Integration of Manual and Automatic Procedures

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Orlando 2017
Savannah River Site – Nuclear Weapons

Sea Wolf 1996.
U.S Navy photo courtesy of Electric Boat Corporation by Jim Brenna.
Human Nature:
Task Experience ≠ Success

SHAMPOO

CONDITIONER
Human Nature:

Competence ≠ Efficiency
Human Nature:
Drivers are More Aware Than Passengers
Human Nature:
Competent People Like Reliable Help
Vision:
Automation Helps Operators
Solution:
Engage the Operator
264-H Diffuser Tank Transfer

5.1 Transferring Filled Product Tank

5.1.1 SELECT the Product Tank to be transferred:
- DS-1500
- DS-1600

5.1.2 OBTAIN samples from the tank to be transferred.
Solution:
Familiar Procedure Format on Operator Interface
Solution:
Blend Manual and Automatic

Command
Perform
Verify
Solution:
Divide Plant into Units or Groups

Plant

Feed Area
- Feed Unit 1
- Feed Unit 2

Process Area
- Process Unit 1
- Process Unit 2
- Pump
- Equip
- Rcvy Tnk
- Equip 1
- Rcvy Tnk
- Equip 2
Solution:
Divide Equipment into Units or Groups
Solution:
Blend Manual and Automatic

PTank A
V-401
Grp P-100
Grp P-200
Grp P-300
V-402
RTnk B
5.1. Transfer Material

1. ENSURE valve V-401 is “Open”.
2. ENSURE valve V-402 is “Open”.
3. ENSURE “Pump Group P-100” is “On”.

Solution: Command – Manually by Operator at Interface, Perform – Computer, Verify - Computer
Solution:
Operator Can Also Check the Result
Solution: Command – Manually by Operator at Interface, Perform – Computer, Verify - Computer

5.1. Transfer Material

1. ENSURE valve V-401 is “Open”. hh:mm:ss mm/dd/yyyy
2. ENSURE valve V-402 is “Open”.
3. ENSURE “Pump Group P-100” is “On”.

EXECUTE
Solution:
Operator Checks the Result

- PTank A
  - V-401
  - Grp P
    - P-100
    - P-200
    - P-300
  - Rtnk B

Operator checks the result after the integration of manual and automated procedures.
5.1. Transfer Material

1. ENSURE valve V-401 is “Open”.  
2. ENSURE valve V-402 is “Open”.  
3. ENSURE “Pump Group P-100” is “On”.

Solution: Blend Manual and Automatic
Solution:
Operator Checks the Result

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PTank A

V-401

Grp P-100

Grp P-200

Grp P-300

V-402

RTnk B
Benefit:
You Don’t Have to Automate Everything at Once

one bite at a time...
Benefit: Electronic Assistance Yields Confident & Successful Completion of Mission
Benefits:
Summary

- Compensate for limitations of human nature
- Determine the right blend of manual and automatic
- Keep the operator engaged. Increase:
  - Quality
  - Efficiency
Further Information – Chris Kourliouros
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