

## **N292. Japan is Nearly Reaching the Limits of Automated Inspection**

In their continuing efforts to prevent component failures in LWRs and to reduce the time taken to check for defects, Japanese engineers are automating many of the techniques previously applied manually. The limitations on the use of automated equipment arise because of:

- **Narrow Space:** The space available to set up a general purpose automated ultrasonic system is general restricted by support structure and obstructions.
- **Time required for fitting:** Application of an automated ultrasonic system does not always reduce the exposure of its operators to radiation, because of the time it takes to set up and later remove, a system and to adjust it *in situ*.
- **Large development costs:** Developing an automated ultrasonic system takes a long time and requires procedure qualification tests before application on-site, making the process expensive. An advanced eddy current detection system for fatigue cracks in steam generator tubes.
- **Difficulty in attracting investment:** It is difficult to quantify the economic advantages attributable to automated systems through improved inspection accuracy and reduced radiation exposure.
- **Reluctance to replace manual ultrasonic methods:** Manual ultrasonic systems are simple to use and are usually sufficiently accurate, so their efficacy may lead to the simple view that it is not necessary to achieve better accuracy by using an automated ultrasonic system.

Nevertheless, despite these limitations, there are some new inspection technologies, which do seem to promise genuine advantages:

- An automated ultrasonic inspection system for the Advanced BWR bottom head.
- A general purpose ultrasonic inspection system for butt and fillet welded joints.
- An ultrasonic data recording system for three-dimensional components.
- A magnetic crawler-type inspection robot.
- An advanced eddy current detection system for fatigue cracks in steam generator tubes.
- Multi-channel digital eddy current instruments for steam generator tubes.

*Taken from, "Are We Reaching the Limits of Automated Inspection in Japan?" Nuclear Engineering International, p.34, July 1993.*