



The Value and Place for Electronic Training
Kaiser Aluminum – 1990's – A True Story

Bill, a production worker – I should say – a GREAT production worker, was working in the Green Carbon Anode production area. It was swing shift and the mechanic had gone to lunch/dinner. The Anode press had a turntable with an anode mold. This turntable was about four feet above the anode roll conveyor. A small lift table would extend upwards to “catch” the freshly pressed anode and gently lower it to the conveyor below. The lift table was a section of roll conveyor connected to a single hydraulic cylinder. A sheer pin on the cylinder shaft kept the lift table “square” with the rest of the roll conveyor. On this particular cycle, the sheer pin failed, the lift table rotated about 20 degrees when lowering the anode to the roll conveyor, and jammed the system. Bill, seeing the mechanic address this issue “hundreds of times before” man-handled the anode off the lift table and down the conveyor, grabbed a pry bar, and started the counter rotation of the lift table to “slide it back into place.”

Bill was unaware of the following:

- The hydraulic cylinder was POWER DOWN as well as POWER UP.
- The mechanic always shut down the hydraulic pump before using the pry bar technique

Once the jammed lift table was freed, it slammed down with full hydraulic cylinder force. This whipped the pry bar up. The end hit Bill in the forehead causing a serious injury – broken skull, personality changes, and lots of lost time.

There are only three reasons why someone doesn't do something correctly:

- They don't want to (a matter of will)
- They didn't know they were supposed to (a matter of communication)
- They don't know how (a matter of training)

In the analysis of why Bill didn't follow lock out procedures, we identified “Lack of MEANINGFUL training” as one of the root causes of the accident. He was a great worker and went above the call of duty many times. He was a great communicator – always informing and being informed about shift responsibilities. However – he didn't know the hydraulic cylinder was POWER DOWN. Further more – he had lock out training – but it didn't seem like a lock out situation – because – “How do you lock out gravity on a lift table that weighs maybe 40 pounds?”

During this time, the smelter's management team was working on a process improvement program modeled after the Malcolm Baldrige National Quality Award. One key aspect of this program calls for determining “best in class” through a process of benchmarking.



Benchmarking is the process of measuring an organization's internal processes then identifying, understanding, and adapting outstanding practices from other organizations considered to be best-in-class.

We decided on finding an organization that has the following attributes:

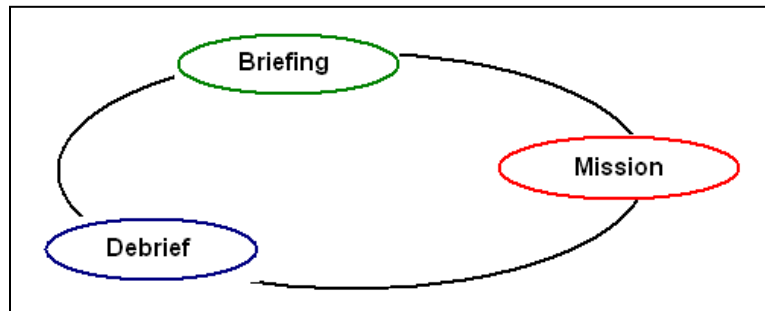
1. One mistake and you're dead
2. Employees are always changing jobs
3. Trainers are never the same (see Appendix 1)
4. Good track record of no deaths

The chosen organization was the Air Force. The job was "Fighter Pilot."

The following information is a summary from the extensive benchmarking report on Fighter Pilot training processes:

The Air Force has a small loop of three tasks that they repeat over and over again. The small loop is:

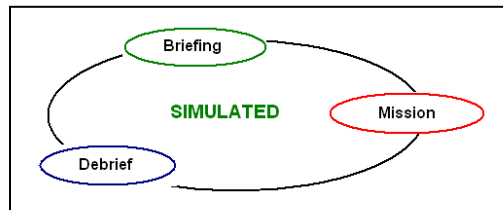
1. Brief a pilot on his mission
2. Conduct the mission
3. Debrief the mission and score the pilot



The loop is then further expanded into "simulated missions" and "live missions." If a pilot is being trained on a specific missile avoidance technique the training loops might be arranged as such:

Loop #1 - Simulated

1. Brief Pilot on Missile Avoidance Technique #MAT1 daytime, good weather
2. Conduct the mission in a simulator
3. Debrief the mission and score the pilot



