PSE

A New Standard for Simulation Engineers

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Agenda

- PSE Overview
- Certification, or an Educational Framework?
- How is the Program Used Today?
- Certification | How does it Work?
- Governance
- Foundation for NAFEMS Activities
- Q&A

PSE Overview

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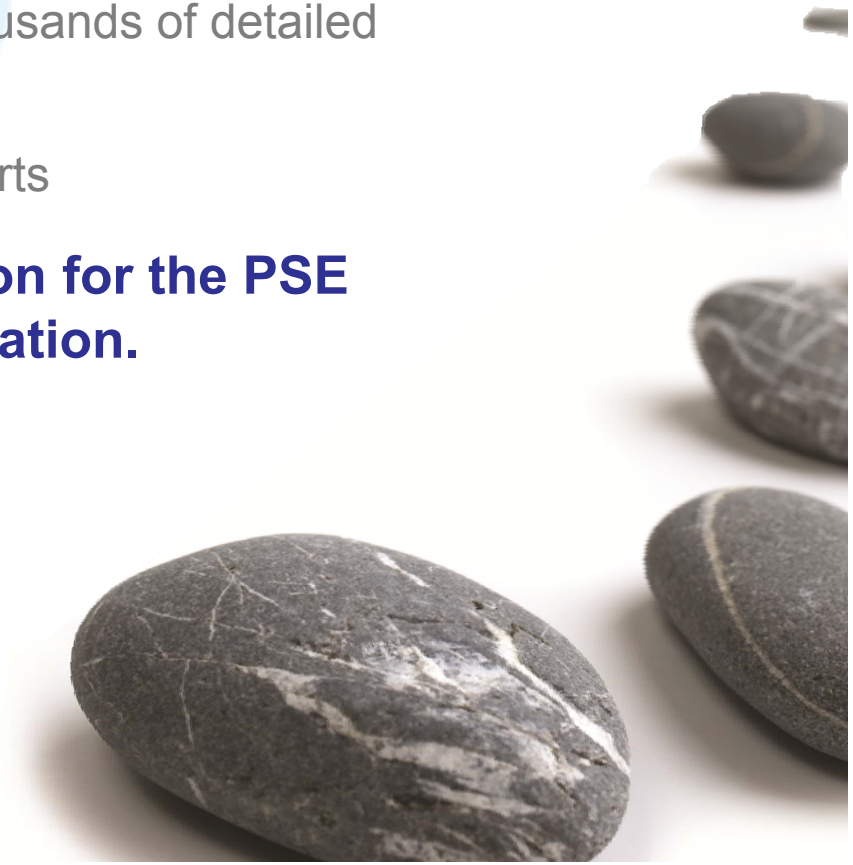
PSE Competencies

PSE (Professional Simulation Engineer) defines the competencies that good simulation engineers should possess.

- The scheme consists of a database of thousands of detailed competency statements
- Peer-reviewed over several years by experts

These competencies are the foundation for the PSE Competency Tracker and PSE Certification.



PSE Competence Statements

FEAco12 - Outline a common method employed to solve the large sets of sparse symmetric matrices common in FEA.

CFDco2 - Compare and contrast the finite difference , finite volume and finite element discretisation methods.

NGECco9 - Discuss the limitations of contact algorithms available in a finite element system.

MASco5 - Discuss the general issue of scatter in material properties relevant to your analysis and simulation and how this is allowed for.

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PSE Background

- CCOOPS – Certification of Competencies in the Power and Pressure Systems Industry throughout Europe
  - Project launched with ½ Million Euro Funding under the EU Leonardo da Vinci Programme
- EASIT^2 – Engineering Analysis Simulation Innovation Transfer^2 European project 18 Technical Areas
- PSE – Professional Simulation Engineer
  - **Officially launched at the 2013 Salzburg NAFEMS World Congress**
  - 26 Technical Areas

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Technical Areas

- *Mechanics, Elasticity and Strength of Materials**
- *Core Finite Element Analysis**
- *Fundamentals of Flow, Mass & Heat Transfer**
- *Core Computational Fluid Dynamics**
- Materials for Analysis and Simulation
- Fatigue
- Flaw Assessment and Fracture Mechanics
- Nonlinear Geometric Effects and Contact
- Beams, Membranes, Plates and Shells
- Dynamics and Vibration
- Optimisation
- Plasticity
- Thermo-Mechanical Behaviour
- General Analysis Management
- Verification and Validation
- PLM Integration and CAD-CAE Collaboration
- Simulation Process and Data Management
- Buckling and Instability
- Multi-physics Analysis
- Composite Materials and Structures
- Creep and Time-Dependency
- Multi-Scale Analysis
- Probabilistic Analysis
- Noise, Acoustics and Vibro-Acoustics
- Electromagnetics
- Multi-body Dynamics

