

OBJECTIVES

- To develop materials with 100,000 hour creep strength at 650°C and 100MPa and improved resistance to steam oxidation, whose use will result in increases in plant operating efficiency and thereby reduce carbon dioxide emissions.
- Increase understanding of microstructural evolution in advanced materials and weldments, steam oxidation mechanisms, and coating degradation mechanisms.
- Mechanical behaviour of advanced materials and weldments on laboratory samples and full size prototype components.
- Demonstration of prototype manufacturing, joining, non destructive examination and coating capabilities for large components.

SUMMARY

Improved efficiency in coal-fired power plant can be achieved by increasing steam temperatures and pressures, and this has been made practically possible over a number of years by the development of steels with improved creep strength enabling operation up to 600 – 620°C at present. In Europe a new initiative (COST 536) has been launched, entitled 'Alloy Development for Critical Components of Environmentally Friendly Power Plant (ACCEPT)', and encompasses all stages in the development and validation of advanced steels capable of operation at temperatures up to 650°C. The primary route of achieving this is through the development of new alloying and coating concepts.

This project focuses on the validation testing of the capabilities of a new class of steels and their weldments at temperatures up to 650°C and the longer term qualification of advanced steels developed under COST 522. The project has been accepted for inclusion in the COST 536 initiative.

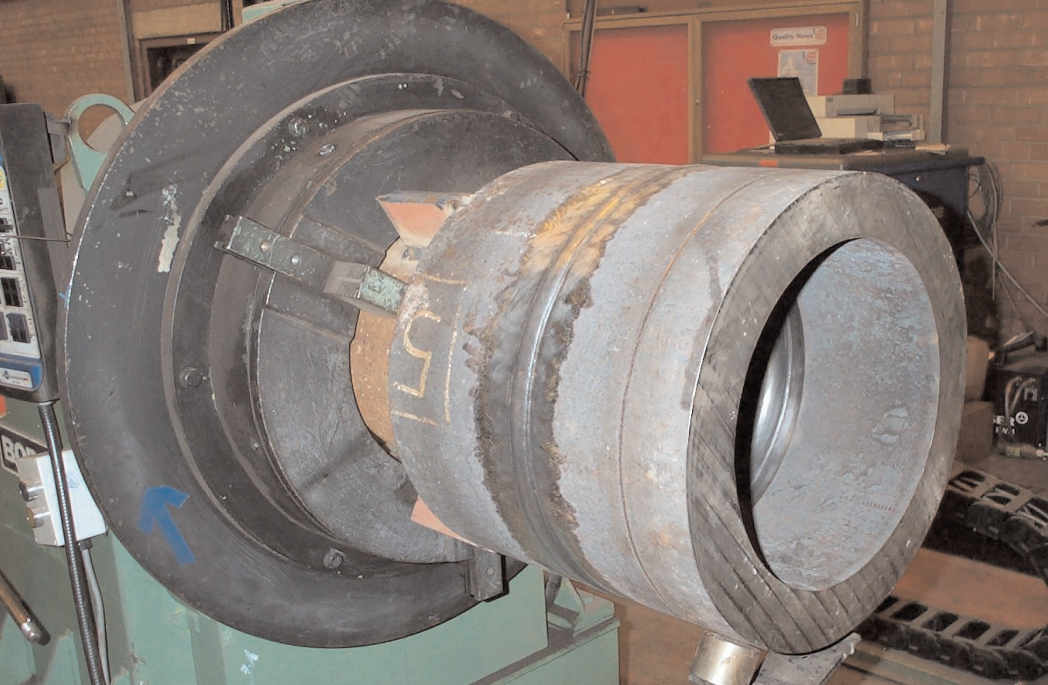


Figure 1. Narrow gap TIG weld in 11.5% Cr pipe (courtesy of Mitsui Babcock Energy Limited)

Which means that as well as retaining a significant UK interest (as many materials and processes have been and will be developed in the UK), it will also benefit by information exchange and technology transfer with other leading companies in Europe. The project consortium consists of UK companies and research centres involved in the pan-European COST 536 initiative.

Specifically, the project will address the following objectives associated with the materials and life prediction aspects of advanced pulverised fuel power plants.

- Improved materials for furnaces, headers, superheaters, reheaters and pipework.
- Improved materials for high pressure turbine rotors, casings, bolting and blading.
- Improved weld and fabrication methods.
- Improved models for steam oxidation and development of oxidation resistant coatings.
- Improved models for corrosion prediction in furnaces.

Further information on the Cleaner Fossil Fuels Programme, and copies of publications, can be obtained from:

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COST

The total cost of the project is £1,952,200 with the Department of Trade and Industry contributing £780,880.

DURATION

46 months – September 2004 to July 2008

LEAD CONTRACTOR

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