Professional CV	**LOUIS CHEEN WAH CHANG** BEng, CEng, MIMechE
Key qualifications:	BEng, (1st Class Honours) Mechanical Engineering, Manchester Metropolitan University, July 2008.
Profile:	Over twelve years' experience in structural integrity assessments, including high temperature creep rupture and fatigue damage, design code, fracture and FAC assessment, CLA, quality assurance management, lead quality auditor. Experienced in seismic and dynamic analysis, finite element analysis of engineering components and structures, thermal-stress, collapse, contact and non- linear material, heat transfer, fluid and aerodynamics, CFD and reverse engineering. Skills acquired in the use of R-Code, ABAQUS, ANSYS, COMSOL, AutoCAD, SolidWorks, ADLpipe, PSA5, PHOENICS, Fluent, Polyworks, C++ and Visual Basic.
SQEP in:	Role code 0: Classic Strength of materials Role code 2: Stress Finite Element Analysis (simple) Role code 7: Creep-fatigue initiation assessment, R5 Volume 2/3 Role code 13: Flow Accelerated Corrosion Assessment (inc. On-Site Support) Role code 14: Pipework Support Survey Role code 15: Creep Rupture and R5 Volume 6 Assessments.

Senior Engineer, EDF DTH Team Leader & Business Development Manager	April 2021 – Present
Senior Engineer & EDF DTH Team Leader	September 2019 – April 2021
Senior Engineer & CLA SPoC	April 2015 – September 2019
Engineer & Quality Manager	April 2012 – April 2015
Graduate Engineer	August 2008 – April 2012

Engineering Analysis Services Limited (EASL)

Acquired Experience (in addition to the above accredited SQEP roles) **:**

Role code 1: Design code and piping assessments. Awaiting technical interview. ***Role code 3: Stress/fracture finite element (FE) analysis (complex).*** Exposure to crack modelling of metallic components, including graphite but require further on-job experience. Experienced in all other parts of complex FE. ***Role code 5: Fracture assessment, R6.*** Attended in-house training course and on-job training on assessing PWR components, awaiting technical interview. ***Role code 6: Creep-fatigue crack growth assessment, R5 Volumes 4, 5 & 7.*** On-job training on assessing AGR piping components, awaiting technical interview. ***Role code 10 & 11: Seismic and dynamic analyses.*** On-job training on random vibration analysis of fluid induced vibration of PWR component and seismic qualification of a support structure on MoD projects. Awaiting technical interview.

Team Lead for EDF-Energy – Dungeness, Heysham B and Torness :

EASL lead for projects related to Dungeness B (DNB), Heysham 2 (HYB) and Torness (TOR). Involves management of resource, contract offer/cost, project planning, provide technical advice, attending to client's queries/complaints, providing solutions and line management responsibilities. Responsible for procuring new work from the wider parts of EDF Energy, allocation of work, management of resource. Involves identifying key technical areas where EASL has the capability to contribute. Extensive plant knowledge of boilers and reactor internals for AGRs, particularly DNB, HYB/TOR and Heysham 1 (HYA)/Hartlepool (HAR).

Secondment to EDF-Energy, Structural Analysis Group Outage Lead for Torness Statutory Outage 2015 :

Management of outage related work programme associated with TOR R2 2015 statutory outage. Role involves a mixture of both technical and management skills. Acted as interface between SAG internal team and EASL referral support team / station / materials and inspection team / design authority (DA) / independent nuclear assurance (INA) for outage technical support.

EASL Quality Assurance Manager:

Manage and overlook EASL quality management system alongside with daily technical task. Successfully hosted external audits by client and accreditation body (LRQA) with no significant findings on non-conformity. Successfully organised company internal audits. Planned and carried out improvement to the company quality system. Comprehensive knowledge of ISO 9001:2008. IRCA trained lead auditor. Successful transition of EASL company quality management system to the new ISO 9001:2015.

Graphite Analysis:

EASL lead for graphite analysis projects. Currently involved in on-going workstream for HYB and TOR graphite brick analyses on predicting keyway-root cracking times and other critical locations, both deterministic and

probabilistic. Good understanding of the material behavior, particularly on the influence of dose distribution affecting the process models such as evolution of weight loss, graphite density, dimensional change, etc. Most recently involved in modelling cracks and the brick-to-brick interaction of the sealing ring and groove.

