Automation Technology & Process Control

MARK MOHR

KAHLER AUTOMATION

Why Automate

◦ Automation cannot correct for equipment limitations.

   ◦ Automation cannot do the impossible.

◦ Automation CAN do what a human has learned thru trial and error, but with greater

   ◦ SPEED

   ◦ ACCURACY

   ◦ DOCUMENTATION

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Why Automate

◦ Operational efficiencies

◦ Revenue-generating output

◦ Value-add operations (repack)

◦ Control exposure to hazards

Why Automate

◦ Competitive objectives
◦ Precise blends
◦ Agronomic, economic and environmental
◦ Timeliness

Speed

- Pumping Rates?
  - Does flow rate give you the speed you need?
  - Additional load out bays?
  - Efficiency?

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Speed

◦ Automation Objectives - Keep trucks moving thru organized and sequential operation

- ◦ Select Order or Recipe
- ◦ Size the load to the tender truck
- ◦ Press "Go" and let it happen
- ◦ Staging of valves and pumps
  - ◦ Flooding delay
  - ◦ Shut down sequence to reduce hammering
- ◦ Keep trucks staged and moving

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Speed

◦ Repetitive operations
◦ Value-add
◦ Repackaging
◦ Record keeping

Accuracy

◦ Mass Flow Meters

  ◦ Legal for resale
  ◦ Measure any liquid product regardless of temperature or density
  ◦ Measure temperature and density

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◦ Mass Flow Meters
  ◦ Flexibility for product changes

Accuracy

◦ MAG Meters
  ◦ Legal for resale for a single product
  ◦ Works best with fluids that have good conductivity
    ◦ Conductivity requirements to measure
    ◦ Conductivity requirements to be NTEP

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Accuracy

◦ Positive Displacement Chemical Meters
  ◦ Legal for resale
  ◦ Requires adjustment for accuracy as density or viscosity changes
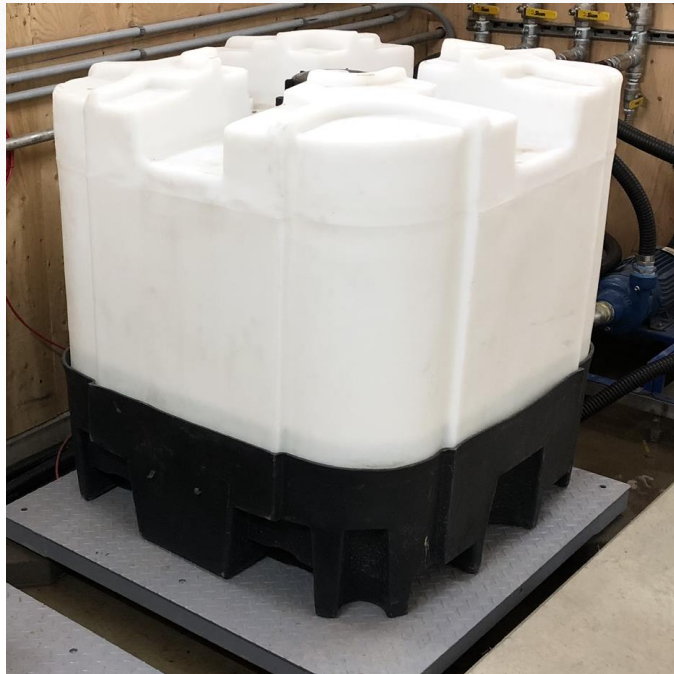 ◦ Single product

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Accuracy

- Deck Scales
  - Legal for resale
  - Always accurate
  - Multiple products

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More scales

Accuracy

◦ Automation advantages
  ◦ Allows reading or meters and scales in motion
  ◦ Stages, controls and manages all pumps and valves to accomplish order
  ◦ No concern of under or over loading the transaction

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Documentation

◦ Did I write it down?

◦ Did the ticket get to the office?

◦ Did all the transactions get billed?

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Documentation Objectives

◦ All actuals are recorded for each transaction
◦ Operator can review if order was correctly dispensed
◦ Accuracy of each product can be analyzed

Documentation Objectives

◦ After the Transaction

◦ Transaction can be sent to office electronically for billing

◦ Inventory is updated

   ◦ Supports operational planning

   ◦ Allows review to be sure transactions were billed

◦ Historical data and Reports

   ◦ All transactions are saved to file

   ◦ All transactions can be reviewed in event of customer inquiry

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What can be Automated?

◦ Liquid Blenders

  ◦ Make product to go directly to grower

  ◦ Make product to go to storage

    ◦ Operate mixer sequentially

    ◦ Decrease inventory of raw ingredients

    ◦ Increase inventory of "made product"

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What can be Automated?

