水管加热炉盘管弯头冲蚀磨损研究

摘 要

水管加热炉盘管的主要功能是对介质进行输送，介质内包含气体、水以及砂砾等物质，因此水管加热路面临着多项冲刷引起的腐蚀问题。由于多项介质的冲严重腐蚀刷引起的集输系统的安全运行，需要对其进行更深的探索研究。加热炉水管弯头是盘管腐蚀的薄弱环节，目前，国内外对弯头冲蚀的认识还有待加深，真因如此，对弯头的冲蚀研究有必要进行深入探索，在保证水管加热炉的安全生产起到十分重要的意义，不仅如此，还可以为管内设计提供有效的指导。

本文应用 GAMBIT 建立水管加热炉盘管弯头冲蚀几何模型，应用 FLUENT 数值模拟方式针对天然气集输管内弯头内部的速度场、压力场及冲蚀过程进行仿真模拟计算，观察冲蚀分布，并通过改变流体流动参数观察弯头内部冲蚀分布，进而提出有效减缓磨损的控制方案，为进一步研究水管加热炉盘管弯头冲蚀机理提供理论依据。

研究结果显示在水炉加热管弯头冲蚀研究中，我们了解到弯头手管内流体的冲蚀主要根据与弯头内压力流速、弯头内流体温度升高、含砂率，流体所含的颗粒直径所影响，根据影响因素我们对水管加热炉弯头给出了方案达到缓解减轻弯头被冲蚀的问题，解决了在加热炉安全的前提下保证生产。

关键词： 冲刷腐蚀，液固两相流，90°弯头，交互作用，数值模拟

Abstract

The main function of the pipe heating furnace coil is to transport the medium, the medium contains gas, water and gravel and other substances, so the pipe heating road is facing a number of erosion caused by corrosion problems. The safe operation of gathering and transportation system caused by the serious erosion of multi-media brushes requires further exploration and research. Furnace pipe bend is the weak link coil corrosion, at present, the domestic and international understanding of elbow erosion remains to be deepened, so for this reason, the erosion study of elbow is necessary to make in-depth exploration, in ensuring safety in production of pipe heating furnace play a very important significance, not only that, but also can provide effective guidance for the tube design.

GAMBIT is applied in this article the pipe heating furnace coil pipe elbow erosion geometric model is set up, and observe the distribution of erosion, and observed by changing the parameters of fluid flow erosion distribution inside the elbow, and put forward effective control scheme to slow the progress of the wear and tear, in order to further study the pipe heating furnace coil pipe elbow erosion mechanism.

Research results show that the water in the heating furnace tube elbow erosion in the study, we learned that hand bend tube fluid erosion is mainly based on and the pressure in the elbow flow rate, the fluid temperature in the elbow, the sand ratio, the fluid contains particles diameter, according to the influencing factors of our solutions are provided for the bend pipe heating furnace to ease ease bend is the problem of erosion, solved on the premise of furnace safety guarantee production.

Key words: erosion corrosion, liquid-solid two-phase flow, elbow, interaction, numerical simulation

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