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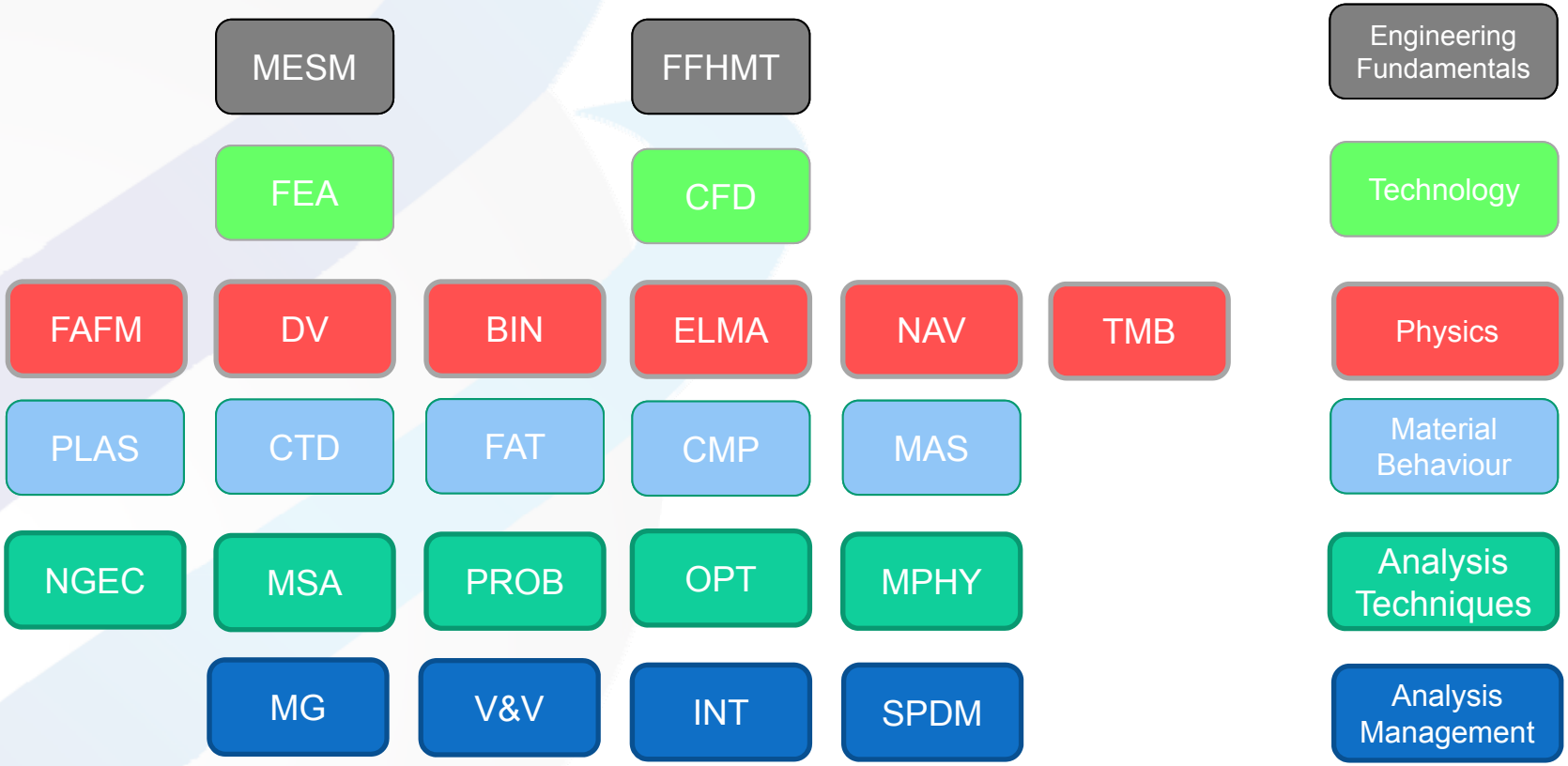
Technical Areas



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Certification, or an Educational Framework?

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PSE COMPETENCY TRACKER

Educational Framework

Plan, Track & Manage Competency

The Competency Tracker can be used to:

- *Access PSE Competencies Online*
- *Browse Educational Resources*
- *Track & Manage Competency*

PSE CERTIFICATION

Certification Scheme

Gain recognition for achievement of competency

- *Independent Assessment by Industry Experts*

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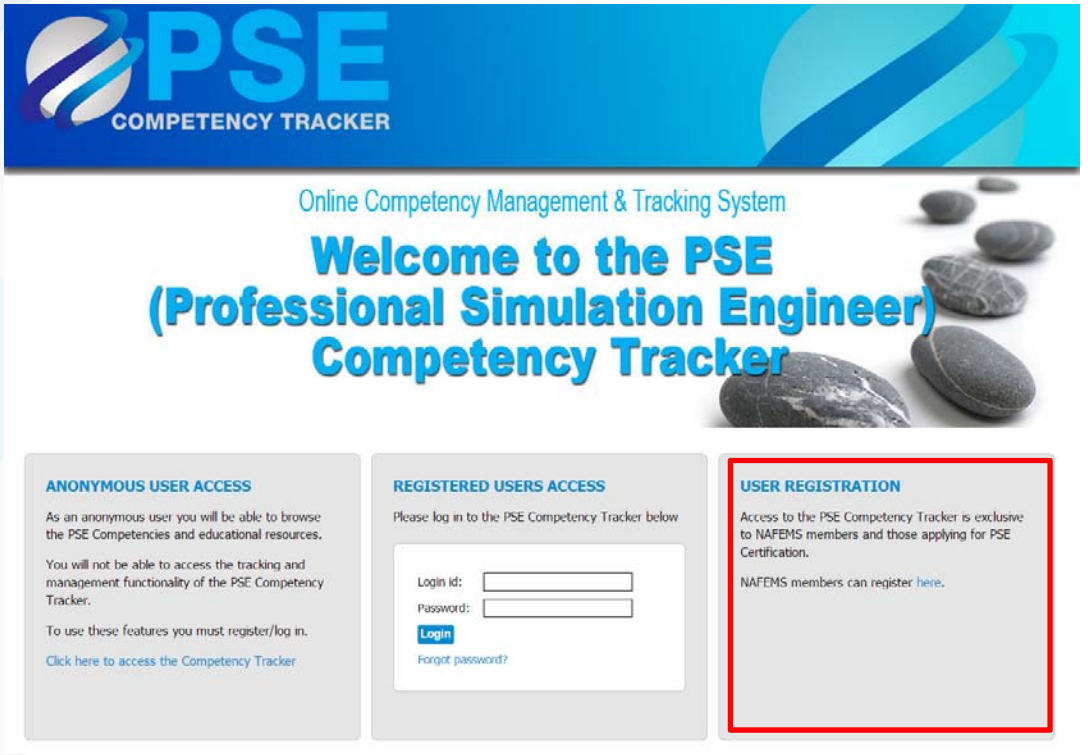
How to Access the Competency Tracker