Component Life Assessment, including Creep/Fatigue Crack Initiation and Creep Rupture Assessments:

EASL lead for component life assessment (CLA) related work. This management role includes supervision and mentoring/development of graduate engineers, and technical oversight which includes providing technical advice. EASL lead for boiler and reactor internal components at HYB/TOR AGRs and the review of plant operating behavior for creep/fatigue damage accumulation. Extensive plant knowledge and understand lifetime issues faced by key components across existing fleet of UK's AGRs. Significant capability in high temperature creep/fatigue assessment (over 12 years' of experience) and currently the EASL technical lead for creep/fatigue crack initiation assessments for high temperature components.

Performed assessments for a range of AGR components, a non-exhaustive list as follows: pipework weld (butt weld, branches, end caps, trunnion support collars welds, transition welds), boiler tube spacers, penetration tubeplate, valve bodies, cuff pieces, thermal sleeve, liner anchor studs, boiler gas duct. Experience/exposure to reviewing metallurgical evidence of creep damage and on-site experience of carrying out weld replication inspection and assessment.

Finite Element Analysis:

Performed complex non-linear contact analysis using ABAQUS and fatigue assessment of pre stressed concrete pressure vessel liner top gas duct junction and liner to concrete anchor studs. Support to the hot box dome drilling option in the sensitivity study of non-linear limit load/collapse analysis for the effect of reduced pitch length of control rod guide tube bleed flow drilling hole using finite element analysis method, ABAQUS (RIKS analysis). Quasi-static thermal stress analysis for COGD circulator outlet nozzle and skirt to anchor ring under flooded conditions due to boiler tube leakage fault with natural circulation have been carried out. Finite element 3D model using both shell and brick elements and axisymmetric model including fillet weld profiles attaching the anchor ring to the liner floor have been explicitly modelled. Hybrid modelling of AGR boiler platens. Experience in non-linear contact analysis and crack modelling of AGR graphite bricks using COMSOL.

Fracture and Creep/Fatigue Crack Growth Assessments:

Stress analysis and fracture assessment of flooding and quenching of the auxiliary gas piping and exposure to extreme low temperature have been carried out. Most recently carried out defect tolerance assessments (limiting defect size, fatigue crack growth and creep/fatigue crack growth) for the main steam isolation valve (casing and weld repairs) as part of the GDA for UK HPR1000 and DNB main steam warming line (MSWL) components (branches and bends). Experience in assessment in accordance to R6 using R-Code and based on spreadsheet calculations.

Seismic/Vibration Analysis and Assessment:

Seismic analysis and assessment of autotransformer as backup power supply at HMNB Clyde Faslane. Involves FE analysis and code assessment of key structures, welded and bolted connections and anchors. Random vibration analysis (includes analysis of fluid-structure interaction) and high cycle fatigue assessment of fluid induced vibration of a submerged drain plug in the steam generator channel head at Sizewell B (SZB).

Minimum Acceptable Thickness (MAT) Calculations:

Minimum acceptable thickness calculations for pipework components, a non-exhaustive list as follows: over-stressed components in the CO2 by-pass line pipework, MSWL components (branch and bends) which includes post-processing of system moments from PSA5/ADLPipe pipe stress analysis models. The assessment considered the avoidance of failure by plastic collapse, ratcheting, fatigue and creep rupture.

Performed MAT calculation for input to outage management database for statutory outage at EDF Energy fleet of AGRs, including extracting system piping moments from ADLPipe pipe stress analysis models. Contributed to DNB statutory outage, providing technical support to EDF Energy, SAG. Currently leading the technical support for the HYB and TOR statutory outage.

Providing continuous on-site support, since 2013 (over 7 years), for the inspection and assessment of MAT for components susceptible to FAC at SZB, HYB, TOR, HYA, HAR, HNB and DNB statutory outages. Experience of reviewing video footage, interpreting thickness readings from inspection report to form judgement for indication of FAC, assessment of component to ensure thickness readings are within the allowable MAT and detailing method scope for repair/replacement of components. On-site management for FAC involves reporting findings at OAP/SIP and liaising with other associated teams.

Hanger Survey:

Performed hanger survey audit and reporting pipework support movement and hanger conditions for hot and cold conditions at HYA and HAR. Reviews the pipework support readings and implication to structural integrity.