



RSI Simcon, Inc.

North American Training Services

80 Days to Operator Competency

SulfurUnit.com
MORE PRODUCTION - LESS RISK!

FCC Conference League City, Texas April 12 – 16

Sulfur Conference League City, Texas April 14 – 16

Coking Conference Galveston, Texas April 19 - 23

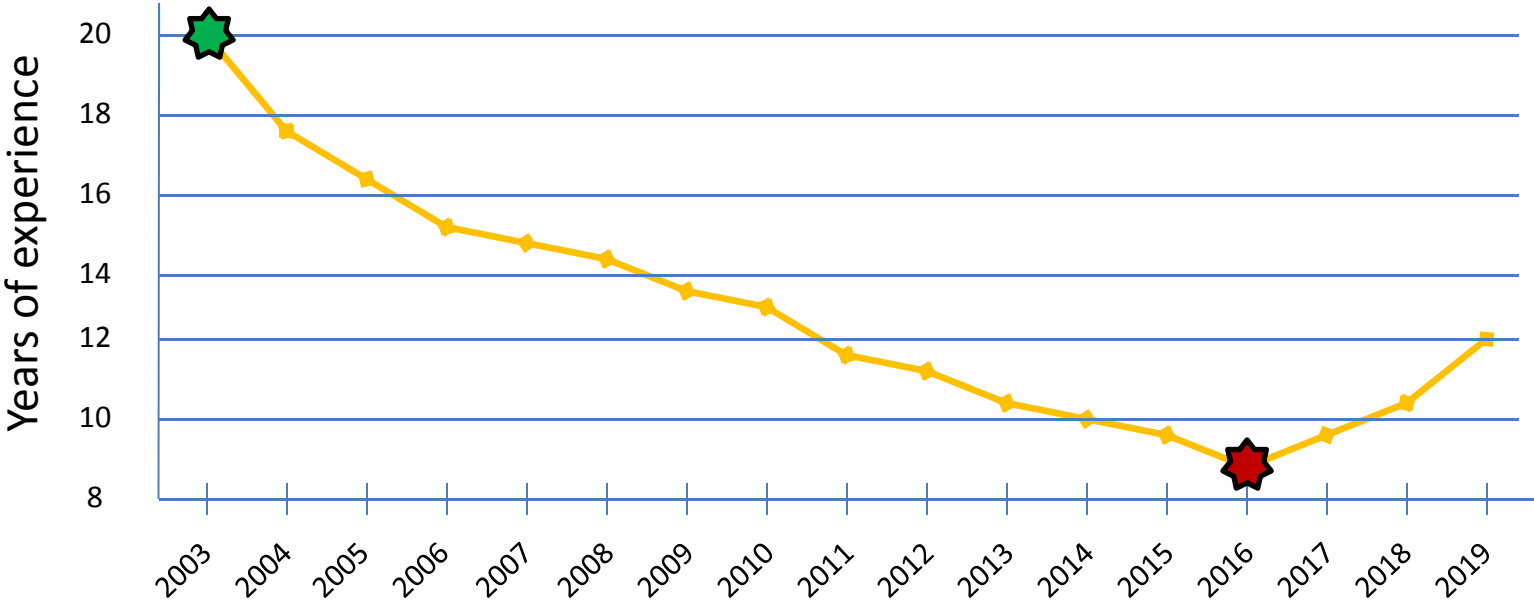


Presentation Topics

- Baby-boom effect
- Skill erosion
- Capability – Demand gap
- Consequences of human error in the refining industry
- Operator training interventions and strategy for closing gaps
- 80 days to competency
- What is a simulator and how they are used
- Benefits of a comprehensive operator training program
- RSI simulation expertise
- Q & A

