paver operator
 - Impacts paver operation, mat consistency & flow of paving train
- Screed Personnel:
 - Address mat imperfections
 - Strive for consistent texture and uniform density
- Lute and Shoveling Personnel:
 - Do they improve imperfections?
 - Involvement in plate sampling?

Placement QC – Paver Operation

- Good working order?
- Slope and grade?
- Speed:
 - Consistent?
 - Match production rate?
 - Delivery rate?
 - Keep rollers in sight!
- Screed:
 - Uniform mat?
 - Extensions set properly?
 - Turning 90% of time?
 - Mix at mid-depth?
 - Tunnel and auger extensions?

Placement QC – Compaction

- Rollers = Placement rate?
- Is each one operating properly?
- Operator familiar with equipment?
 - Amplitude & frequency settings
 - Water in drums
 - Water spray system
 - Tire pressure
- Rolling Pattern:
 - Number of passes?
 - Pattern layout?
 - Speed?
 - Pattern length?
 - Compaction temperature range for roller position?
 - Directly impacts density and smoothness

Placement QC

- There are **many** other items to pay attention to, such as:
 - **Base** conditions – temp, smoothness, stiffness, texture
 - **Ambient** conditions – air temp, sunlight, wind
 - **Prime / Tack** – type, amount, uniformity of application, adequate cure time
 - **Mat thickness** – available compaction time
- Is anyone ***making*** time to watch these **QC** items?

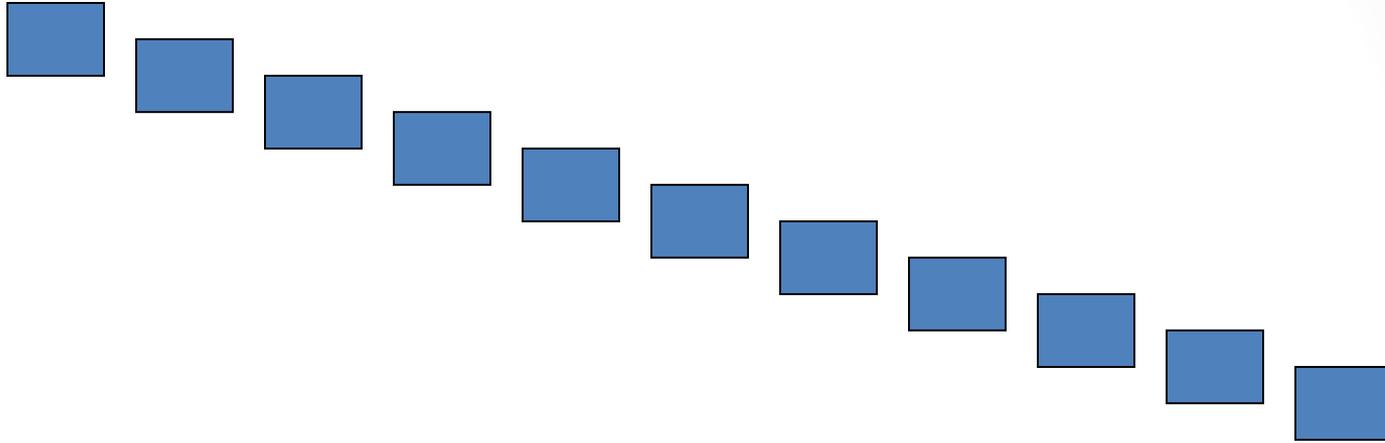


Placement **QC** – Sampling/Testing

- Mix samples:
 - Take them correctly and consistently
 - Identify them clearly and get them sent in
- Density – Gauge:
 - Is it working, and being used properly and frequently?
 - Has it been calibrated to this mix, on this job?
- Density – Cores:
 - Use the right equipment, remove them carefully!
 - Identify clearly and get them sent in
- Smoothness:
 - Mat **thickness**, mat temperature, etc.



