Materials Science Forum
ISSN: 1662-9752, Vol. 1038, pp 393-400
doi:10.4028/www.scientific.net/MSF.1038.393

Submitted: 2021-04-01
Accepted: 2021-04-11
Online: 2021-07-13

Solution of the Problem of Operational Reliability and Environmental Safety of Transport Pipeline Systems

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Keywords: technogenic and environmental safety, transport pipeline systems, abrasive finishing treatment, reliability, wear.

Abstract. Ensuring technogenic and environmental safety of transport pipeline systems is a complex state task. The main group of reasons leading to failures, accidents and other incidents in these systems is associated with the quality of manufacture (repair) of equipment, as well as the level of operation of transport pipeline systems. At the present stage of transport pipeline systems development, the design-technological approach, including the maintenance and repair of valves, is significantly changing. Particular attention is paid to the abrasive finishing and lapping treatment, which allows, in one operation, carrying out first the roughing (allowance removal), and then the final finishing with achievement of the shape and dimensional accuracy of the workpiece. The proposed calculated dependences allow predicting the operation reliability and durability of high-precision products of transport pipeline systems valves and, thus, increase the level of environmental safety of transport pipeline systems.

Introduction

Technogenic load on the environment in Ukraine. The sources of this load will not be the last stage of the transport pipeline systems. The ecological safety of such systems is the absence of harmful effects of the environment on the object of the system. For existing transport pipeline systems, the main reasons for the impact on the environment are energy losses. The level of danger to humans and the environment can be different - from minimal deviation or the norm to critical and even catastrophic [1, 2]. Today in Ukraine there is no clear methodology for ensuring the safety of transport pipeline systems. This practice leads to significant accidents on them.

Reliability and technological characteristics of elements of transport pipeline systems, including valves (mean time between repairs to probable failures, average time of emergency and planned repairs, performance of elements, etc.) depend on the quality of manufacture (repair) of equipment, as well as the level of operation of such systems [3].

Long-term operation of transport pipeline systems leads to various types of damage. Among them are damage to the insulating coating of pipes, corrosion damage, cracks in welded seams of pipelines and body parts of fittings, etc. The specified damage reduces the reliability and durability of the transport pipeline systems and can have a negative impact on the environment, in particular, atmospheric air.

Significant depreciation of such systems is the reason for the annual increase in the cost of updating fixed assets. Therefore, in recent years, there has been a persistent trend towards a decrease in funding for capital, flow and scheduled repairs, which negatively affects the efficiency and reliability of the operation of transport pipeline systems. In addition, an insufficient volume of investments worsens their technical condition and increases the current and unproductive costs of material and energy resources.