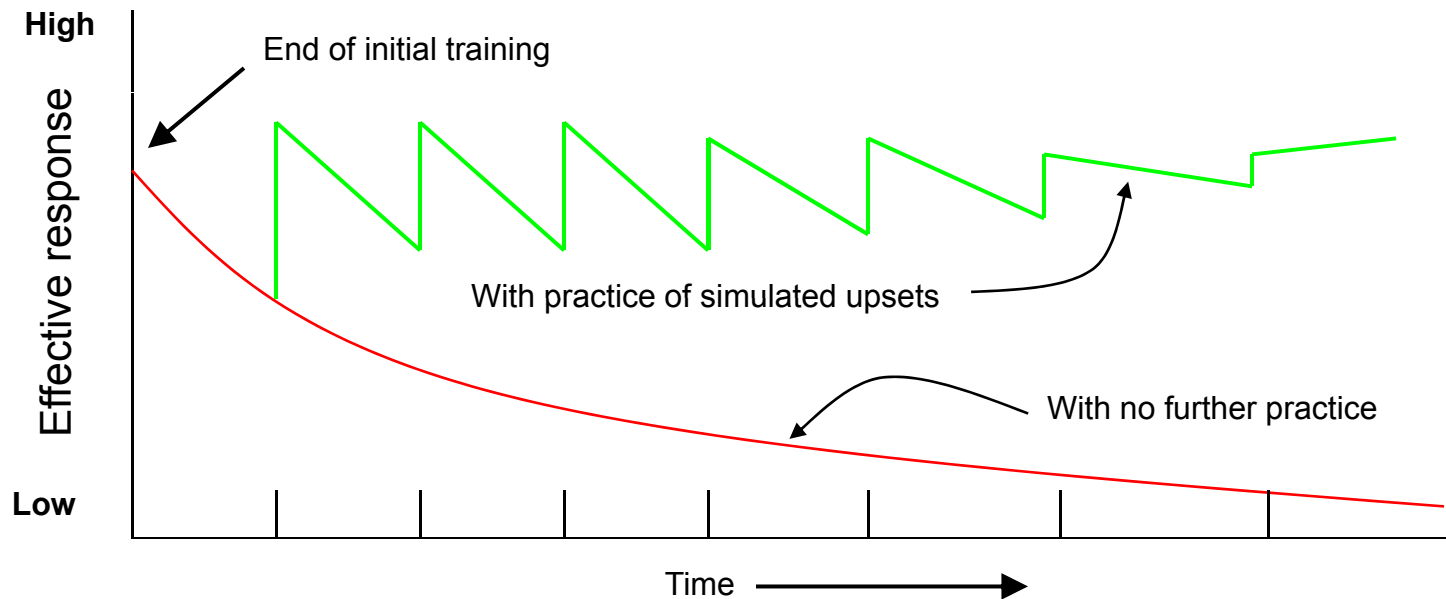
Baby boom effect

Competent (adj); having suitable or sufficient skill, knowledge and experience



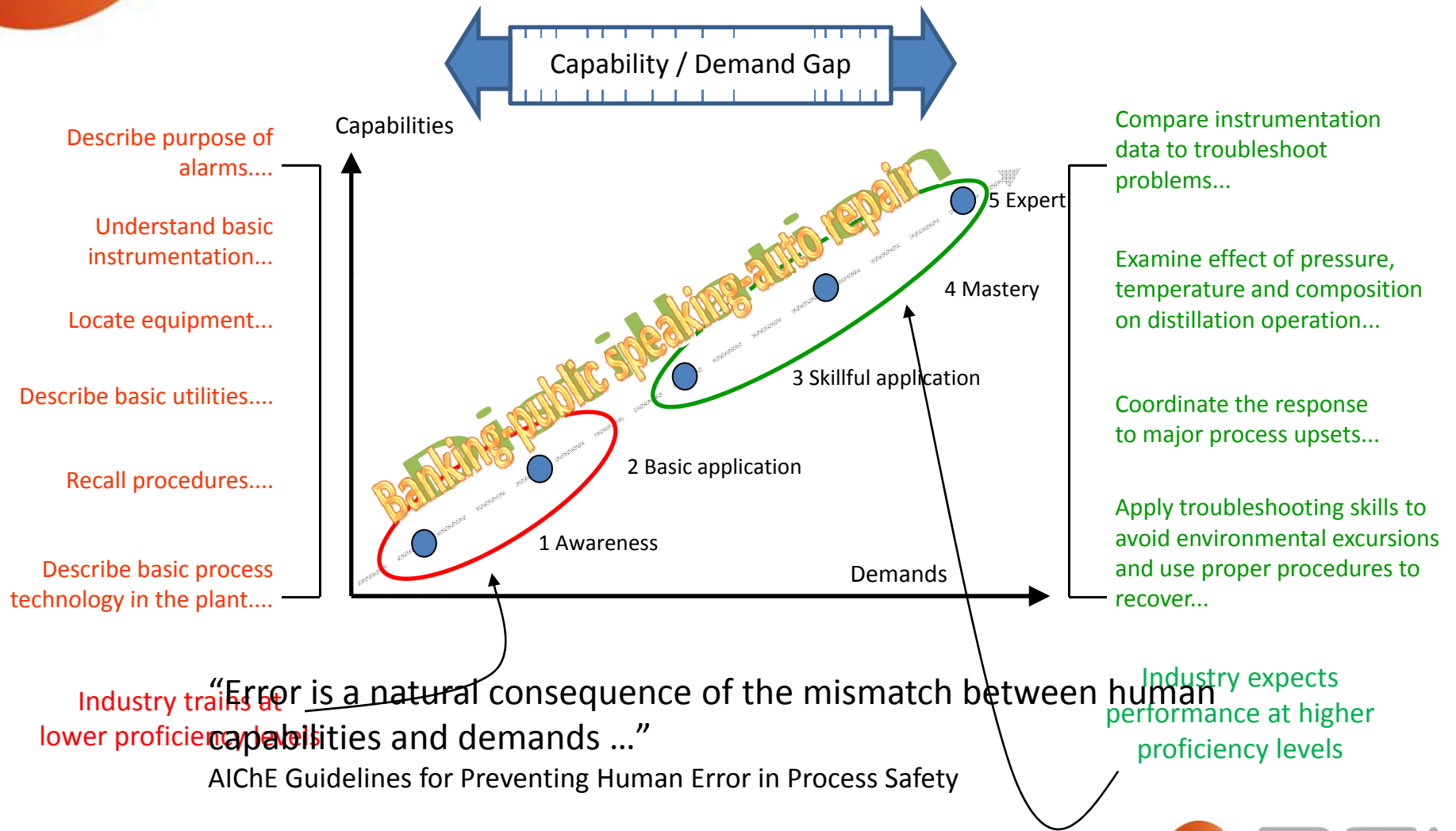
The importance of sustaining your training program

Performance degrades with a sustained training program



1990 Chemical Manufacturer's Association - "A Manager's Guide to Reducing Human Error"

The Capability/Demand Gap



Consequence of the Capability/Demand Gap

- Fatal accident, Tosco Avon refinery, Martinez California 1997.
 - Fatal collision at Reno Airport, 1997.
 - "... operator training materials were outdated."
 - "... the flight crews and air traffic controllers were properly trained and certified."
- Fatal accident: Bethune WWTP, Daytona Beach, Florida 2006.
 - Shuttle Challenger disaster, 1986
 - "The CSB found no evidence that workers at the Bethune Point WWTP received any methanol, no reason to question the competence of the individual technical specialists or managers."