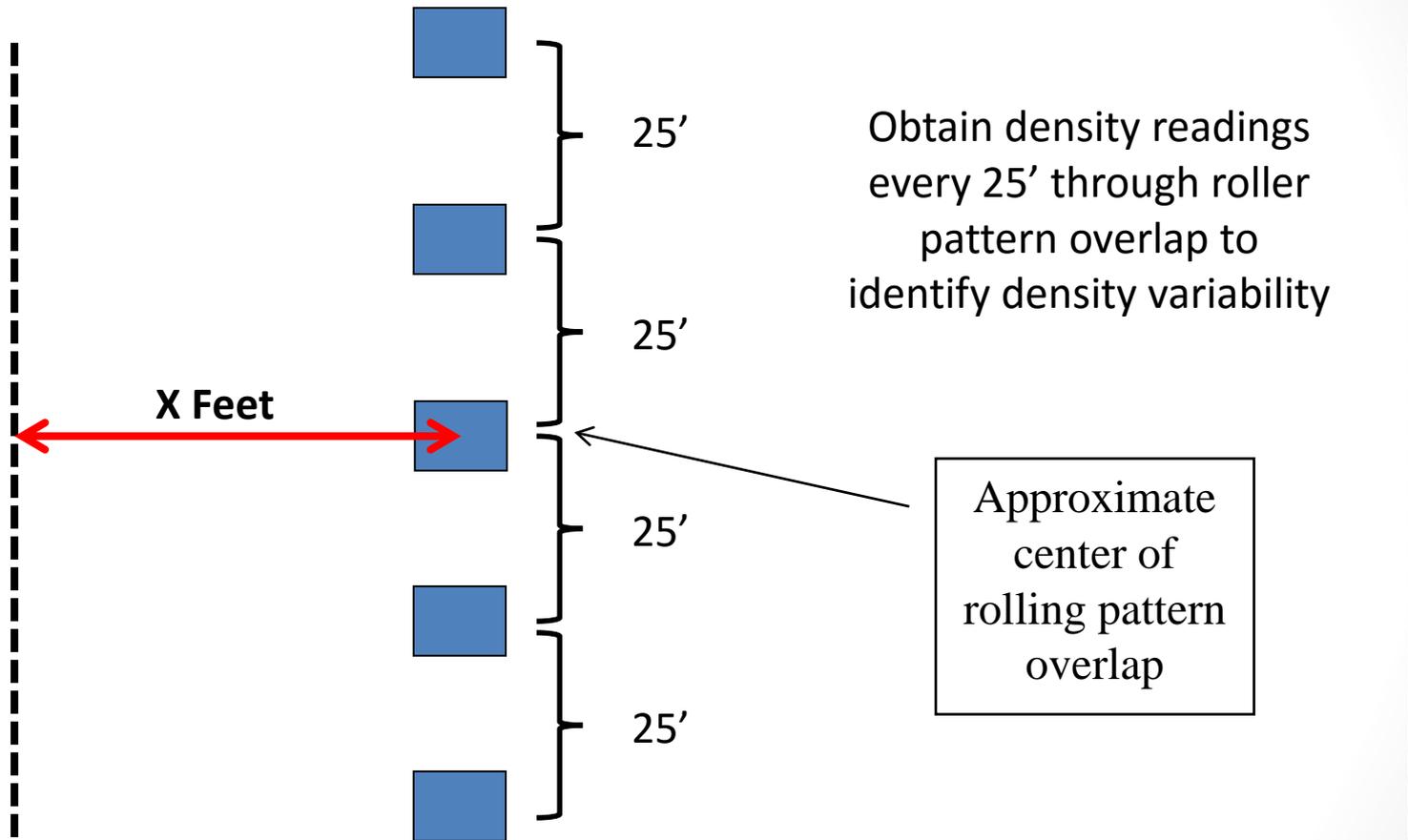
Paver Screed



Obtain density readings every 1' across **uncompacted** mat and test behind rollers to identify density variability across mat before **and** after compaction



Paving Direction

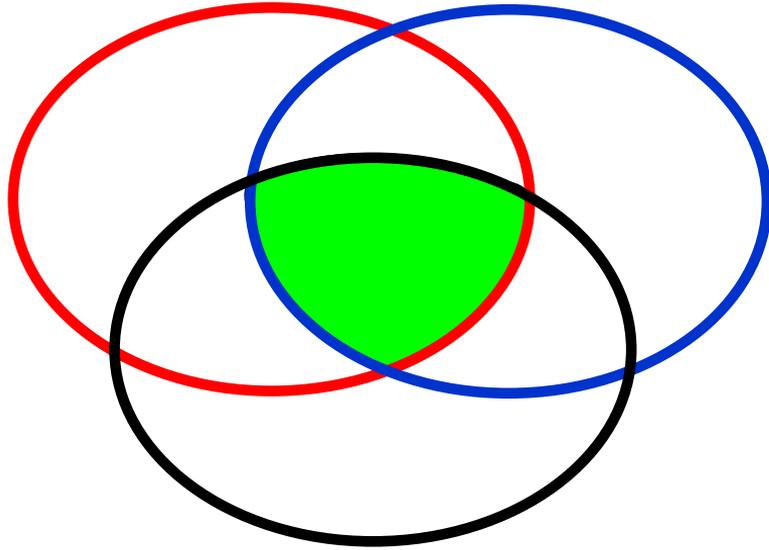


In The Past...

Quality Control



Functioning as a TEAM!



Quality Control

Production

Placement

Clarify QC and Everyone's Role

Train them, Enable them, and Support them

Thank You!

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