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Manual Rod Control Cluster Assembly Change Tool

Innovative new design for improved reliability and ease of use

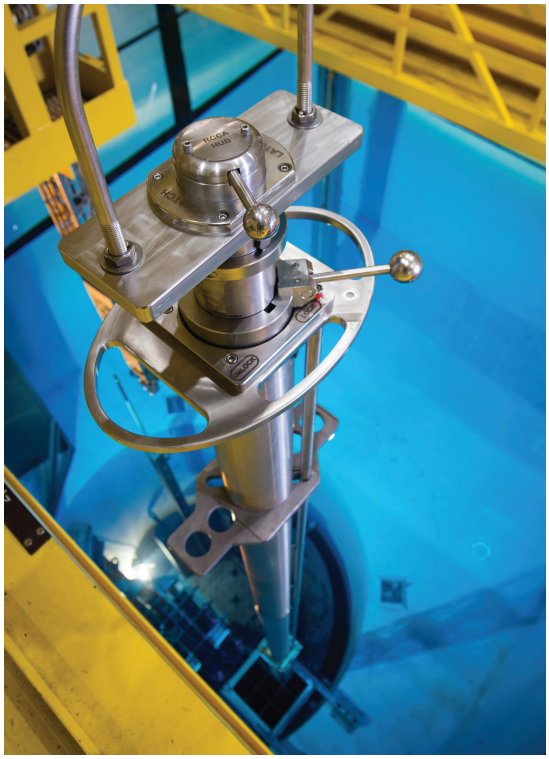
Challenge

Customers are being challenged to reduce outage durations. The unreliability of equipment, even during non-critical path windows can drastically impact scheduled activities — occasionally affecting critical path due to unexpected repairs. An identified area for improved equipment reliability is the rod control cluster assembly (RCCA) change tool. The current RCCA tool is unreliable, cumbersome, and overly complicated. Underwater limit switches often suffer from water intrusion causing tool failures. Due to the tool length, these failures often require repair over the cavity while fuel is in the racks — a significant FME risk. The bulky winch setup makes operation very difficult and awkward. The two-piece design of the tool makes assembly, upending, and testing extremely challenging. The current tool is not robust enough to upend/downend as a complete assembly without risking significant damage to the structure.

Solution

Listening to the utility and service team challenges, Framatome designed a more innovative, robust, and reliable RCCA tool. During the design process, our engineers collaborated with the field service team to better understand the current tooling challenges. The team created an entirely new tool, eliminating the problematic electrical components and improving the overall design through simplicity.

The newly designed RCCA tool presents an all-manual method to engage and withdraw the control component. The telescoping tool actuates the gripper and finger assembly, securing them in the “locked” position. The control component is then withdrawn into the cage and transported using the overhead crane. Insertion is the opposite process, lowering the crane hook to insert the RCCA into the next fuel assembly. To aid in ergonomics, large positioning handles maneuver the tool onto the fuel assemblies and a mechanical flag provides visual indication for proper engagement.



Customer benefits

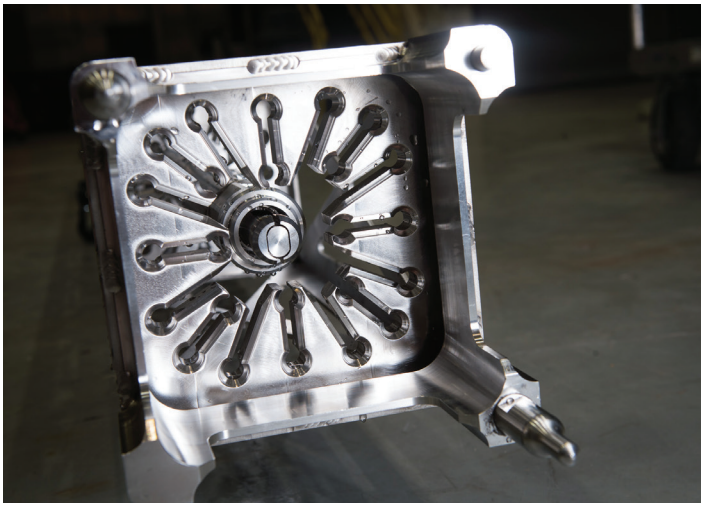
- Improved tool reliability
- Increased tool life span
- Diminished risk of human performance error
- Electro-polished stainless steel for reduced contamination build-up
- Reduced maintenance costs
- Lowers risk of FME
- Robust to upend and downend as one piece

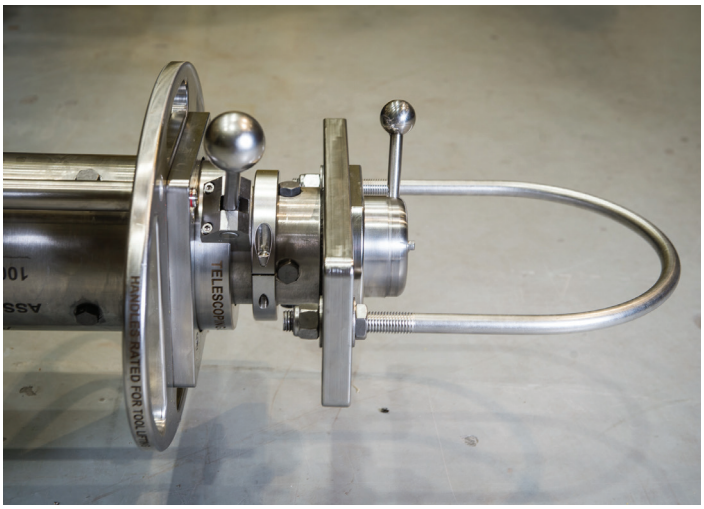
The RCCA tool introduces a new, locking cage design including thick guide cards spaced closer together resulting in a stronger, rigid frame. These design improvements make the tool robust enough to upend and downend as one piece. However, it is easily dissembled into two halves for trouble-free removal and transport.

Focused on innovative ideas leads to patents and industry awards, Framatome consistently produces advancements for the nuclear industry. The expertise of our people in solving challenges, while working in the field with customers and teams, are at the heart of the new and improved RCCA tool for the industry.

Features

- All mechanical with minimal moving parts
- Simple and ergonomic
- Locking cage design
- Visual full down indicator
- Method to lock the drawbar assembly from extending
- Rigid frame with thick guide cards spaced closer together
- Easily disassembled into two halves





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