Register for Access: https://www.psecompetencytracker.org /

Complete Tracker Available to:

- PSE Certification Applicants
- NAFEMS Members



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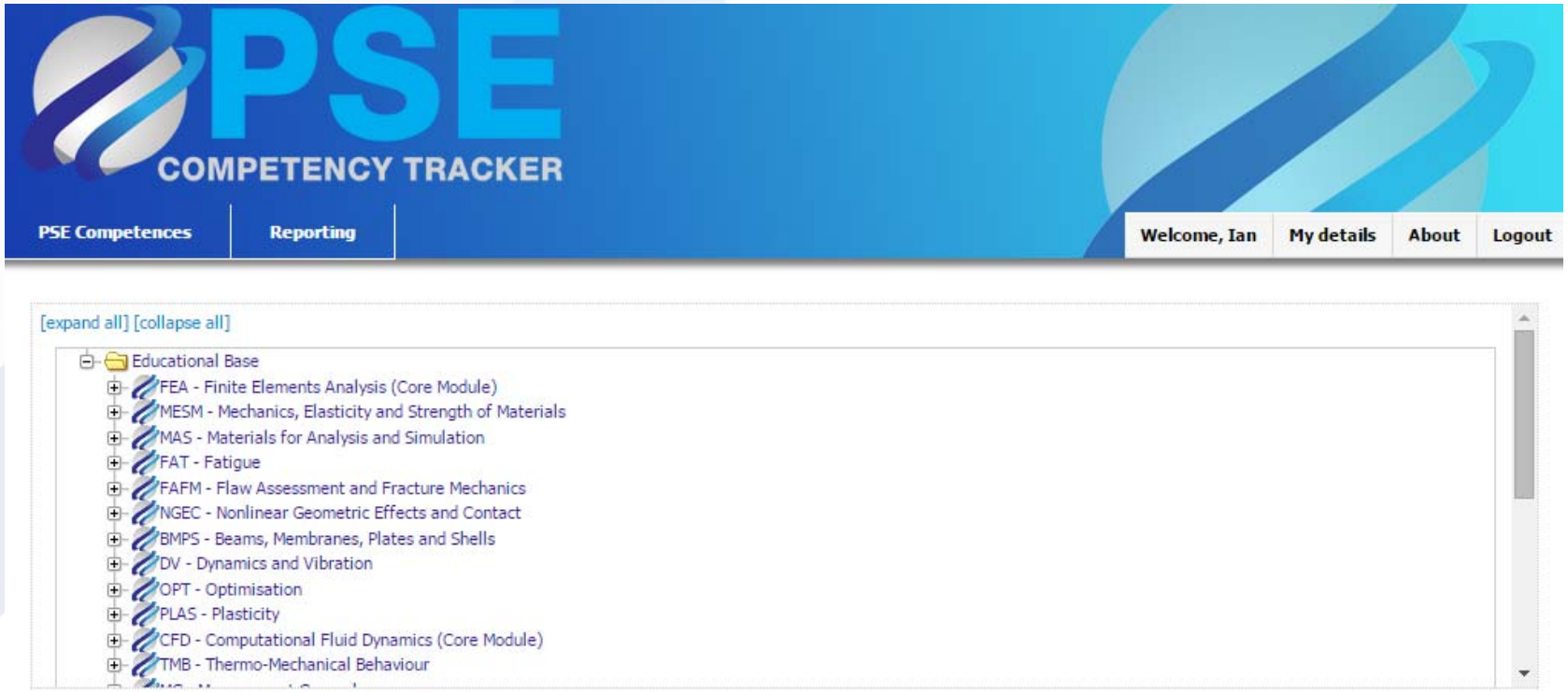
PSE Competency Tracker