 - "... no reason to question the competence of the individual technical specialists or managers."
 - hazard training in the last 10 years."
- MD83/Shorts 330 crash Charles De Gaulle Airport, 2000
- Fatal accident, Baker Panel Report on BP Texas City Isomerization explosion 2007.
 - "... the reason to doubt that everybody involved in this accident was not properly qualified and certified degrees across all 5 BP U. S. refineries."



Operator training interventions

3 general categories:

Simulators can be used effectively for training on:

Technical Fundamentals

- DCS Introduction
- Math for technicians
- Instrumentation
- Pumps
- Valves
- Thermodynamics
- Process control
- Chemistry

Process Fundamentals

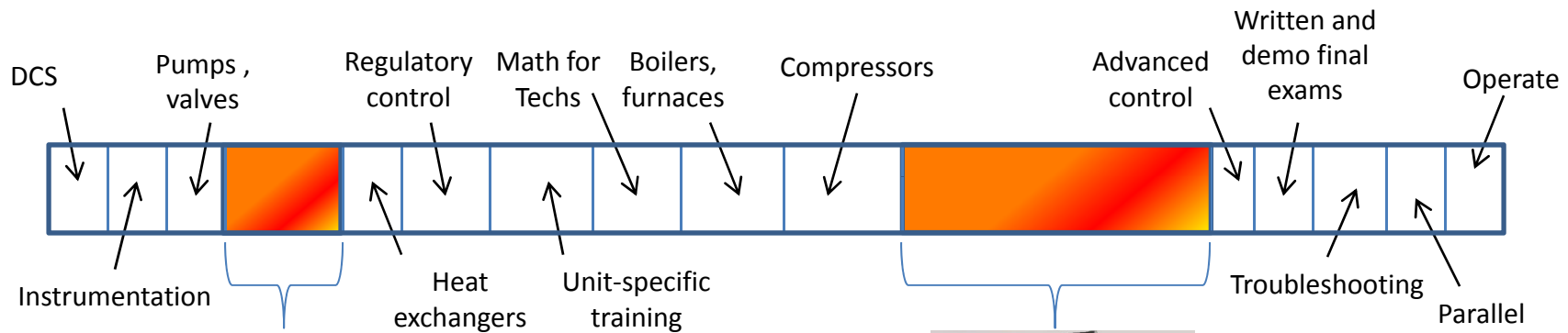
- Distillation
- Boilers
- Furnaces
- Compressors
- Reactors
- Refrigeration
- Heat exchangers
- Troubleshooting
- Regulatory and advanced process control
- Basic Multi-variable Process Control (MPC)

