US Army Corps of Engineers
Engineer Research and Development Center

Robotic Assessment of Closure Gates for Safe Entry

Need

Conduit inlet of a flood control dam

Materials used in construction of dam outlet works are vulnerable to corrosion and fatigue issues that may compromise the structural integrity of the system and put personnel entering the conduit/tunnel at risk. US Army Corps of Engineers (USACE) maintains many of these aging structures in need of an updated inspection, but placing personnel, including inspection personnel, inside dam outlet works of a facility in an unknown or deteriorated condition presents unacceptable risk to personnel and does not comply with current safety requirements. This issue is further addressed in SoN: 2017-F-47

Approach

The work unit will engage the USACE districts to determine current standard and methods for inspection of flood control dam conduits. Close collaboration between Hydraulic Steel Structure (HSS) safety personnel and project execution team will develop standard procedures for risk assessment and criteria for possible defects evaluation. A robotic platform capable of delivering a multimodal sensing system will be developed to supply the necessary data to the HSS safety personnel before personnel enter the structure.

Outcomes

At the end of this work unit an inspection system will be deployed at flood control conduits for assessment of risk prior to personnel entry. Standard procedures for the use of the system and guidance for safe entry into such structures will be disseminated to the districts. Availability of such systems will directly address the concerns outlined in SoN: 2017-F-47 thus providing safe working environments for our personnel.

UCSD academic partner testing new 3D-mapping technologies

ARGO J8XTR robotic development platform [1]

More Information

POCs, wiki page links, links to other sources of information

For more information on FRM R&D, see the ERDC FRM wiki:
https://wiki.erdc.dren.mil/Flood_and_Coastal_Storm_Damage_Reduction_Research_Program

[1] https://www.unmannedsystemssource.com/shop/unmanned-vehicles/j8xtr-atlas/