EPRI Workshop on
"**State of Knowledge on Continuum Damage Modelling**"
held in Collaboration with ASME PVP, 2018

July 19 & 20th 2018

EPRI has been providing technical support to Global partners in the Electricity Supply Industry for over 40 years. In the Generation Sector, a key research imperative is efficient and effective knowledge creation and technology transfer to achieve reliable, safe and economic flexible operation of power plants. We believe that it is critical to engage with all stakeholders in the supply industry so that issues can be discussed and actions plans developed. It is vital then that the lessons learned are used to establish best practice. In addition to meetings with members and direct collaborators, broader EPRI activities have included annual creep fatigue discussions, publication of summary documents and position papers as well as facilitating expert research. These activities show again and again that excellence in science and engineering is necessary to properly underpin technology which facilitates the professional operation of modern plant.

The third Workshop arranged in collaboration with the annual ASME PVP meetings, permits a broad exchange of views on the state of the art associated with the development and application of meaningful models which can be applied to describe the long term high temperature performance of components. Continuum damage based models to simulate progressive degradation and failure are seeing increased application to power plant components because of their ability to provide insight into deformation and damage, and predict initiation and propagation of damage. Details and further information are available from the 2018 PVP website (*EPRI Workshop* tab) & by contacting Jonathan Parker at ebenton@epri.com.

Draft Workshop Agenda

Thursday July 19th 2018

8.30am Welcome and Introduction (EPRI and CEZ)

9.00am – Session 1 Keynote Presentations
Chair Jonathan Parker; Co-Chair Sam Zamrik, ASME

- 9.00 am Keynote 1 – **Professor Hermann Riedel** (Materials)
- 9.40 am Keynote 2 – **Professor David Hayhurst** (Mechanics)

10. 15 am Break

10.30 am Session 2 – Properties and Models for Low Alloy Steels
Chair Professor Bob Ainsworth; Co- Chair Dr. Ralf Mohrmann

- LAS 1 – Creep and Fracture of low alloy steels **(Flewitt)**
- LAS 2 – CEZ experience with low alloy steels **(CEZ)**
- LAS 3 – Multiaxial effects on creep and fracture (**Cane**)
- LAS 4 - Long-term creep fatigue interaction in low alloy steels – data & models (**Oesterlin**)
- Discussion

12.15 Lunch

14.00 Session 3 - Properties and Models for Martensitic Steels
Chair John Siefert; Co – Chair Dr Mirko Bader;

- MS 1 – Creep and Fracture of Martensitic steels (**Parker**)
- MS 2 – Creep and Fracture of Martensitic steel welds **(Mayr)**
- MS 3 – Multiaxial effects on creep and fracture (**Takahashi**)
- Discussion

15.45 Break

16.00 Session 4 - Session 3 - Properties and Models for Stainless Steels
Chair Dr Brian Cane; Co – Chair TBD;

- SS 1 – Review of Factors Affecting Damage in Eddystone (**Masuyama**)
- SS 2 – AGR experience including susceptibility to reheat cracking **(Dean)**
- SS 3 – Approaches for considering cyclic performance of components (**Ainsworth**)
- Discussion

17.45 Close

Friday July 20th 2018

8.30 am Session 5 – Fundamental Approaches for Modelling - Considering BOTH Damage Tolerant and Damage Susceptible steels;
Chair Professor David Hayhurst, Co-chair

- FM1 - Models for describing the creep behaviour of notched bars **(Cocks)**
- FM 2 – Welds, (influences of geometry and heterogeneity of microstructure) (**Perrin)**
- FM 3 – Creep and Fatigue (**Klenk**)
- Discussion

10.00 am Break

10.30 am Session 6 – Design and Component Assessment Applications;
Chair Dr Ian Perrin, Co-chair Dr Ondřej Němec. Considering the following examples:

- DC 1 – Creep performance of seam welded components (**Komaii**)
- DC 2 – Modernization of ASME Code, example of large bore branches, design and performance considerations (**Anderson**)
- DC 3 – Well Engineered Repairs - design, planning and execution (**Siefert)**
- DC 4 - Validation of Models using information from Case Studies , **(Rudolph Blum)**
- Discussion

12. 45 - Summary and Close - Jonathan Parker

13.00 – Finish