

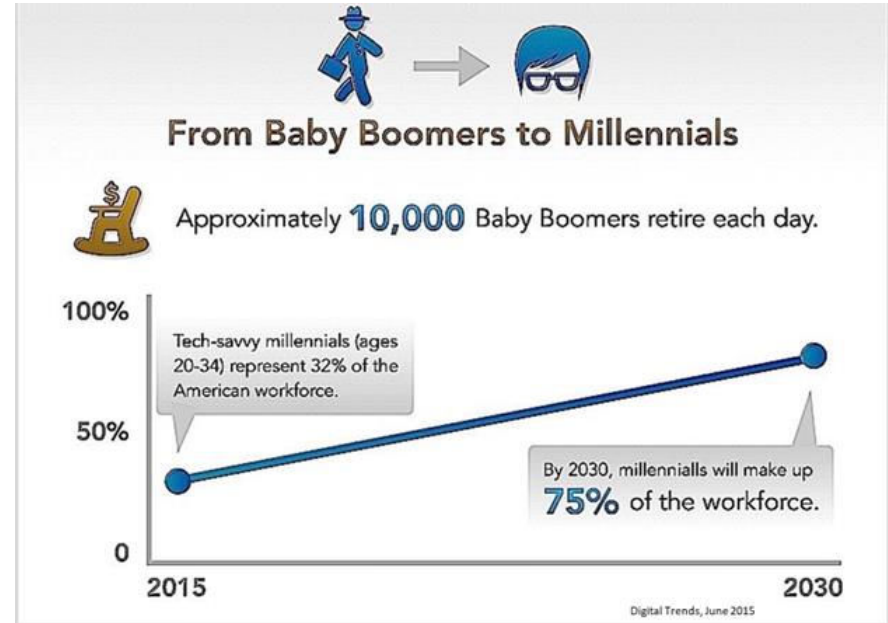
Manufacturing Knowledge Capture and Transfer.

Tom Kearns & Michael Brendel
Booth #616

The Workforce is Changing: Losing Operating Expertise.

Deloitte and The Manufacturing Institute Study 2021:

- In NA Manufacturing, 2.1 million unfilled jobs by 2030, costing \$1 trillion in 2030
- Attracting and retaining a quality workforce is a top focus for 83% of companies
- Almost 45% of manufacturing executives have turned down business opportunities due to lack of workers



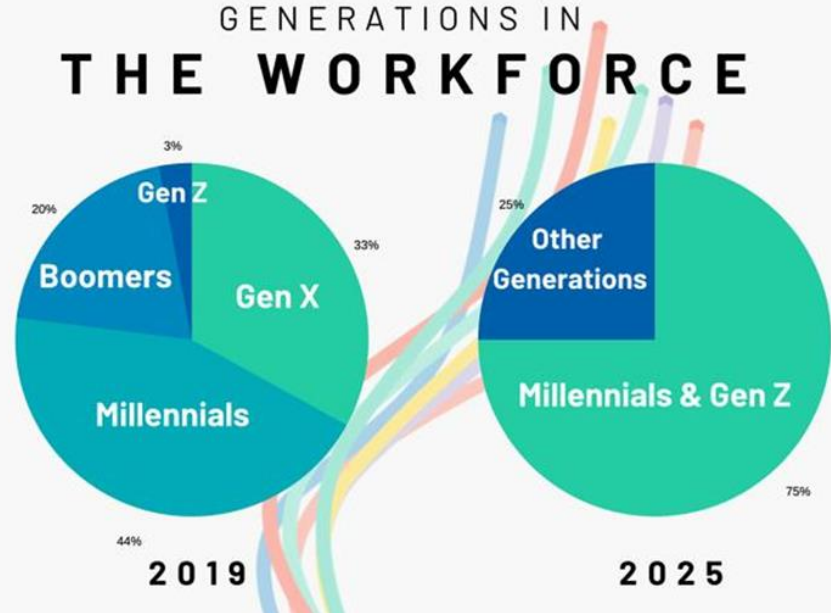
Knowledge Capture and Transfer Challenges in Manufacturing.

