

Abstract Submitted  
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**Erosion resistance of pipe bends with bio-inspired internal surfaces**<sup>1</sup> CHENGCHUN ZHANG, Key Laboratory of Engineering Bionics, Jilin University, China, OMAR MATAR, Imperial College London — Guided by the structure of a shell surface, a bio-inspired surface is proposed to enhance the erosion resistance of pipe bends carrying crude-oil and sand in the turbulent flow regime. A comparison of the erosion rate between a smooth bend and the bio-inspired one is carried out using numerical simulations: large eddy simulations are used to simulate turbulence, and these are coupled to a discrete element method for the solid particles. The results indicate that the bio-inspired surface can control effectively the liquid-solid flow near the wall, and decrease the particle-wall force. This, then, leads to a reduction in the erosion rate brought about by the sand transported by the crude-oil in the pipe bend.

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