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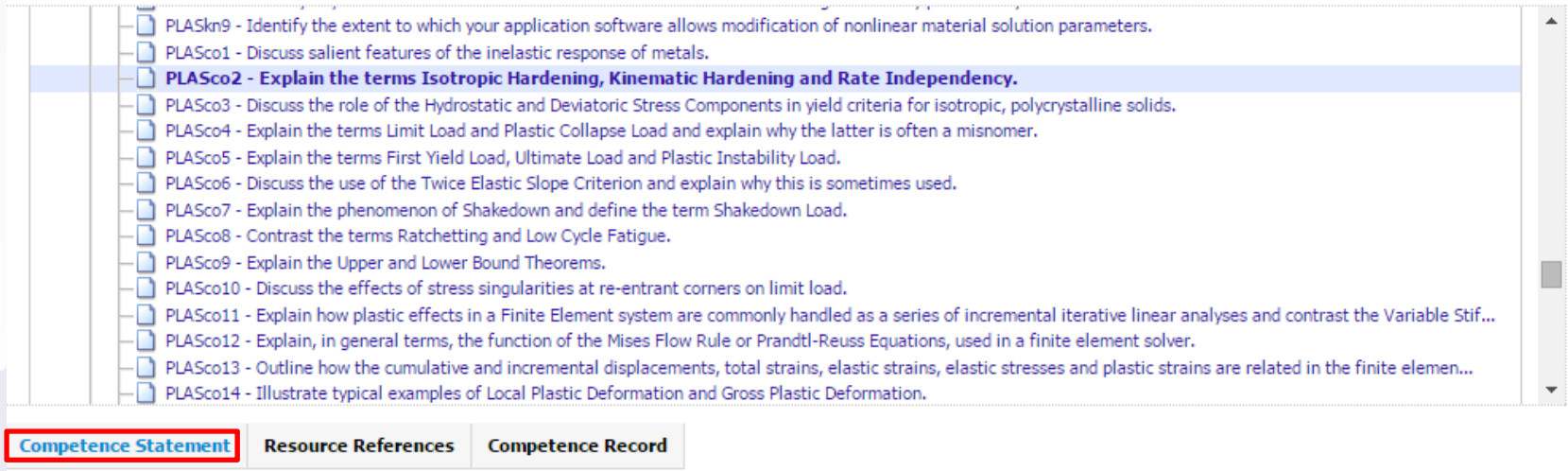
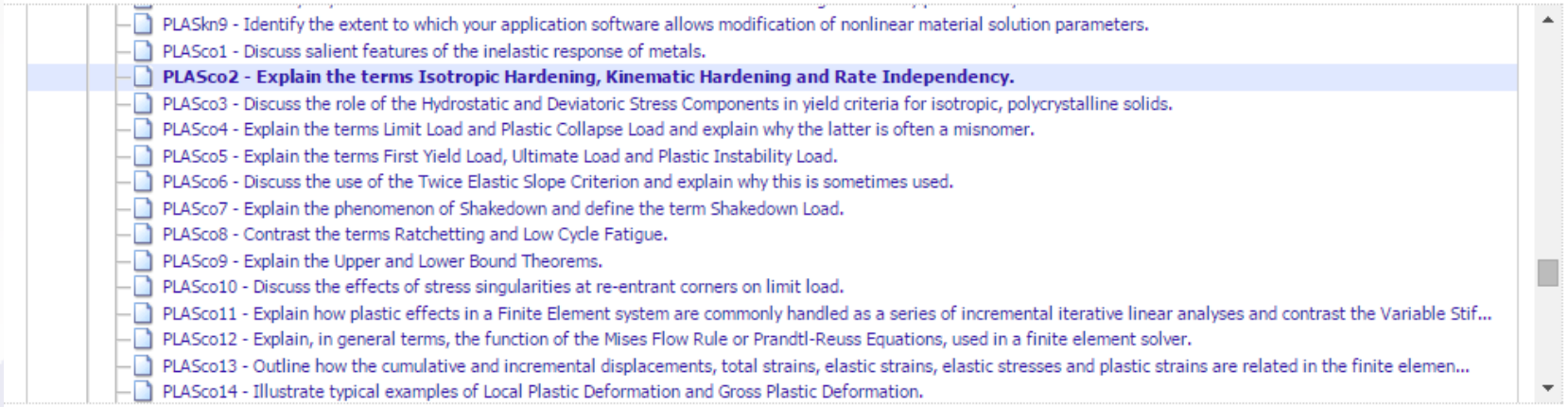
PSE Competency Tracker