◦ Review the process

  ◦ Make sure an expert has reviewed the process

    ◦ Write the sequence down for any product to be made

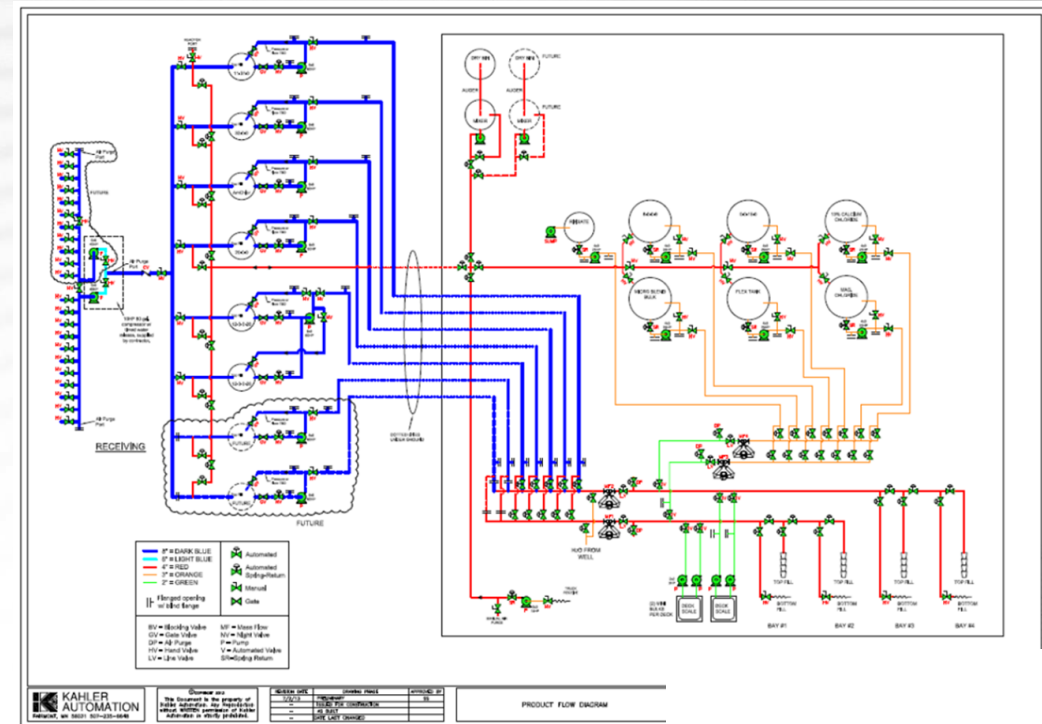   ◦ Set up the automation to do this precisely

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What can be Automated?

◦ Truck Loading
  ◦ Single ingredient dispense (wholesale products)
  ◦ Blended order dispensing
    ◦ "Splash Blending" - sequential
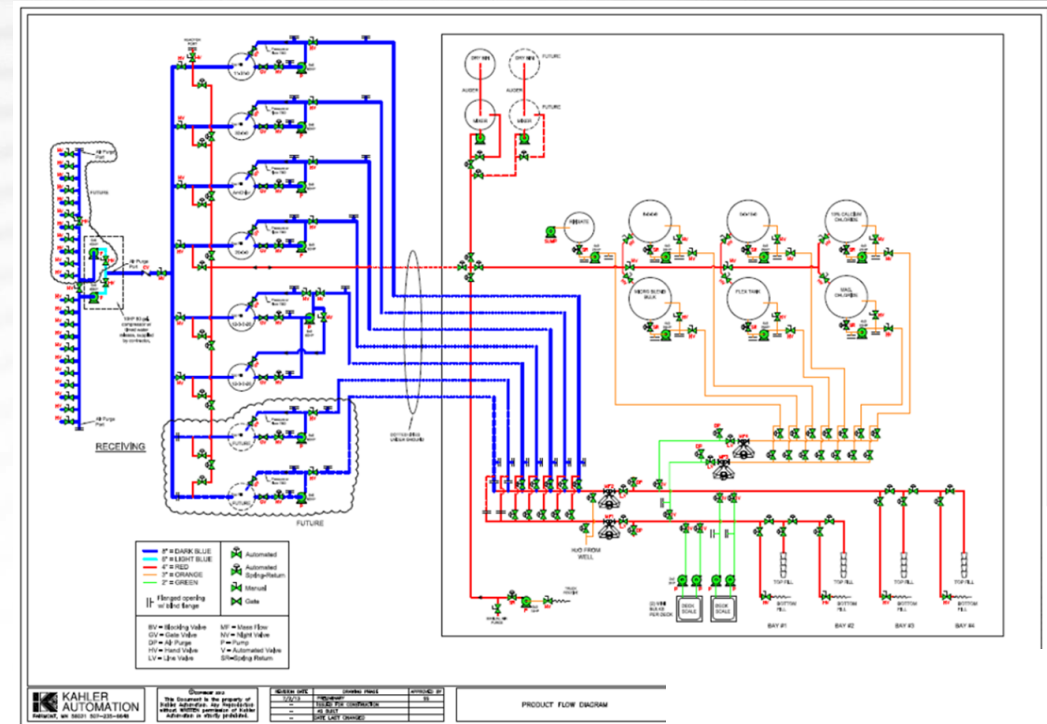   ◦ "Line Blending" - simultaneous

How do I put it together?

- Design a plan
  - Put a plan together as you wish the plant to operate
  - Review the plan for accuracy and speed
  - Review the plan for "compatibility"
  - After you think you have it right, have an industry expert review this for problems
- Review the process for automation sequences
  - Work closely with Agronomy or Transaction Management Software provider
  - Review sequential priorities
  - Size the pumps to accomplish the procedures
- Develop a plan to manage inbound inventory

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Some common starting points

◦ Products
◦ Amount per load
◦ Target load times
◦ Incompatibilities
  ◦ Tolerance of cross-product
  ◦ Air-purge or follow-by
◦ Staff or unstaffed
◦ Data flow
◦ Traffic flow
◦ Receiving
◦ Recirculation

Anything else?

◦ Get buy in from your employees

  ◦ Talk the new system over with the operators and employees

  ◦ Review your goals

  ◦ Explain how automation will speed up all facets of the process

  ◦ Have a "person who owns the system"

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Anything else?

◦ Safety

- ◦ Begin with a plan
- ◦ Build for it with components safe for your employees and customers
- ◦ Communicate it
- ◦ Be sure all procedures are followed to keep everyone safe from harm

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Thank you!

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