

Quarterly Report – Public Page

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Project Title: Human Centric Approach to Improve Pipeline Non-Destructive Evaluation (NDE) Performance and Reliability

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Non-destructive evaluation (NDE) is critical to the efficient and safe operation of pipelines. These inspections, however, are often riddled with unintentional human error, with proven, serious consequences in the form of lost lives and staggering property damage. The objective of this project is to pilot both technology and human solutions that will address this critical deficiency.

Battelle experts in human factor evaluations are leading the investigation, and are collaborating with partnering NDE vendors Mistras Group, Inc, JENTEK Sensors, Inc, and Applus RTD. Extensive interviews, protocol reviews, field observations, and control tests with field pipe defects will be conducted and systematically analyzed to identify and prioritize detrimental human shaping factors in the first 12 months. For the most effective analysis, Battelle experts will optimize the well-established Saba™ Peak Performance System accompanied by Human Performance Technology Front-end Analysis. In the following one to two years, solutions will be developed and piloted, with Phase 2 dedicated to human interventions and Phase 3 to technology interventions.

Results and Conclusions:

The Principal Investigator reviewed approximately 200 open-source citations/abstracts (e.g., web, Battelle library, engineering literature/peer review sources, proceedings, etc.). Sixty (60) full-text articles were identified and acquired for review.

The literature tends to broadly categorize and order the influence of performance shaping factors (PFS) on NDE reliability from most salient to least as:

1. Organizational characteristics
2. Inspection procedures/training

3. Individual characteristics
4. Technology
5. Working (environmental) conditions
6. Group/team dynamics

Very limited data/research on the influence of working (environmental) conditions and even less on the influence of group/team dynamics was identified. Technology no doubt affects performance, but also presents its own set of problems that come with automation. With increased use of automation, higher reliability standards are believed to have been achieved. However, human inspectors, and thus human performance shaping factors (PSF), still play an important role throughout the inspection process. Increasingly, factors related to organizational structure, inter-personal/inter-organizational communication, training, and procedure content are being investigated to determine their influence on effective NDE.

All investigative material (e.g., investigator guide, database, interview job aids, audio/video recording equipment) was gathered and prepared, and a pilot interview was conducted.

Plans for Future Activity:

The main data collection effort has commenced, with interviews expected to continue into July 2016.