PSE Competency Tracker



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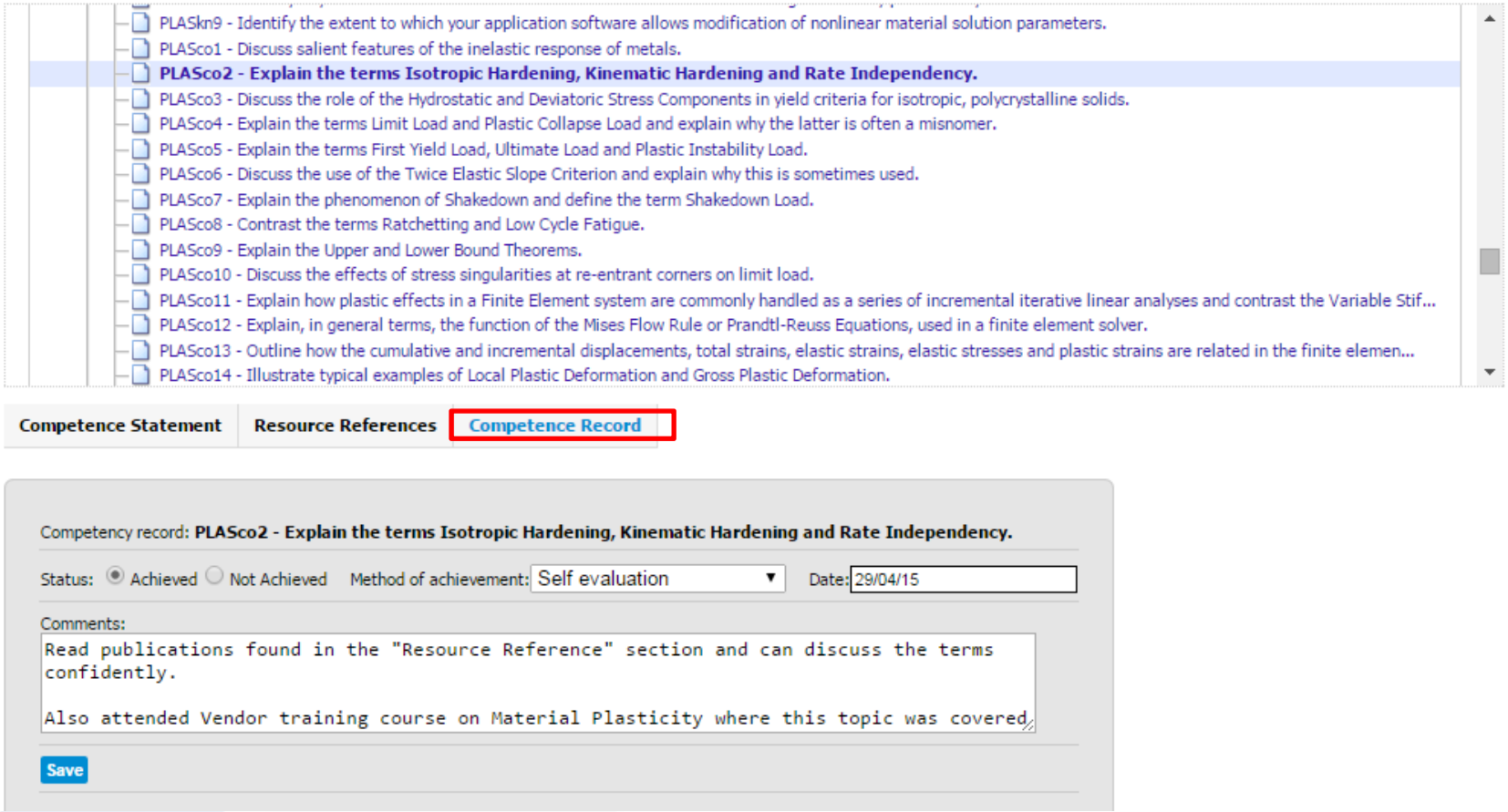
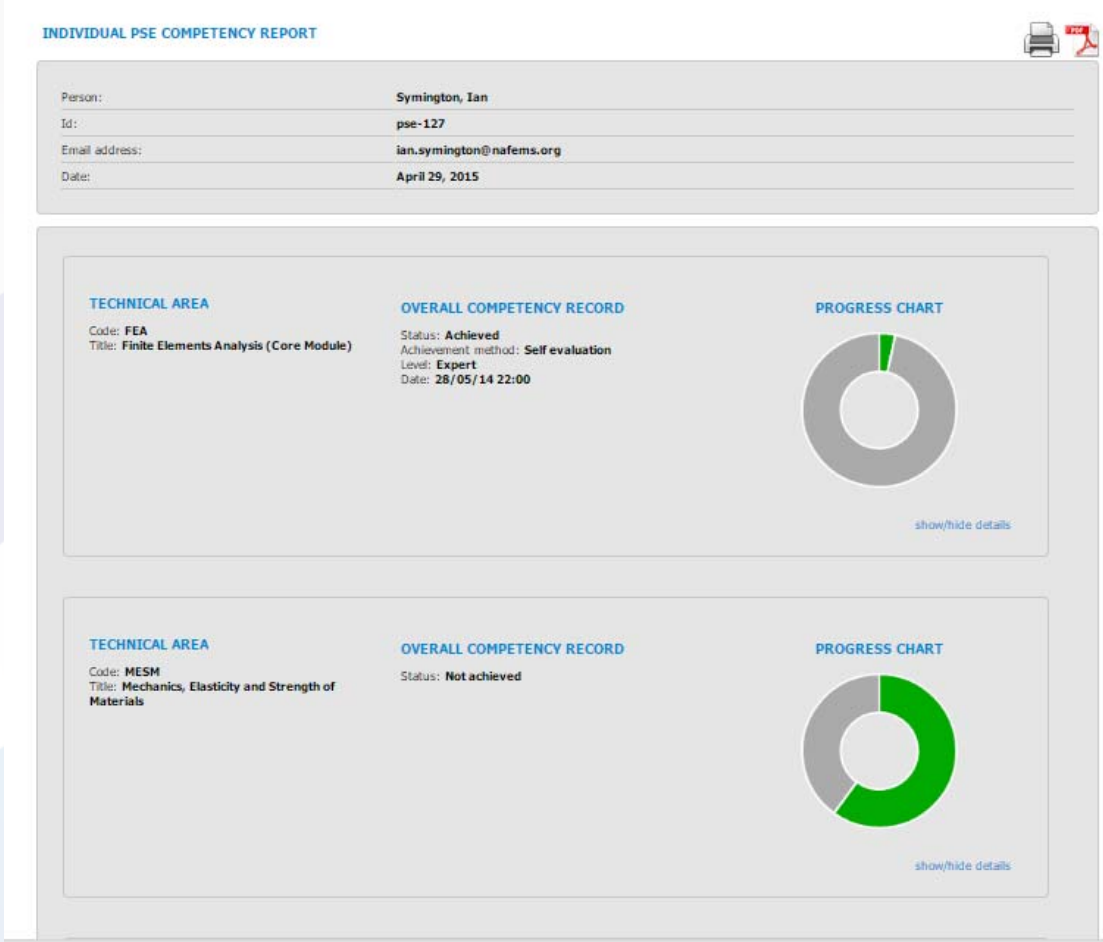
PSE Competency Tracker



PSE Competency Tracker



INDIVIDUAL PSE COMPETENCY REPORT

Person:	Symington, Ian
Id:	pse-127
Email address:	ian.symington@nafems.org
Date:	April 29, 2015

