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The Benefits of NDT Training Simulators

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Definitions from Merriam–Webster

Definition of *simulator*
one that *simulates* especially: a device that enables the operator to reproduce or represent under test conditions phenomena likely to occur in actual performance

Example of *simulator* in a Sentence
a flight simulator used by pilots
What is an NDT simulator? Why do we care?

How does an NDT Simulator Work?

**UT Simulator**
- Affordable & accessible hardware
- Virtual Test piece
- Educational tools
- Virtual UT device

**RT Simulator**
- Dummy probe
Where does simulator data come from?

EXPERIMENTAL DATA
• UT scan or x-ray of each position to be evaluated
• Data from not only optimal but sub-optimal setups

Advantage: very realistic data
Disadvantage: time consuming data acquisition which is costly

SIMULATED DATA
• Simulation of each UT scan or x-ray position to be evaluated
• Data from both optimal and sub-optimal setups

Advantage: fast data acquisition of many scenarios
Disadvantage: does not account for real life variations in electrical signal
Training and Proficiency Challenges

- Limited Test Pieces
- Safe Access to Equipment
- Limits of Performance Evaluations
- Limited Trainers
Training and Proficiency Challenges: Limited Test Pieces

• Can be expensive
• Requires extensive storage space
• May require special equipment for handling
• Only one student can utilize a piece at a time

Benefits of Simulators
• Multiple trainees can perform inspections at once
• Easy to switch from setup of one piece to another
• Increases the number of inspections per trainee
Training and Proficiency Challenges: Safe Access to Equipment

- Limited number of x-ray and scopes per company
- Limited choice of x-ray levels or gamma sources
- Safety courses required before handling radioactive materials
- Risk of environmental and field conditions

Benefits of Simulators

- No conflict if the source or scope is needed onsite
- New hires can start hands on training on day 1
- Virtual sources options make ALARA = Zero
Training and Proficiency Challenges: Limits of Performance Evaluation

- Instructor has to observe the inspection to give feedback
- Accuracy is based on the experience of the instructor
- Training hours limited to instructor’s availability and manufacturing schedule

Benefits of Simulators

- Setup and inspection parameters can be automatically analysed and documented in a report
- Training can be performed without instructor present
- Users can get immediate feedback from the simulator
Training and Proficiency Challenges: Limits of Performance Evaluation

Errors report
Well positioned marker

IQI
10 AL EN selected
Correct model of ICI
Correct IQI orientation

Screenshots
Training and Proficiency Challenges: Limited Trainers

• Aging workforce
• Pressing work schedules
• Lack of new proficient inspectors

Benefits of Simulators

• Predefined training sessions can be created
• Provides immediate feedback while trainer is not present
• Creates a learn at your own pace environment
TRAINDE RT MANAGER

Profile: Trainee
Session: Casting
Username: Starr
Password:

VALID

v1.1.0
The Benefits of an RT Simulator

- Increases the number of shots per trainee safely
- No conflict if the real source is needed during training
- Perform RT shots simultaneously
- See the invisible, with embedded educational tools
- No radiation protection issue
- Easy to transport
- Receive immediate feedback about potential mistakes
- Improves NDT exam prep for a better success rate!
The Benefits of a UT Simulator

- Fast and easy to set-up
- Saves time and **reduces costs**
- Small initial investment
- **Increases practice time** and number of studied cases
- **Realistic** handling (skew) and signal (noise)
- **Work simultaneously** on the same exercise
- Easy to transport (all included)
- “See the invisible” with the embedded **educational tools**
Benefits of an NDT Simulator

TRAINING:
• Each student can inspect the same part simultaneously
• Simulators can add training tools not available with real parts, such as superimposed image of the flaws on the test piece
• Less mock-ups: Saves money and storage space

PRACTICE:
• Hands on calibration (where applicable) and inspection of parts with flaws
• Multiple virtual parts in one portable unit
• Increases practice time and number of cases studied

TEST:
• By customizing test pieces, including flaw size, shape and location, it may be possible to test inspector’s proficiency on a simulator

SAFETY:
• Avoid lifting and handling heavy parts
• Avoid exposure to radiation and other hazards
Thank you!

Questions?

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Additional Resources

https://blog.asnt.org/high-tech-hands-on-training-the-evolution-of-nondestructive-training-simulators/
https://trainde.extende.com/