What our customers are telling us:

- Losing 'tribal knowledge'
- Practice does not match procedures
- Relying on few SMEs creates inefficiencies
- Operators know <50% of job at qualification
- Inexperienced operators are training new operators

Customer impacts:

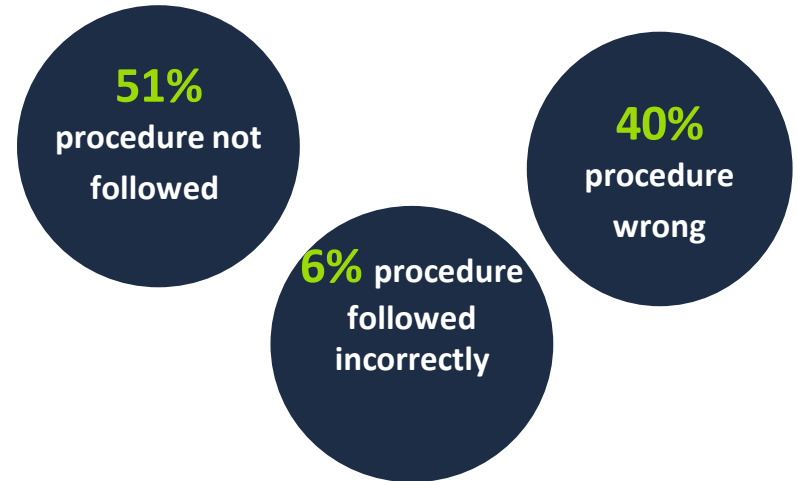
- Unplanned downtime events (equipment reliability)
- Safety & environmental incidents
- Production losses
- Morale issues, SMEs overworked



Procedure Execution is Critical.



ASMC study identified causes of abnormal events as:



Based on data collected from customers in North America, Voovio believes this is valid because *procedures are often full of ambiguity.*

SOURCE: "The Abnormal Situation Management (ASM) Consortium"

Procedure Analysis.

We randomly sampled and analyzed ~500 customer procedures:

S/U and S/D incl Equipment Swaps	80%
Normal	10%
Emergency/Abnormal	7%
Maintenance Overhaul	2%
Temporary	1%

90%
Of SOPs
analyzed
contained
ambiguities

Inconsistencies in procedures.

- **Procedure does not reflect operator practice**

Written procedures vary from the unit's established practice with some practices varying from shift to shift either due to training inconsistencies or a lack of standardized execution.

- **Ambiguities and generalizations**

Procedures are written with a lot of technical content, generalizations and ambiguities that assume clear understanding by the operator.

- **Inexperience; Lack of practice**

Operators only experience or practice ~40% of the procedures they qualify on for any given job.

Voovio is the Digital SME.



Implemented across the Globe:



Thank you!



Tom Kearns

Booth #616

Account Executive

(770) 634-6531

tkearns@voovio.com

Follow us on LinkedIn
or visit www.voovio.com

Customer Case Studies.

Onboard faster & ease pressure on SMEs.

Impact on	Benefit	Time Required	
		Voovio	Traditional
Procedure Competency	65% faster	3.30 hours	9.75 hours
SME / Trainer Time	>73% reduction	2.25 hours	8.25 hours

- Controlled experiment at major Texas Petrochem facility with input from Rice university, Houston TX – June 2021.
- 24 operators, split into 2 groups, learned 2 SOPs in 2 days. No experience in that production unit prior to exercise.
- Traditional method: classroom, review P&IDs/SOP, field walkthrough
- Voovio method: Voovio Guided/ Learn, field walkthrough

Standardize Training & Best Practices.

Challenge	Impact
Standardization in Procedure Execution	Locks in best practices across shifts
Unplanned downtime due to procedure execution	Fewer unplanned events with est. savings \$50k to >\$500k per procedure per year
Not enough SME time for training	50% reduction – free SME up for important knowledge transfer
Qualification time too short to learn everything	Reduced time to qualify by 30% while increasing competency
Overtime on training	50% reduction

*Presented by BASF at AFPM Reliability and Maintenance Conference 2019 – confidential – do not share without permission

and Voovio Partnership to improve workforce competency.