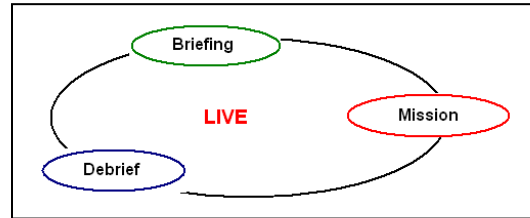
Loop #2 - Simulated

1. Brief Pilot on Missile Avoidance Technique #MAT2 nighttime, bad weather
2. Conduct the mission in a simulator
3. Debrief the mission and score the pilot

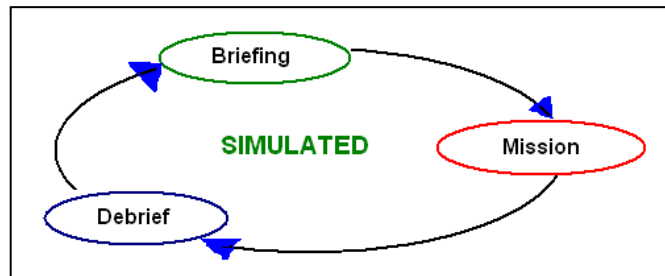


Loop #3 - Live

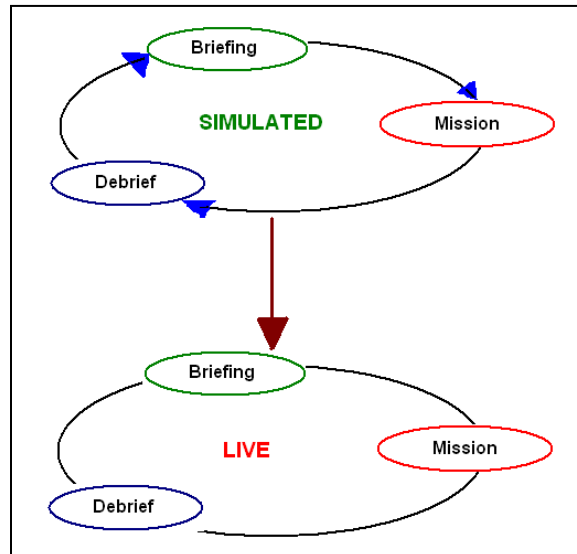
1. Brief Pilot on Missile Avoidance Technique #MAT1 daytime, good weather
2. Conduct the mission in a real plane
3. Debrief the mission and score the pilot



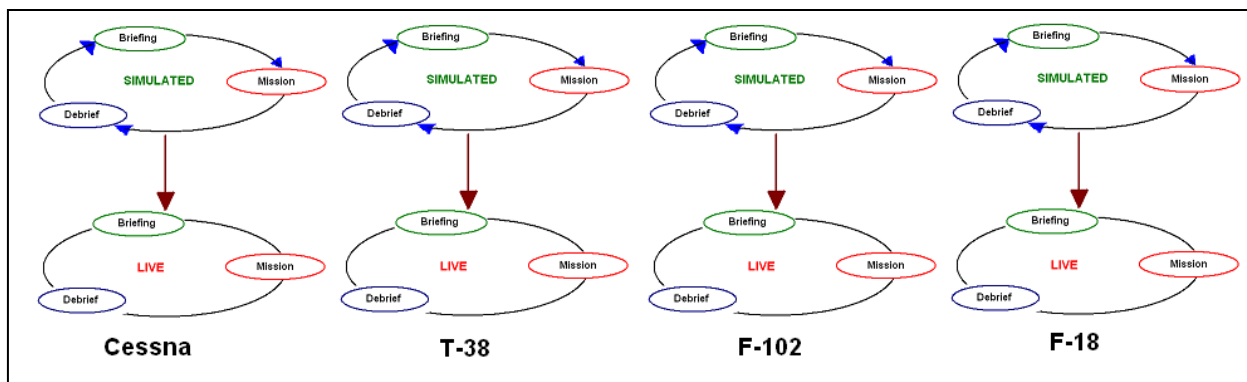
Pilots are given unlimited Simulator time to hone their skills and reach the required score. Then they are allowed to take the LIVE mission.