Unit Specific Training

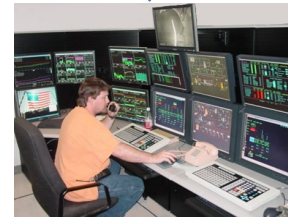
- Process Description
- Procedures
- Training workbooks
- Assessments
- Unit drawings
- DCS unit-specific
- Routine duties
- Safety systems
- Advanced regulatory control
- Advanced process technology
- Multi-variable Process Control (MPC)

Strategy for building a sustainable training program

- Immediate focus on developing comprehensive training programs



Technology-specific
Process Fundamentals
Generic Simulators



Unit-specific training
High Fidelity
Simulators

- Sustain with a Maintenance Program tied to plant MOC process



80 days to competency

1. DCS Introduction	4
2. Instrumentation Basics	5
3. Process Fundamentals	2
4. Technology-specific Fundamentals	5
5. General Computer Skills (ongoing)	
6. Regulatory Control	5
7. Unit-specific DCS	3
8. Unit-specific Control Strategies	5
9. Job Orientation – Routine Duties (ongoing)	
10. Unit-specific Simulator Training	30
11. Multivariable Predictive Control (MPC) Basics	2
12. Unit-specific MPC	5
13. Advanced Process Technology	2
14. Final Written and Demonstration Exams	2
15. Parallel	<u>10</u>

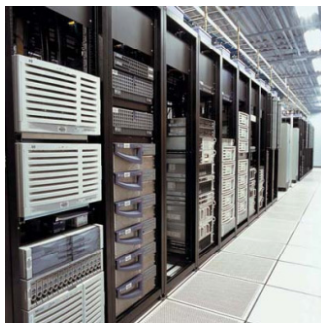
Total days in training program

80 Days

Is it the plant or the simulator?



Control Room



DCS



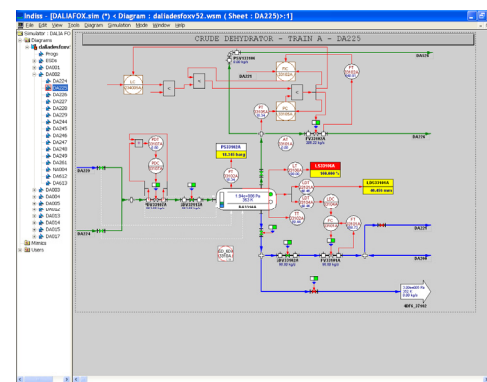
Plant



Training Room



Emulated DCS



Simulated Plant

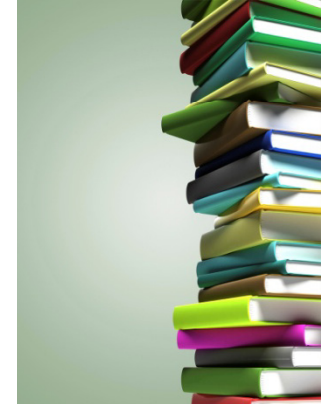
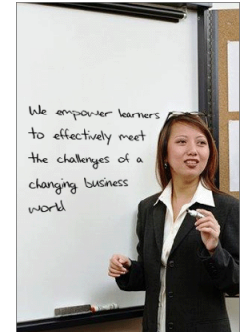


