

PELICAN

Modular robot for foreign material removal in fuel assemblies

Based on 30 years of experience, PELICAN provides the unique solution for extracting foreign material in PWR fuel assemblies as part of the industry Foreign Material Exclusion initiatives.

Challenge

Operating Experience continues to be challenged with incidents involving foreign material intrusion in nuclear power plant systems. These incidents can have adverse affects on Pressure Water Reactor (PWR) fuel assemblies (FA). Generally, debris resistant fuel design features capture fragments/materials to prevent damage to the fuel rods during operation. However, foreign materials can be present downstream of the design features that challenges product performance and reliability. Removing such foreign material safely and protecting the FA from damage is a key operational challenge. Limiting the time required for removal of foreign material is also a key financial challenge to plant operators.

Solution

Framatome has developed the PELICAN tool to help meet such challenges. PELICAN allows the plant operator to remove retrievable foreign material, wherever it may be located in the fuel assembly, without causing major disruption to refueling and/or maintenance operations.

By removing any material which may affect plant operations, PELICAN helps to improve plant operational safety. It is also highly radiation resistant, meaning it can be safely applied to an extensive range of extraction tasks. PELICAN uses multi-axis configurations with various remote interchangeable end-effectors to extract foreign material from three FA configurations. In addition, the delivery and installation of PELICAN is efficient and as such minimizes operational impact. The removal of such material with PELICAN is also highly efficient, allowing plant operators to make further time and cost savings.

Customer benefits

- High success rate guarantees allows better spent fuel pool management
- Improved economics from reduced fuel assembly downtime after the detection of foreign material presence

Your performance
is our everyday **commitment**

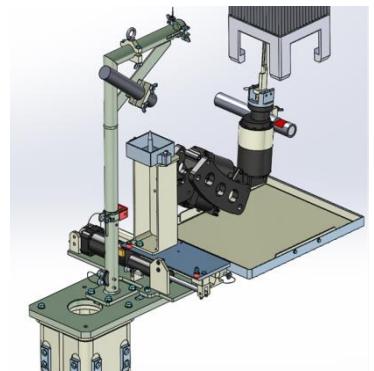
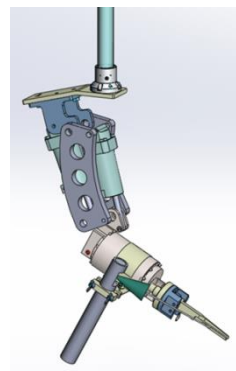
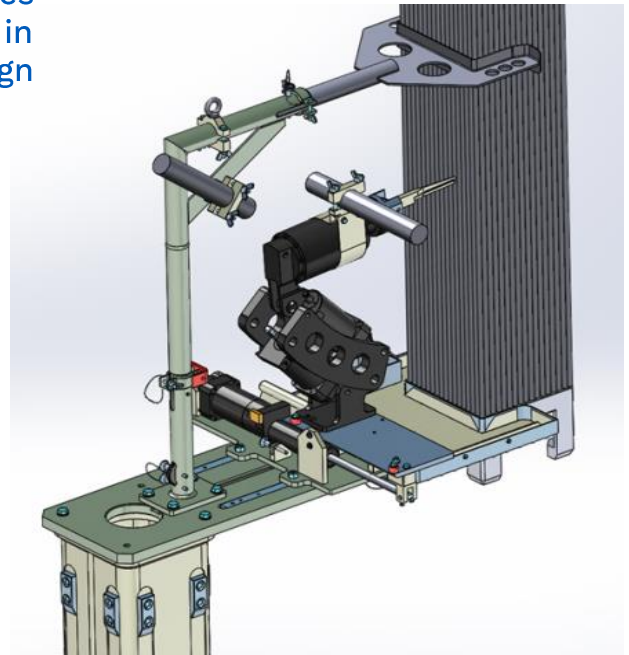


Fig 1. PELICAN extraction configurations: between the rods, below the bottom nozzle and on the top nozzle