TECHNICAL AREA

Code: **FEA**
Title: **Finite Elements Analysis (Core Module)**

OVERALL COMPETENCY RECORD

Status: **Achieved**
Achievement method: **Self evaluation**
Level: **Expert**
Date: **28/05/14 22:00**

PROGRESS CHART

show/hide details

TECHNICAL AREA

Code: **MESM**
Title: **Mechanics, Elasticity and Strength of Materials**

OVERALL COMPETENCY RECORD

Status: **Not achieved**

PROGRESS CHART

show/hide details

PSE CERTIFICATION

Independent Assessment of PSE Competencies Resulting in a Recognised Certificate

- Multi-level certification scheme that recognises achievement of PSE competencies
- Independently assessed by NAFEMS
- Online Application via NAFEMS website

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Multi-Level Certification

Competencies can be claimed at Entry, Standard and Advanced Level

Entry

- Employs available software tools in an effective manner
- Able to work in a supervised capacity when provided with clear guidelines
- Doesn't take on general tasks without supervision
- Typically applies to trainees and/or technician level staff working under the supervision of a person(s) with appropriate competence who will sign off the results

Standard

- Has sufficient knowledge and comprehension of theory to employ available software tools in a safe and effective manner
- Able to work in an independent manner without supervision
- Conducts appropriate checks on results
- Is aware of their own limitations when faced with new or novel problems
- Observes professional practices

Advanced

- Can take on a range of complex, novel tasks without supervision
- Plans analysis strategies and validation studies
- Provides effective advice and guidance

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How is the PSE being used today

By Individuals…

- Used to differentiate themselves
- Used for professional development
- Used as proof of competence to current and future employers
- Steady uptake in interest in PSE from individuals

By Companies…

- As an competence management system
- A clear way to demonstrate the company's commitment to quality standards
- A formal record of employee competency and training satisfying the requirements of ISO 9001
- Creating and maintaining competitive edge

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Examples of How PSE is being used today

- Individuals
  - Using ‘out of the box’ PSE

PSE Competence Statements ☑

PSE Competence Tracker ☑

PSE Certification Assessment ☑

Examples of How PSE is being used today

- High Tech Electronics Manufacturer
  - Managing Competence of Engineering Designers
  - Restrict access to simulation tools
  - > 80 engineers through process

PSE Competence Statements	✓
PSE Competence Tracker	?
PSE Certification Assessment	✓

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Examples of How PSE is being used today

- Large Aerospace Manufacturer
  - Managing Competence of Analysis Engineers
  - Incorporated into companies own Competency Management Process

PSE Competence Statements ☑

PSE Competence Tracker ☒

PSE Certification Assessment ☒

Certification | How Does it Work?

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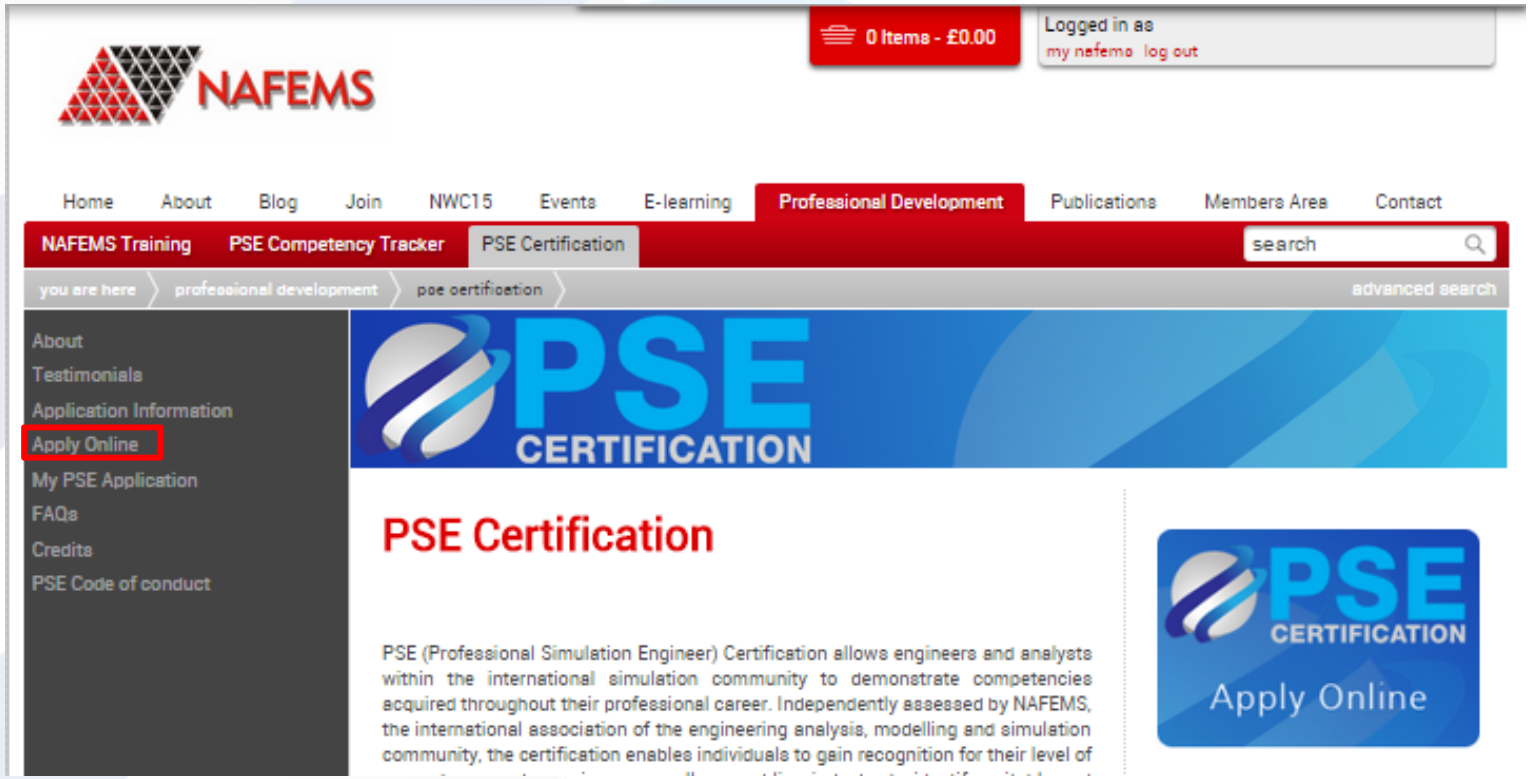
Certification – Application

