

DEVELOPMENT OF INNOVATIVE INSPECTION TOOLS FOR HIGHER RELIABILITY OF PHWR FUEL

B.Kamalesh Kumar, B.Viswanathan, B.Laxminarayana, C.Ganguly

**Nuclear Fuel Complex,
Department of Atomic Energy,
Hyderabad, India**

Abstract

Advent of Computer aided manufacturing systems has led to very high rate of production with greater reliability. The conventional inspection tools and systems, which are often manual based do not complement with output of highly automated production line. In order to overcome the deficiency, a strategic plan was developed for having automated inspection facility for PHWR fuel assembly line.

Laser based systems with their inherently high accuracy and quick response times are a favorite for metrology purpose. Non-contact nature of laser-based measurement ensures minimal contamination, low wear and tear and good repeatability. So far two laser-based systems viz. Pellet density measurement systems and triangulation sensors have been developed. Laser based fuel pellet inspection system and PHWR fuel bundle metric station are under development.

Machine vision-based systems have been developed to overcome certain limitations when inspection has to be carried out on such a large scale manually. These deficiencies arise from limitations of resolution, accessibility, fatigue and absence of quantification ability. These problems get further compounded in inspection of fuel components because of their relatively small sizes, close tolerances required and the reflective surfaces. PC based vision system has been developed for inspecting components and fuel assemblies.

The paper would touch upon the details of the various laser systems and vision systems that have been indigenously developed for PHWR Fuel Metrology and their impact on the assembly production line.