Simulators; more than just training

- A high fidelity OTS is expected to provide intensive training in various plant operator regimes such as:
 - Normal operations
 - Cold unit startup (summer and winter conditions)
 - Unit re-start from tripped conditions
 - Normal and emergency shutdowns
 - Process upsets and emergency conditions
- The OTS allows for validation of:
 - Procedures: startup, shutdown, normal and emergency
 - Critical process designs
 - Critical automation systems, SIS logic, ESD and CCA
 - DCS control configuration

RSI Simcon Operator Training Services

- Training Program Evaluation
 - Analyze current state of operator training against plant expectations
- Training Gap Analysis
 - Identify competency gaps for targeted training
- Training Program Development and Execution
 - Manage design and execution of operator training and development programs
- Training Simulators
 - Provide clients with training programs to compliment simulation technologies





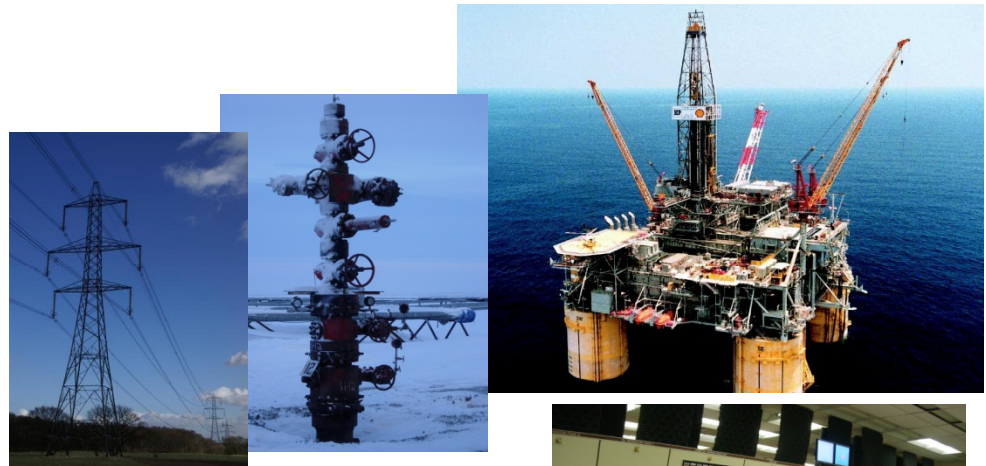
Complete training packages

Our acquisitions and expansion into operator training services uniquely positions RSI to offer our clients:

- *Rigorous simulation technologies in a variety of fidelities to meet our client's training, process design, and safety needs*
- *... and training solutions to compliment every one of our simulation technologies, providing our clients with operator competency assurance to meet their business needs*

Simulation expertise

- For more than 40 years RSI has supplied dynamic simulation solutions to these energy sectors:
 - Onshore / offshore oil and gas
 - Production platforms
 - LNG Processing facilities
 - Refining processes
 - Pulp and paper
 - Chemicals
 - Coal liquefaction
 - Utilities



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Simulated processes

RSI has process simulation expertise in **all** sectors of the oil and gas industries

Production and LNG

Storage and Offloading
Onshore production
Floating Production
Receiving facilities
LNG Terminals
MEG Injection
LNG Carriers
LNG storage
Gas lift



Offshore wellhead
Pipeline networks
Subsea pipelines
Gas compression
LNG liquefaction

Refining

Atmospheric Distillation
Selective hydrogenation
Alkylation – Sulfuric, HF
Fluid Catalytic Cracking
Sulfur Recovery
Steam Reforming
Vacuum Distillation
H-oil
Lube Oil
Blending
LC Fining
Visbreaker
Residual FCC
Hydrocracker
Delayed Coker
Isomerization
Steam Cracking
Catalytic Reforming
Aromatics Extraction
Hydrogen Production
Ethylene Dimerization
Hydrodesulphurization



Chemicals

Ethylene
EB Styrene
Xylenes Separation
Polyethylene
Polypropylene
Ethylene Oxide
Ethylene Glycol



Methanol
Ammonia
Urea

Benefits of a comprehensive operator training program

- Improve plant safety and reliability
- Address ageing workforce; new generation of workers in need of training
- Reduce time-to-competency
- Accident risk reduction; safety through composure
- Effective response to abnormal situations
- Normal and emergency procedure validation
- Improve yields
- Standardize knowledge and procedures
- Improve response time



Open discussion, Q&A



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