NAFEMS PSE Certification *at TWI*

Tyler London, TWI Ltd.

TWI is one of the world's foremost independent research and technology organisations, with expertise in materials joining and engineering processes. TWI specialises in innovation, knowledge transfer and in solving problems across all aspects of manufacturing, fabrication and whole-life integrity management.

Established in Cambridge, UK in 1946, the organisation has gained a first-class reputation for service through its teams of respected consultants, scientists, engineers and support staff. Now approaching 1000 employees, it works with over 1800 Industrial Member companies in 70 countries.

At TWI, Finite Element Analysis is widely used to help organisations achieve their most critical objectives from the optimisation of processes and product performance to the investigation of failures.

TWI aims to support its customers with:

- Introduction of materials and processes for new or existing products
- Integration of novel production solutions
- Root cause analysis after the failure of products during fabrication or in-service
- Demonstration of structural integrity for components and assemblies
- Staff competence through relevant, tailored and effective training
- World-class expertise to support litigation processes.

To provide this support, TWI's Numerical Modelling and Optimisation team use FEA to simulate the behaviour of structures under static, dynamic and cyclic loads, including the analysis of the welding processes for distortion and residual stresses.

As part of TWI's structural integrity support, the team regularly models inspection and testing procedures for Engineering Critical Assessments (ECAs - also known as Fitness-For-Service (FFS) assessments) required by the relevant standards, such as BS 7910, API 579, R6 and BS 7608. Moreover, TWI has been increasingly providing advanced modelling support for micro-mechanics, design optimisation and additive manufacturing to industrial partners looking to introduce disruptive technologies into their workflows.

A group of eight finite element analysts from TWI with diverse backgrounds from mathematics to aerospace engineering and professional experience ranging from 2 to 30 years recently received NAFEMS PSE accreditation.

For TWI, the key motivators for using PSE Certification were to:

- Provide independent, external certification that demonstrates the high standard of international competency that TWI can offer for modelling solutions
- Enable structured continuous professional development for analysts through the NAFEMS PSE Competency Tracker and Certification.

Due to having modelling staff at three different sites around the UK (Cambridge, Middlesbrough and Port Talbot), the PSE interviews were conducted by video conference. This flexibility was highly beneficial for TWI as it was minimally disruptive to the applicants' normal work whilst still enabling effective communication during the interview process. TWI staff received Advanced Level certification in over eight different topic areas covering thermo-mechanical behaviour, composite materials, fatigue and fracture mechanics. The entire process was positive for TWI and has generated stimulating discussions about how to integrate increasingly complex modelling solutions into longer-term business plans.

Achieving PSE Certification demonstrates TWI's commitment to providing high quality modelling for industries where quality assurance, product safety and structural integrity are the key drivers.

Tat-Hean Gan, Business Group Manager, Integrity Management at TWI said "Achieving these accreditations enables our Finite Element Analysts to demonstrate that they have been externally verified to a high standard of international competency, reflecting the knowledge and experience they have acquired during their professional careers to date across a range of specialist areas within the discipline of numerical modelling and optimisation."