Key figures

> 90% success with foreign material extraction, anywhere in the fuel assembly, in any fuel assembly design

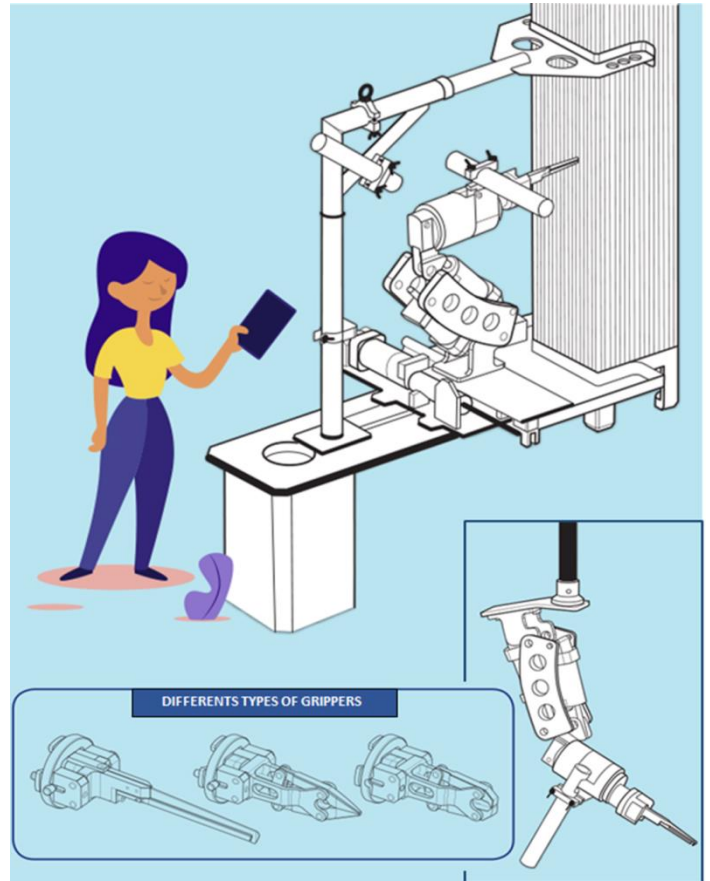
30 minutes installation time

< 15 minutes to extract located foreign material

A1692

Technical information

- Adaptable, PELICAN supports 3 FA configurations:
 - between the rods
 - below the bottom nozzle
 - on the top nozzle
- Equipped with 2 irradiation-resistant cameras, located as close as possible to the foreign material location, and a third recessed camera for operation overview, it is controlled by a joystick in front of broadcast screens.
- Its electric motor, resistant to irradiation, allows for smooth and precise movements.
- The extraction forces ranges from 3 to 150 daN. The software allows the control of efforts by limiting the current to avoid any damage to the fuel assembly.
- A suction system can be mounted on the arm. Several types of extraction clamps are available and are quickly interchangeable.
- Its small dimensions allow it to be packaged in P21 crates to be transported directly to the fuel repository building via the auxiliary building.



Discover PELICAN in Augmented Reality

1. **Download** the ARGOpay app on your smartphone
2. **Open** ARGOpay
3. **Scan** the image above



References



PELICAN is qualified in France for use in reactors. It was qualified at the Cadarache center, in the presence of EDF.

Agile and mobile, PELICAN can be dispatched to any international location at short notice.

Contact : sales-fuel@framatome.com

www.framatome.com

It is prohibited to reproduce the present publication in its entirety or partially in whatever form without prior written consent. Legal action may be taken against any infringer and/or any person breaching the aforementioned prohibitions. Subject to change without notice, errors excepted. Illustrations may differ from the original. All statements, even those pertaining to future events, are based on information available to us at the date of publication. They shall neither be construed as a guarantee of quality or durability, nor as warranties of merchantability or fitness for a particular purpose. These statements, even if they are future-orientated, are based on information that was available to us at the date of publication. Only the terms of individual contracts shall be authoritative for type, scope and characteristics of our products and services.

framatome