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IMechE West Cumbria eNewsletter
Edition 123, September 2013

Institution of MECHANICAL ENGINEERS

www.imechewestcumbria.org.uk

International Thermonuclear Experimental Reactor Talk

EXPANDING LOCAL KNOWLEDGE

THE ITER PROJECT

On 17th of September approximately 60 engineers attended a joint lecture with the Institution of Civil Engineers at the Lakes College. The lecture was delivered by Peter Sedgewick (Project Director Atkins) on one of the most challenging and innovative projects in the world today.

Peter began the presentation by giving a brief history lesson on power generation from the use of fossil fuels which was the energy source that shaped 19th and 20th century civilization through the Nuclear age to Fusion. Peter also postulated that global energy consumption is set to triple by the end of the century, fossil fuels are depleting, with environmental consequences of their exploitation.

No single nation can face these challenges alone hence the International Thermonuclear Experimental Reactor (ITER) project is a multi nation project which is staffed by men and women from all over the world working together for the success of the ITER Project. Five hundred directly employed staff and 350 external contractors currently work for the project in Saint Paul-lez-Durance, France.

Over the past 50 years, immense progress has been made in the fields of plasma science and fusion technology. Still, harnessing fusion power and delivering it for industrial applications remains one of the greatest challenges of our time. There are a number of problems for the ITER project to overcome, one being to fully explore the properties of super hot plasmas, which is the environment which is needed for the fusion reaction to occur. The challenge facing the ITER project is huge with tremendous temperature gradients to overcome and implications this has on material selection.

ITER's plasma pulses will be of a much longer duration than those achieved in other devices, creating intense material stress. ITER will be used to test and validate advanced materials and key technologies for the industrial fusion power plants of the future. All through fusion history, challenges which appeared insurmountable have been overcome. Developments in fusion science have been constant and impressive. ITER, which incorporates the experience of all previous fusion machines, will take fusion to the point where industrial applications can be considered for providing mankind with a cleaner, safer, and unlimited source of energy.

Peter went on to describe the challenges faced during the construction of the Plant, the main challenge (not withstanding the technical developments) included building a plant whilst a great portion of the engineering is still on the drawing board or earlier in the engineering process (conceptual). These problems are nothing new in engineering projects but the scale of the project, the nations involved, the timescales, the technical challenges all contributed to making the project such a difficult challenge.

Tom Pritt, IMechE West Cumbria