A successful MISSION sequence is a combination of several SIMULATIONS and a LIVE mission. Scores are recorded. All results are added to the pilot's training history records.



Finally, our pilot progresses from Cessna to F-18 through a hundreds of missions.





How do we translate that looping technique to an aluminum smelter? - Computer-Based Safety Training

Randy discovered the Williams Learning Systems, a subsidiary of the Williams Brother's oil company. Having suffered a major industrial accident affecting employees and civilians, Williams had the dubious honor of the largest OSHA fine. At the time of the accident, their training processes included safety meetings and attendance sheets. OSHA identified that the sign-in sheets DID NOT constitute learning – those sheets simply identified that the employee was “in the room.”

Williams developed an elaborate and modularized training system that was administered by computer. The results revolutionized their training processes. Our Kaiser facility bought the program.

Lock-Out Tag-Out Training – An Kaiser Union Employee Experience

Steve was a 20-year union employee working in the Rodding Room. He was the union's safety representative for Rodding. The union was VERY hesitant to agree to computer-based training. Randy worked with Steve to review the Lock-Out training module. In addition, Randy had the maintenance department build a desktop simulator containing electrical disconnects, ball valve, breaker, and several other common energy disconnect devices found in Rodding. Finally, Randy and Steve co-wrote the Briefing, Debriefing, Scoring, and LIVE mission aspects of the training. We started with a group of five union volunteers. The briefing took fifteen minutes. We assigned each a computer and they took the Lock-Out computer-based training module. There were several questions on PC usage as most had never touched a computer before (this was 1993). We debriefed them, conducted the desktop simulation, debriefed, then conducted the LIVE mission on each employee's job area, recorded their scores, debriefed, and graduated our first five.

The process continued in a very apprehensive manner until Bob, a 30+ year union employee spent four hours on the computer. The module had taken most people 45 minutes. Bob emerged with big tears in his eyes. Here are his words:

“I have that thing where I see things backwards. My teachers told me I was dumb and didn't try hard enough. My grades were horrible...so I dropped out and came to work at Kaiser. The computer let me go back and forth on each page until I understood the lesson. I got a 90% on the test! That is the very first “A” I have ever got in my WHOLE LIFE!”

That single event broke the logjam. The union agreed to computer-based training and actually helped move it throughout the plant.

When we started up a brand new Carbon Plant, we rented a trailer containing 12 computers and processed the entire work force through 7 “New Carbon Plant Missions” before graduating them.



A Final Word

Electronic training cannot be the only method of training. I have seen several initiatives fail when management bought a system and expected people to use it. That method DOES NOT WORK. Instead, electronic training must be “engineered” as an integral component to the fabric of skill development. The alternatives and “old ways” must be removed from the organization. Schedules must be altered. Resources must be deployed. It is HARD WORK to change a training culture of hour-long monthly safety meetings to 15-minute briefing sessions with individual people moving through the computer training. We increased manning an extra 2 people per shift on certain weeks so we could have two people on training each shift.

We eventually moved Behavior-Based Employee Feedback to computer training. We even moved non-safety training to computer such as Operator-Performed Maintenance and Quality Training.

Towards the close of my Kaiser experience, Rodding went one week with only 17 minutes in equipment down time (yes....one week..17 minutes). We had a run of 4 months without a single “accident” including “Near Misses.”

I am a believer.



Appendix 1 - A Note on the Reliance on Individual Teachers

In primary (elementary) school, I figure that I had two teachers per year. In my K-6 years, I experienced 14 teachers. In junior high (middle school), I had five teachers per year, I experienced 15 teachers. In high school I experienced another 15 teachers. Finally, in college I experienced ten teachers per year, about 40 teachers. So, in ALL my student life I experienced 84 teachers. I remember ONE – Mr. Abbott – Algebra 2 – junior high. Mr. Abbott instilled in me the love of finding a solution to a problem. He taught me how to focus and think.

All 84 of these teachers went to college to become teachers. They had formal training on teaching. And all I remember is ONE of 84 (1.2%)?

The Air Force clued into this fact. Their design is to place less emphasis on the teacher and more emphasis on the process of learning and applying. The teacher becomes a Facilitator of Learning by managing the flow of students through the SIMULATION-LIVE loops.