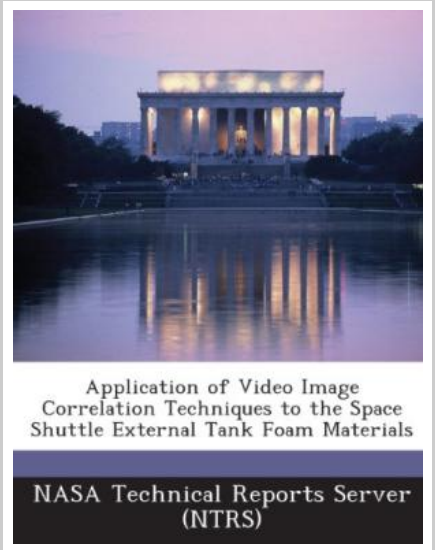


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# Application of Video Image Correlation Techniques to the Space Shuttle External Tank Foam Materials

By -

BiblioGov. Paperback. Book Condition: New. This item is printed on demand. Paperback. 32 pages. Dimensions: 9.7in. x 7.4in. x 0.1in.Results that illustrate the use of a video-image-correlation-based displacement and strain measurement system to assess the effects of material nonuniformities on the behavior of the sprayed-on foam insulation (SOFI) used for the thermal protection system on the Space Shuttle External Tank are presented. Standard structural verification specimens for the SOFI material with and without cracks and subjected to mechanical or thermal loading conditions were tested. Measured full-field displacements and strains are presented for selected loading conditions to illustrate the behavior of the foam and the viability of the measurement technology. The results indicate that significant strain localization can occur in the foam because of material nonuniformities. In particular, elongated cells in the foam can interact with other geometric or material discontinuities in the foam and develop large-magnitude localized strain concentrations that likely initiate failures. Furthermore, some of the results suggest that continuum mechanics and linear elastic fracture mechanics might not adequately represent the physical behavior of the foam, and failure predictions based on homogeneous linear material models are likely to be inadequate. This item ships from La Vergne,TN. Paperback.

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