

FAILURE PREVENTION AND SERVICE LIFE EXTENSION OF WELDED PIPES IN OIL INDUSTRY

Dušan Arsić¹, Ružica Nikolić², Aleksandra Arsić³, Živče Šarkoćević⁴,
Dragan Cvetković⁵

¹ Faculty of Engineering, Sestre Janjić 6, Kragujevac, Serbia

² University of Žilina, Research Center, Univerzitna 8215/1, Žilina, Slovakia

³ Faculty of Mechanical Engineering, Kraljice Marije 16, Belgrade, Serbia

⁴ Faculty of Technical Sciences, Knjaza Milosa 7, Kosovska Mitrovica, Serbia

⁵ Faculty of Engineering, Sestre Janjić 6, Kragujevac, Serbia

1 Introduction

Oil and gas well piping and pipelines for the transport of oil and gas are regarded as highly responsible structures, quite susceptible to corrosion and occurrence of cracks. Therefore, it is very important to know the pipe's residual strength, in the case that any of aforementioned types of damage occur [1, 2].

Steels meant for the production of protective seam welded pipes, which are used in wells are specified in the API 5CT standard [3]. Automatic or semi-automatic production of welded pipes enables the continuing production of longitudinal-seam welded pipes and the basic intention is to achieve the welding speed, which would be equal to the speed of pipe-forming. Machines for the continuing production of longitudinal-seam welded pipes are mainly designed for the automatic high frequency contact welding [4].

Based on the precise examination regarding the defect type and size, as well as based on the calculation of operating ability of the welded joint, the decision, which refers to the possibility of reintegrating the pipe into the system, can be made [5].

Steel pipes in oil industry are continuously exposed to corrosive effects, enhanced by pressures and temperatures, which exist within the well. Corrosion can lead to decrease of mechanical properties of steel, which can, in combination with the effect of unfavorable conditions, lead to occurrence of the initial crack and, subsequently, failure. Failure of protective pipes can be caused and accelerated by various corrosion mechanisms [6, 7].

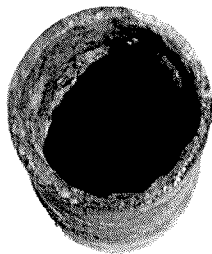


Fig. 1 General corrosion of well pipes and pipeline failure [1]