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In-situ Creep Specimen Monitoring: A Comparison of Guided-Wave and Local Transducer Techniques

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Performing in-situ measurements of specimens in research reactors is challenging because of the environmental conditions. In this paper, two approaches were investigated for performing in-situ measurements of the change in length of creep specimens. In the first method, the transducer is located outside the hostile environment, and the specimen is interrogated by transmitting ultrasonic guided waves down a wire waveguide to the creep specimen. In the second method, a piezoelectric element is mounted directly to the creep specimen. If the piezoelectric element can withstand the operating environment, higher resolution and more compact specimen design can be achieved with the directly mounted transducer elements.