

IMPLIED VALIDITY OF SIMULATION RESULTS

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ABSTRACT

The need and benefits relating to the demonstration of the quality of any simulation study are widely discussed in documents produced by NAFEMS and others. The principal tools relating to the demonstration are the process known as Verification and Validation.

In terms of practical simulation work, verification, the demonstration of the mathematical quality of the software and methods used is outside of the control of the analyst.

Validation on the other hand is primarily the task of the analyst as it is the demonstration that the correct tools have been used to obtain results of a suitable accuracy. Work being carried out by the Verification and Validation committees of ASME is leading to a strict definition of validation: that the validation should be against known theory or physical test. For many industries, such as civil engineering, this introduces a potential dilemma as physical test to extreme loads in particular is not practical.

The Analysis Management Working Group is examining the concept of "Implied Validity" as a means of accepting designs as valid; clearly this could also be termed "Conditional Validity". Using civil engineering as the example a design and hence the supporting simulations will be considered to be valid if they satisfy the design codes of practice. The development of the code of practice and its continuing revision is based on verified and validated testing and rigorous examination of underlying theory. A well written design code clearly identifies the limits of validity for the code; therefore, if the simulation and subsequent design calculation satisfies the code, the work can be considered to have Implied Validity. This thinking is not limited to civil engineering; it will fit all engineering fields where there are known responses bounded by the known test and theory. It should be noted that compliance to the ASME Pressure Vessel codes will also lead to Implied Validity.

This paper looks at Implied Validity and what happens when work is taken beyond code limits; this will be most simulation where non-linear responses are dominant.

SUGGESTED THEMES

Simulation Quality; Verification and Validation; Design Codes and Simulation;
Simulation Data Management.