- Apply Online: http://www.nafems.org/professional_development/certification/
- Application Fee: £150 / $230 / €210



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Certification – Guidance

- Guidance information is available to download from website

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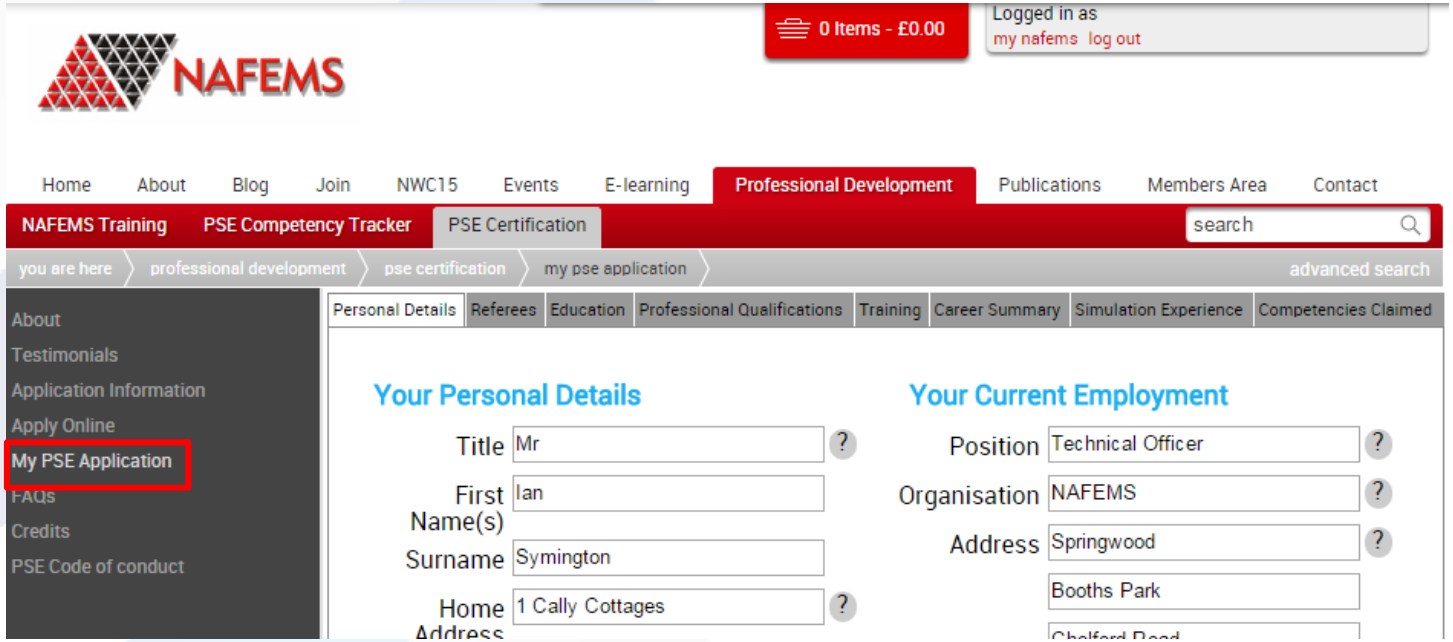
Certification – Application

- The application is stored online and can be saved and modified at a later date



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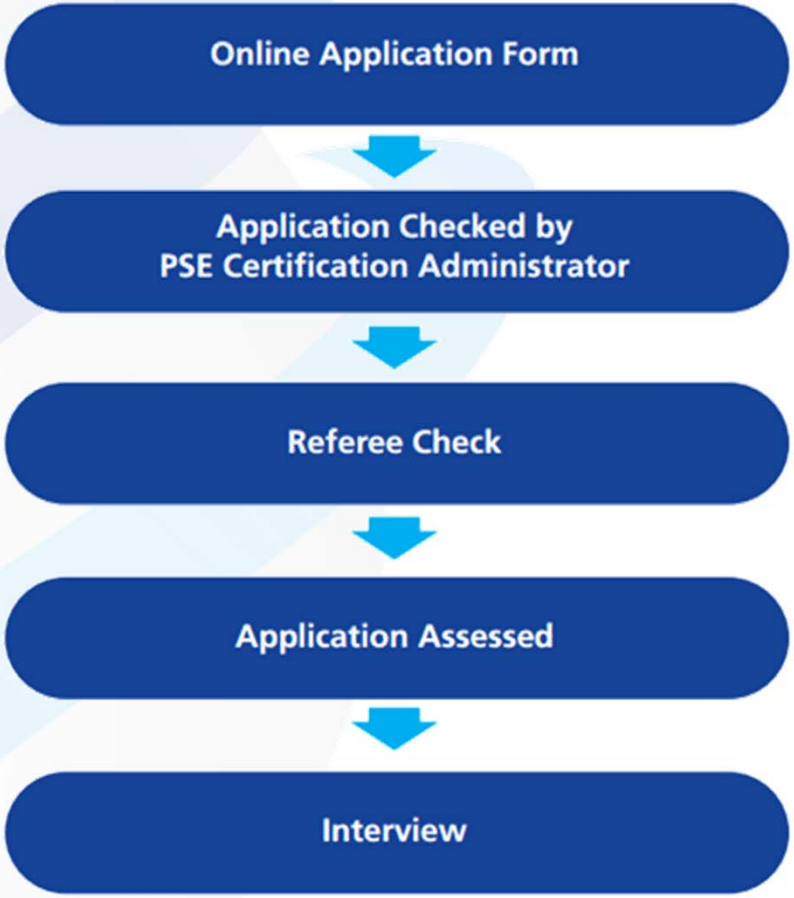
Certification – The Process



