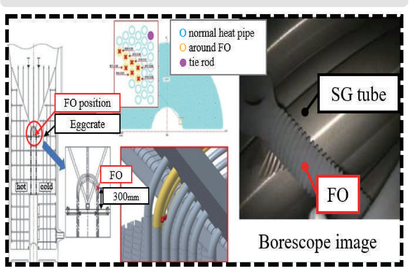
Korea Nuclear power Robotics

Remote SG tube Window Cutting EDM In-bore and Boat Sampling Tool for the Internal/External Welding Parts of the Nozzle.

Abstract: KNR introduces **the world's first ultra-compact in-bore type EDM and boat sampling technology**, specifically engineered to meet the debris removal maintenance demands of nuclear power plants. Our cutting-edge 'Remote SG Tube Window Cutting EDM In-bore and Boat Sampling Tool' utilizes this technology to perform debris removal successfully in actual nuclear settings. Notably, our boat sampling technique can operate on welding joints at nozzle angles less than 40 degrees and also facilitates the collection of welding part samples from within the nozzle. This unique achievement by KNR underscores our commitment to precision and stability, significantly enhancing the safety and efficiency of nuclear maintenance.

1. Innovative Foreign Object Removal in SG Tubes

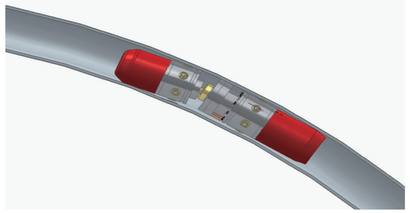
A novel **in-bore EDM system** is introduced for safely extracting foreign materials from nuclear SG tubes. This technology automates the creation of passage windows near the U-BEND area, ensuring minimal mechanical stress and radiation exposure during removal.

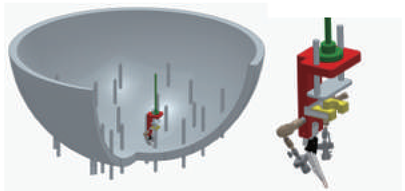


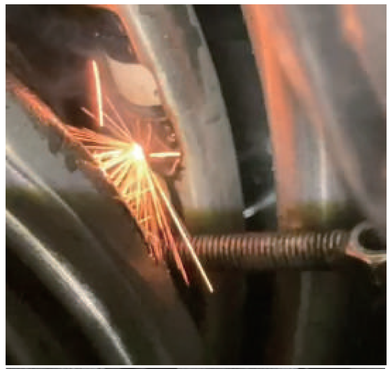
This involves miniaturizing EDM to a form that can be inserted into heat exchange tubes. It has been successfully used to remove foreign materials in nuclear power plants. **Pipe blocking** is also carried out in conjunction.

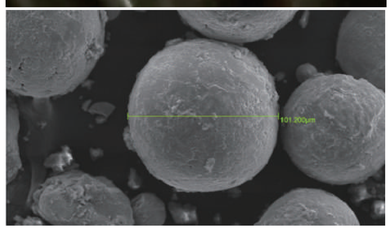
2. EDM Boat Sampling Tech

The EDM Boat Sampling Technology is specifically designed for root cause analysis in nuclear power plants. It enables the precise collection of **samples from both external and internal welds of nozzle joints**, without causing damage to the base material. This technology supports underwater operations and can accommodate nozzle inter-angles of less than 40 degrees. The system is equipped with radiation resistance and a manipulator for remote sample collection, utilizing various control programs for efficient and effective field application. A gripper connected to the suction nozzle prevents samples from detaching.









3. Conclusion

KNR Maintenance Technology has successfully passed rigorous radiation tests and has been validated in nuclear facilities. This system efficiently manages debris down to 100μm and features remote control software that guarantees worker safety. It offers secure and effective maintenance solutions for challenging environments.

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