

Heat Exchanger Failure Investigation Report

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technical report from the year 2013 in the subject materials science grade b robert gordon university aberdeen course msc oil and gas engineering language english abstract a high pressure gas cooler located in an offshore platform have been operating for more than 10 years throughout that period the gas cooler have been subjected to several tube failures the failures

have caused gas leak from the tube side several materials upgrades have been used to contain the tube failure the last choice was to use a more corrosion resistant material hastelloy c22 crevice corrosion has been reported as the primary failure mechanism the tube and tube plate joined surfaces have been exposed to high temperature which is relatively higher than the critical crevice temperature of hastelloy c22 there was a poor heat transfer between the shell side fluid and tube side due to a small heat transfer area and low fluid velocity in the affected zone stress corrosion and fatigue corrosion accounted for the secondary failure mechanism which ultimately caused a crack in the tubes other possible reason identified to cause crevice corrosion was the mechanical rolling expansion technique oftentimes it creates rear crevices on the tubes with enough geometry to develop crevice chemistry mitigation methods such as hydraulic expansion technique heat treatment for residual stresses and baffle design enhancements have been proposed in this report key words shell and tube heat exchanger failure hastelloy c22 material tube failure localized corrosion crevice corrosion internal pitting corrosion

academic paper from the year 2018 in the subject engineering metal engineering metal processing metal structure grade b robert gordon university aberdeen course oil and gas engineering language english abstract as a corrosion expert this report centred around the failure investigation of a shell and tube heat exchanger due to corrosion mechanisms the different types of corrosion its effect resulting to the failure and possible solutions and recommendations were submitted to the client for further action the report also sheds light on the alloys used for the design and better alternatives to be used to prevent future degradation of the shell and tube heat exchangers

failures or forced shutdowns in power plants are often due to boilers and particularly failure of boiler tubes this comprehensive resource deals with the subject of failure investigation of boiler tubes from basic fundamentals to practical applications coverage includes properties and selection of materials for boiler tubes from a metallurgical view point damage mechanisms responsible for failure of boiler tubes and characterization techniques employed for investigating failures of boiler tubes in thermal power plants and utility boilers of industrial commercial institutional ici boilers a large number of case studies based on the actual failures from the field are described along with photographs and microstructures to allow for easy comprehension of the theory behind the failures this book is geared to practicing engineers and for studies in the major area of power plant engineering for non metallurgists a chapter has been devoted to the basics of material science metallurgy of steels heat treatment and structure property correlation a chapter on materials for boiler tubes covers composition and application of different grades of steels and high temperature alloys currently in use as boiler tubes and future materials to be used in supercritical ultra supercritical and advanced ultra supercritical thermal power plants a comprehensive discussion on different mechanisms of boiler tube failure is the heart of the book additional chapters detailing the role of advanced material characterization techniques in failure investigation and the role of water chemistry in tube

failures are key contributions to the book the authors have long standing experience in the field of metallurgy and materials technology failure investigation remaining life assessment rla and fitness for service ffs for industrial plant and equipment including power plants they have conducted a large number of failure investigations of boiler tubes and have recommended effective remedial measures in problem solving for power and utility boilers

the era of lean production and excellence in manufacturing advancing with sustainable development demands the rational utilization of raw materials and energy resources adopting cleaner and environmentally friendly industrial processes in view of the new industrial revolution through digital transformation the exploitation of smart and sophisticated materials systems the need of minimizing scrap and increasing efficiency reliability and lifetime and on the other hand the pursuit of fuel economy and limitation of carbon footprint are necessary conditions for the imminent growth in a highly competitive economy failure analysis is an interdisciplinary scientific topic reflecting the opinions and interpretations coming from a systematic evidence gathering procedure embracing various important sectors imparting knowledge and substantiating improvement practices the deep understanding of material component role e g rotating shaft extrusion die gas pipeline and properties will be of central importance for fitness for purpose in certain industrial processes and applications finally it is hoped and strongly believed that the accumulation of additional knowledge in the field of failure mechanisms and the adoption of the principles philosophy and deep understanding of failure analysis process approach will strongly promote the learning concept as a continuously evolving process leading to personal and social progress and prosperity

the open access volume titled ntpc transactions on energy research nter 2025 is a collection of technical papers related to different domains of the power sector it provides a glimpse of the research and scientific activities in several key areas of the power sector like carbon capture and utilization ccu waste to resource technologies metallurgical studies and advanced nde for power plants oil water management ash utilization integration of artificial neural networks into dcs and plc systems hydrogen technology and renewables etc this volume will be of interest to power plant professionals researchers and academicians

this book comprises select peer reviewed proceedings of the international conference on advances in materials research icamr 2019 the contents cover latest research in materials and their applications relevant to composites metals alloys polymers energy and phase change the indigenous properties of materials including mechanical electrical thermal optical chemical and biological functions are discussed the book also elaborates the properties and performance enhancement and or deterioration in order of the modifications in atomic particles and structure this book will be useful for both students and professionals interested in the development and applications of advanced materials

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