

## **Design and Development of an Innovative Stroke Limiting Device for Shutdown System of a Nuclear Power Plant**

Sudheer Patri, Muhammad Sabih, T.V. Maran, T. Logaiyan, C. Meikandamurthy,  
R. Veerasamy

### **Abstract**

Common method of limiting the stroke of a machine/mechanism by physically providing stoppers at the extreme limits is a proven concept to avoid unsafe manoeuvres. However, in some applications, it may be necessary to provide periodic stoppers while travelling in unsafe direction & their resetting after ensuring the safety of further travel and freewheeling from any position in the safe direction. The stroke limiting device is one such active safety device which safeguards the Reactor against uncontrolled withdrawal of one or all control rods resulting in unprotected transient over power (UTOP) accident. This is a mechanical device, which physically limits the upward movement of control rod to a specified maximum and allows further upward travel only on authorization by the plant operator, at the same allowing the freewheeling for downward movement from any given position. In this paper, design and development of the device are brought out.

**Keywords:** Stroke Limiting Device (SLD), Prototype Fast Breeder Reactor (PFBR), Control and Safety Rod (CSR), CSR Drive Mechanism (CRSDM), One-Way Clutch

---

Sudheer Patri (corresponding author)  
Fast Reactor Technology Group, Indira Gandhi Centre for Atomic Research, Kalpakkam, India,  
E-mail: patri@igcar.gov.in.

Muhammad Sabih  
Fast Reactor Technology Group, Indira Gandhi Centre for Atomic Research, Kalpakkam, India,  
E-mail: sabih@igcar.gov.in