

1.5.31. A COMPARISON BETWEEN 3D AND 1D NUMERICAL SIMULATION MODELS FOR INFRARED THERMOGRAPHIC NDT

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Numerical simulation is an important tool to study the thermal response of test specimen in infrared thermography. For simplicity in theoretical analysis and quantitative calculation, 3D model is often simplified to 1D model. 3D and 1D models for 2 samples, one is a CFRP panel and another is an aluminum one, are built and calculated by FEM method. The results show that influence of lateral heat diffusion is more serious in materials with greater thermal diffusivity. An experiment was carried out on a GFRP/NOMEX honeycomb panel. It was seen that lateral heat diffusion become obvious in materials with low thermal diffusivity as time goes by. In conclusion, error should be estimated before using 1D model instead of 3D model for simulation.