



# When it comes to improving outage performance, innovation matters.

Our customers play a vital role in helping meet the world's need for carbon-free electricity. So, when they say they need innovative solutions that ultimately support those efforts, we listen.

While performing factory acceptance testing of a new Spent Fuel Bridge (SFB) at Framatome's Technical Training Center, our engineers were approached by a utility's fuel handlers and asked: why, in 25 years, hasn't there ever been any upgrades to the Spent Fuel Handling Tool (SFHT) for their pressurized water reactor (PWR)?

The SFHT is a long-handled tool utilized in a variety of different fuel movement activities including core offload and reload during a refueling outage, fuel shuffles in the Spent Fuel Pool (SFP), new fuel receipt, and dry cask loading. This tool, so significant to critical path activities,

had remained unchanged throughout the history of the PWR industry.

The SFHT supplied by the original equipment manufacturer forces tool operators to squat or kneel and reach through the handrail to manually remove a locking pin, raise or lower the bail handle to actuate the tool, and reinstall the locking pin to lock the tool. Operators typically perform this latch-or-unlatch action at least 772 times during a refueling outage. This interaction is physically straining and difficult to execute in contamination zone clothing, contributing to operator fatigue. This ultimately wastes time and increases the likelihood of mistakes being made during fuel movement.

To improve the SFHT, Framatome engineering identified the need for better ergonomics and faster latching/unlatching. An upcoming upgrade

period provided an ideal opportunity to design, fabricate and implement a first-of-a-kind SFHT. The redesigned tool would eliminate the common problems associated with the current tooling utilized at plants.





The tool quickly went from concept to completion. Framatome's new tool design improved upon existing tooling and made efficiency improvements by incorporating successful and unique features from the company's extensive portfolio of long-handled tooling.

During development, Framatome was able to share assembly specifications with the utility in real time and receive input on the tool design. Once the design was completed, the tool was fabricated, fully tested and delivered to the site in a span of only five months.

The greatly improved ergonomics of the new SFHT make it operable from a standing position, eliminating the need for the dressed-out fuel handlers to squat or kneel and reach through handrails. This greatly reduces operator fatigue, contributing to safer and more efficient handling of spent fuel assemblies and reduced safety risks for the plant and its personnel.

The improved SFHT also no longer relies on the operator to physically raise or lower the rod that actuates the tool. Instead, the tool features an innovative battery-powered drive-unit that is removable, interchangeable and capable of performing over 600 fuel moves with a single charge. By shortening latching and unlatching times, the Framatome SFHT improves efficiency and further minimizes operator fatigue.

The flanges on Framatome's new SFHT are positioned to stay below or above the spent fuel pool water level, minimizing disruptions in the water surface caused by dripping water. This results in better water clarity and increased visibility.

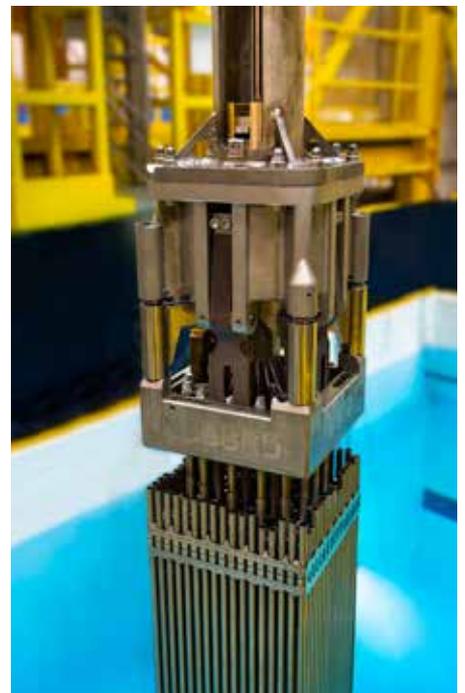
The tool was successfully installed at a plant and recently utilized in a refueling outage. Over the course of the outage, the utility conservatively estimated a minimum of 15 seconds saved during each latch/unlatch action performed by the Framatome SFHT due to the tool's quick battery-powered latching features and improved ergonomics. That added up to one plant's reduction of core offload and reload critical path time by a total of 3.22 hours. Estimating a savings of \$75,000/hour of critical path time comes out to \$241,500 in savings for every refueling outage, which could result in over \$3,000,000 in savings with a potential tool lifetime of 20 years.

Over its lifetime, the new SFHT also reduces the time fuel handlers are on the SFB by

approximately 32 man-days, assuming every hour of critical path savings results in 12 man-hours saved. This reduces the accumulated dose of fuel handlers and provides additional cost benefits.

These benefits are expected to increase as operators gain efficiency with the new tool as well as when the tool is used in upcoming dry cask campaigns, new fuel receipt operations and B.5.b fuel moves. Even the price of the new SFHT provides a significant benefit in the short term.

**Innovation matters when it comes to improving your efficiency and plant economics — that's why it matters to Framatome.**



[Learn more about our outage services solutions.](#)



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