“In addition to reducing the time its SMEs spent training others by half and greatly accelerating the learning process, BASF has used... [Enhanced Reality] ...

- to reduce unplanned events and startup delays
- improve equipment reliability
- reduce downtime
- increase safety
- and maximize profitability.”

* Source: BASF presentation to Manufacturing Leadership Council – Sep 2021

Inside BASF's Customized Digital Training Simulators

By Sue Pelletier

October 1, 2021 1:29pm



Wherever your company is on its Smart Manufacturing journey, one stubborn issue remains: reducing human error. Whether it's insufficient operating practices and procedural follow-through, equipment operation failures, or inconsistencies in shifts due to capability issues, the human component is a key feature of any reliability strategy for forward-thinking manufacturers.

In a virtual factory tour held September 8, MLC members got an inside look at how BASF Chemical Intermediates is implementing Voovio Technologies US Inc.'s Enhanced Reality training software simulation system to move both new hire and refresher training into the digital age.



CALUMET loading racks have fewer issues with 3rd Party Drivers.

150 trucking companies, >900 drivers

Before Voovio:

- Shadowing time and frequent incidents

Time savings for operators:
75-80%

After Voovio:

- Drivers:

● **are better prepared** "this is now an area we worry less about. Life is a little easier!"



● are more familiar with equipment/site

Oil Refinery.



Site:

Fort McMurray – Alberta, Canada



Unit:

Upgrader

Challenges:



- Extended downtime due to failed compressor startups
- Unit operators reliant on the Operations Coordinator availability
- Lack of knowledgeable operators capable of executing upgrader unit restarts



Solution:

- Simulators for plant startup critical equipment
- Nov 2023 - operators successfully restarted unit without issue following TAR

**Unit restart
without issues**



Petrochemical Company.



Site:
Alabama



Unit:
Multiple Units

Challenge:



- Practice not matching Procedure- >\$2.5MM in production losses
- Retirement of experienced operators. Little experience with “Loss of”/infrequent procedures.
- High turnover: Need better process to train new operators efficiently

Solution:



- 50% reduction in operator onboarding and qualification time.
- In Aug 2023, operators used Voovio to review SU/SD procedures for TAR preparation. Successful shutdown, clearing, LOTO, and restart.

50% reduction
in operator
qualification



Oil Refinery.



Site:

Great Falls, MT



Unit:

Site Logistics- Truck driver loading



Challenge:

- Independent truck drivers require extensive training to load on site
- Operator time spent training
- Frequent incidents and spills, resulting in incidents and high-cost repairs



Solution:

- Voovio platform implemented into the driver qualification process
- Operator over sight reduced by 75%
- In 2023, over 400 drivers qualified to load on site



Over
400
drivers qualified
to load on site

Automotive Gigafactory.



Site:

Austin, TX



Unit:

Cell Manufacturing

Challenge:



- Rapid site expansion required scalable training tools to match hiring demands (>100/month)
- Traditional training takes 2-4 months to achieve certified operator status
- Lack of standardized procedures



Solution:

- Voovio is used to mass onboard new hires
- Increased Knowledge retention: Voovio simulators: Learn by doing
- Standardized training and operating methods

Making mass
onboarding
possible



Global Chemical Company.



Site:
Geismar, LA



Unit:
Utilities



Challenges:

- Ineffective methods to qualify new hires on job
- Low procedure competency amongst operators



Solution:

- Voovio is implemented into the unit's onboarding curriculum for new operators and refresher training,
- 50% reduced SME time required to onboard operators

50%
less SME time
required to
onboard
operators



Specialty Materials Chemical Company.