Certification – The Interview

- Duration: 45 minutes
- Location: Webex
- Two PSE Assessors and the PSE administrator in attendance
- Open questions about the candidates background & simulation experience
- Specific questions relating to the PSE competencies

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Governance

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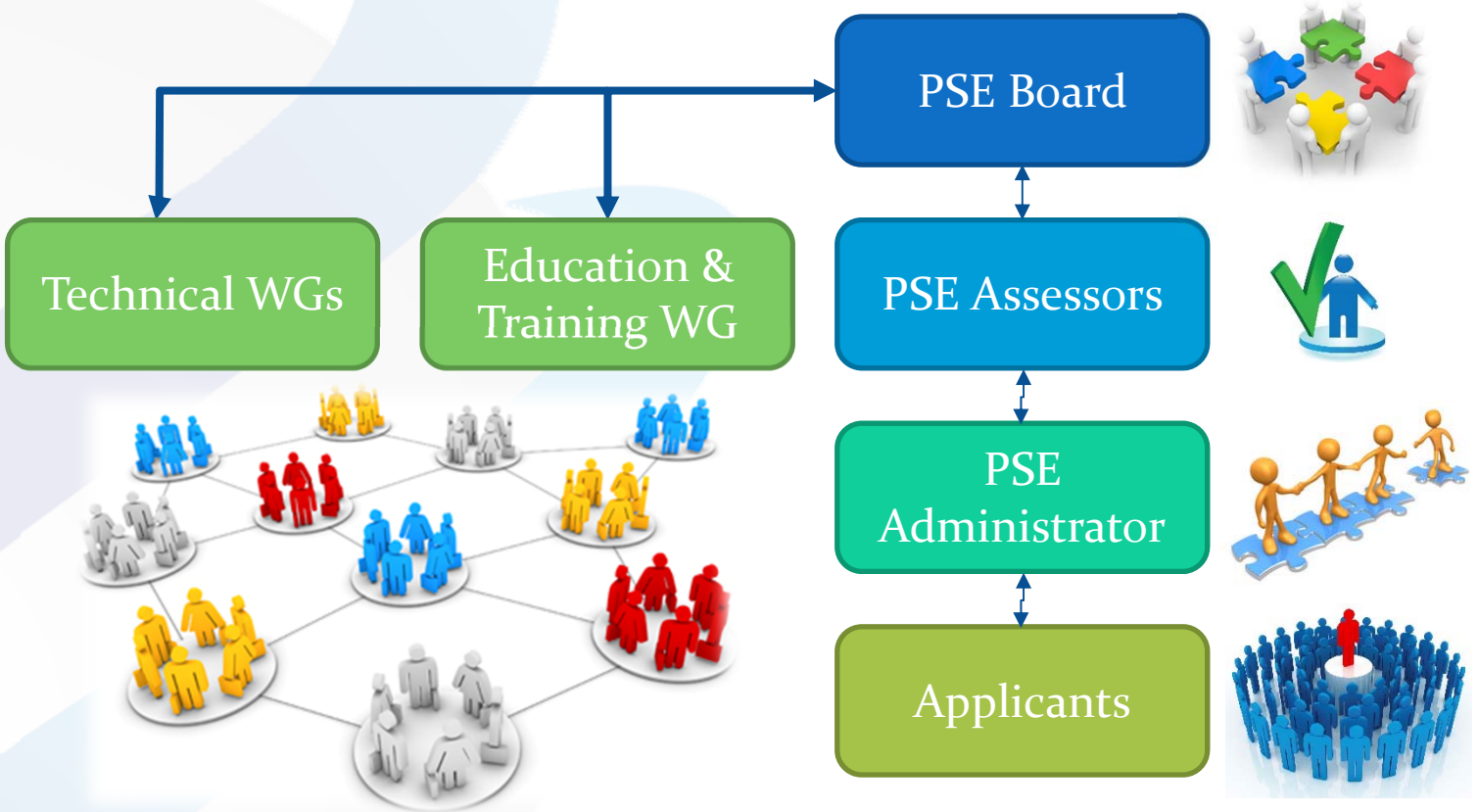
Governance


PSE Board
Technical WGs
Education & Training WG
PSE Assessors
PSE Administrator
Applicants

The Foundation for NAFEMS activities

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Future developments

- PSE feeds into “Academic Course Approval”
  - Ensure that graduates possess the skills that industry require
- Associate all NAFEMS training courses with the competence statements
- Working groups tasked with developing the educational resources

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Find out more at

www.nafems.org