

PWR Manipulator Crane Retracting Finger Gripper

Background

During PWR refueling outages, the manipulator crane gripper can, in some instances, become lodged under the fuel assembly hold-down spring, causing delays and damaged fuel. Westinghouse offers a PWR manipulator crane gripper, complete with retractable fingers, to prevent this issue. While installation of such a gripper on an operating unit previously required a complete trolley replacement, the PWR manipulator crane retracting finger gripper has been redesigned. Today, the gripper can be installed on any existing mast, along with a new gripper-actuating cylinder and mast top plate.

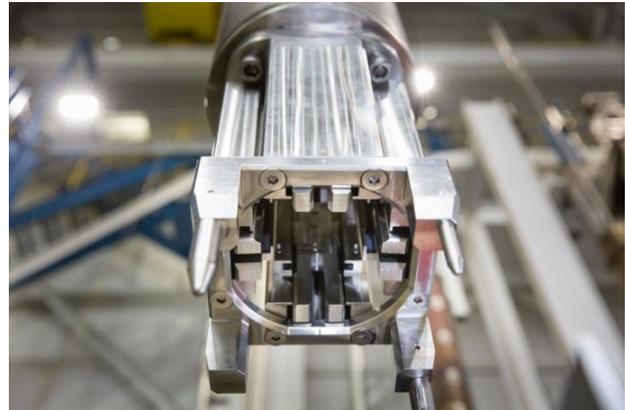
Description

Grippers using non-retractable fingers are an industry standard and are available from more than one source. However, these grippers are known to cause hang-ups between the gripper fingers and top-nozzle spring clips during the engagement process between the gripper and the PWR fuel assembly.

With the Westinghouse gripper, the fingers remain retracted as they pass by the spring-clips mechanisms and the “S” pins are aligned with the holes in the fuel assembly top nozzle. Once the proper alignment is achieved, the fingers are lowered and rotate under the top-nozzle ledges using pins on the gripper fingers and guide tracks on the gripper head. The pins and tracks act as a cam mechanism. This design is similar to the Westinghouse gripper designs currently used on Westinghouse and **AP1000**[®] plant refueling machines.

Benefits

The Westinghouse retracting finger gripper eliminates the possibility of the gripper fingers becoming lodged under the fuel hold-down springs. In recent years, this occurred at four operating units, resulting in outage delays and damaged fuel assemblies.



Gripper on mast with fingers retracted



Gripper with fingers extended

Deliverables

Westinghouse will provide a new main fuel hoist gripper with the gripper-actuating cylinder and top mast plate. The following items will be part of your delivery package:

- New gripper assembly
- New modified top plate assembly
- New gripper cylinder and gripper actuation tube
- Brackets to adjust normal and maximum up limit switches. Modified top-level, inner mast assembly drawing incorporating modifications
- Top-level gripper assembly drawing and top-plate assembly drawing parts list
- Updated operations and maintenance manual
- Factory Acceptance Test report
- Site installation and acceptance test procedures

Experience

The retracting finger gripper has been in use at Westinghouse sites since the mid-1980s with no reported failures and no downtime due to gripper hang-ups.

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Gripper actuating cylinder and top mast plate

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