Site:
West Virginia



Unit:
Nylon Autoclave

Challenge:

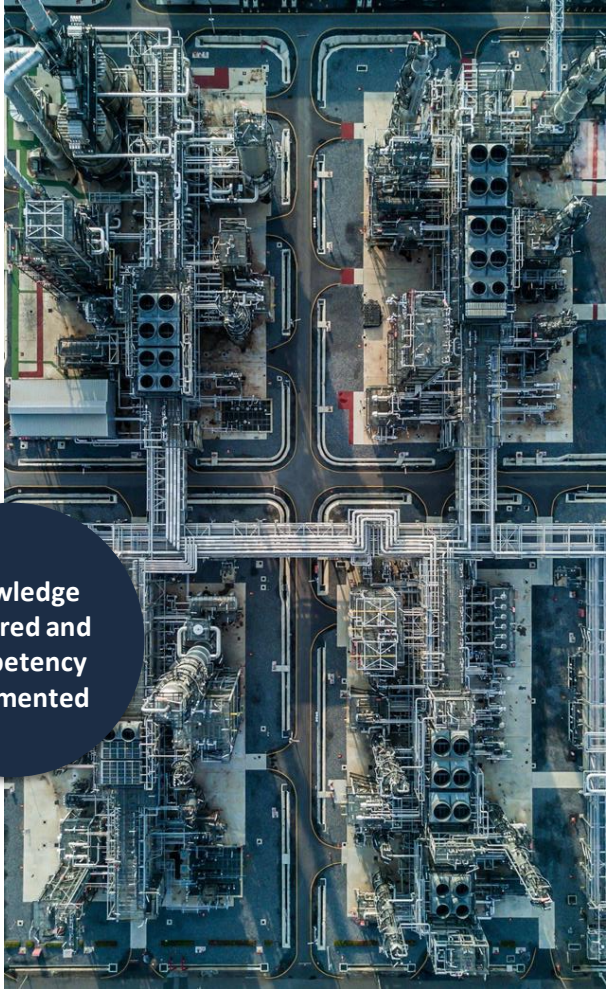


- Regulatory requirement to document operator knowledge on vaporizer operation
- Minimize planned vaporizer shutdowns (rate reductions) to train operators on the procedures



Solution:

- Simulators are part of operator training. Competency documented.
- Simulators assigned for TAR preparation.
- Assignments part of 3-year recertification process



Knowledge
captured and
competency
documented

Feedback.

Operator Trainee Feedback:

"I think I could go out into the field right now and startup the Extruder. I feel now very familiar with the area and procedure."



"This is engaging. Reading a procedure is not engaging. This is the most engaging and effective training I have ever done."



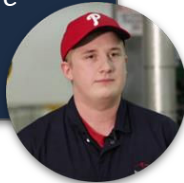
"We went through the SOP in about 10 min in the field because we already were familiar with the area and the SOP. The trainer couldn't believe it."



"When we were out in the field, we knew where everything was and felt familiar with the area. I like the way you learn the detail and sequence of a procedure, so when you're in the field training you learn new things faster and retain the info better because you're more familiar."



"When we were out in the field, we knew where everything was and felt familiar with the area. I like the way you learn the detail and sequence of a procedure, so when you're in the field training you learn new things faster and retain the info better because you're more familiar."



"I feel better armed and have more confidence because I was able to practice in Voovio first."



Trainer Feedback:

"Trainees can see and operate the equipment virtually, having direct report back to how they are performing. Instead of me walking a student through a process 40 min individually, I can now have 16 students do the same task at once. It's a timesaver! It could shorten our training from 6h to 40 min."



"I was fairly impressed with the thought process of how Voovio trains a new operator. It is a really unique approach. My opinion has only changed by getting stronger because after learning how to operate Voovio, I've really seen how it can do a lot of great things."



"Voovio gives the opportunity for seasoned operators to ask questions, check things etc. whereas without Voovio you might not be willing to ask questions".



"It absolutely works. It is a legitimate tool and has a defined place."



"Well done. It was truly a noticeable difference" (between those who had used Voovio & those who hadn't)



"I think Voovio helped a lot for the trainees. There is a time factor when looking through procedures & trying to relate the real world to the procedures. Using Voovio provides clarity on what exactly needs to be done & helps create muscle memory."



Thank you!



Tom Kearns

Booth #616

Account Executive

(770) 634-6531

tkearns@voovio.com

Follow us on LinkedIn
or visit www.voovio.com