STUDY OF EROSION WEAR BY SOLID PARTICLE ON A CARBON STEEL PIPELINE SECTION (API 5L-X52)

J. A. Frias-Flores, M. Vite-Torres, E. A. Gallardo-Hernández
*egallardo@ipn.mx
[a] Instituto Politécnico Nacional, SEPI ESIME Zacatenco, Grupo de Tribología, Ciudad de México, México

KEYWORDS

Surface topography; Experiments in tribology; Wear; Erosion.

ABSTRACT

Solid particle erosion (SPE) is still a phenomenon of interest within a huge range of industries like mining, aeronautical, extractive, automotive, railway and so on [1]. Since SPE continues to represent a constant and huge problem within the industries whose suffer from it. Within these industries one of the elements most affected by SPE are transportation elements such as ducts and pipelines [2], since in most cases harder materials must be transported and although much research has been done to improve the wear resistant. There is still a lack of knowledge required to minimize erosive wear [4], not to mention that this type of transport elements are tough to improve due to their large volume and investment needed. The present study has been conducted to analyse the effect due to the impact of solid particles on a carbon steel pipeline section. To carry out the erosion test, hard particles of aluminum oxide (Al203), with an approximate average particle size of 90 µm, were used as an eroding agent. Erosion test were conducted on a carbon steel (API 5L X-52) section pipeline. An erosion test rig was used and adapted based on the ASTM G76-18 [3] to simulate erosive wear by solid particles. Prior to experimental tests, some characterization of both materials was carried out. Particle velocity was evaluated with the double disc method and the impingement angles are ranging from 15° to 90°. Different wear damage and wear mechanisms were observed at different time intervals, evaluating the wear rate with the test materials.

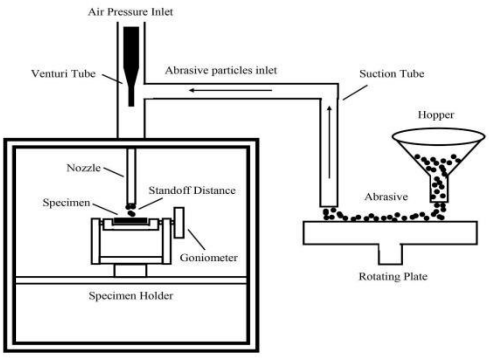

Fig 1. Schematic diagram of the erosion test bench.

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If necessary.

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