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Article

Regarding The Management of Wastewater Reuse in Trasnport Washing Stations

N. Khalilov[1], D.M.Nodirov[1*], Sh.Imanazarov[2]

1. Samarkand State Architecture and Construction University, Samarkand, Uzbekistan.
2. Tashkent University of Architecture and Civil Engineering, Taskhent, Uzbekistan.

* Correspondence: d.nodirov@samdaqu.edu.uz

Abstract: This study addresses the pressing issue of water consumption in car washing facilities and proposes solutions to mitigate its environmental impact. The main focus is on implementing closed-loop circulating water supply systems, which have shown to reduce water usage by 10-50 times compared to traditional methods. The research highlights the necessity for water used in circulation systems to meet specific quality requirements, such as carbonate hardness, pH levels, and biogenic particle content. Additionally, it discusses the challenges of water loss through evaporation and contamination during usage, necessitating periodic replenishment with fresh water. The study identifies the formation of calcium carbonate deposits within pipes and heat exchangers as a significant concern, emphasizing the need for water desalination technologies to maintain system efficiency. By analyzing wastewater sources within car washing facilities, the research finds no evidence of chemical contamination, thus indicating potential for sustainable water management practices. Overall, the findings underscore the importance of adopting closed-loop water supply systems in industrial settings to conserve water resources and minimize environmental impact.

Keywords: car wash shop, machinery, fuel, chemical, petrochemical and food industries

1. Introduction

Water is one of the most important natural resources, which determines the technical and sociable economy of one or another country. The consumed mix of fresh water is one hundred times more than that of all other natural resources. In particular, the circulation of water forms the basis of the change in the man-made circulation of substances and the energy associated with it in ecological-economic systems. Our planet is rich in water resources, but the proportion of fresh water is about 2%, while the usable one is about 0.01% raw. Farm networks in which too much water is used for energy, mechanical engineering, cellulose-cog, fuel, chemical, petrochemical and food industries, black and non-ferrous metallurgy include housing and communal and rural economic sectors.

2. Materials and Methods

The main way to reduce the amount of efficient use of clean water is to establish systems of closed-loop circulating water supply systems. The use of water in a closed-loop circuit method reduces its consumption by 10-50 times. For example, if you spend 250-300 liters of water for washing light cars, you will spend 25-30 liters of water circularly. In this method, capital and operating costs are also reduced. Currently, the use of water in all enterprises belonging to the industrial production network is aimed at using the system of operation in a circular system. For example, in the chemical industry, this method has grown to 82.5%. The water used in the circulation system must meet several requirements:

- to carbonate hardness; to water medium - p H

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- the amount of hanging and biogenic particles
- to BPK and XPK indicators of water.

The closed loop circulating water supply is largely lost to evaporation or splashing of much of it. In addition, water can be partially contaminated with corrosion products and biological substances during use. Therefore, from time to time, part of the water in the system is filled with fresh water. As a result of the movement of water inside pipes and heat exchangers, calcium carbonate on their walls is formed and sits based on the following reaction:

- CaJ+ + 2HCO ,- and JCaC03 + C02 + H20
- The water solubility of calcium carbonate decreases as the temperature rises.
- Therefore, the solubility hardness used in Rotary systems is

  it should be low and special before such waters are used should be desalinated based on technology.

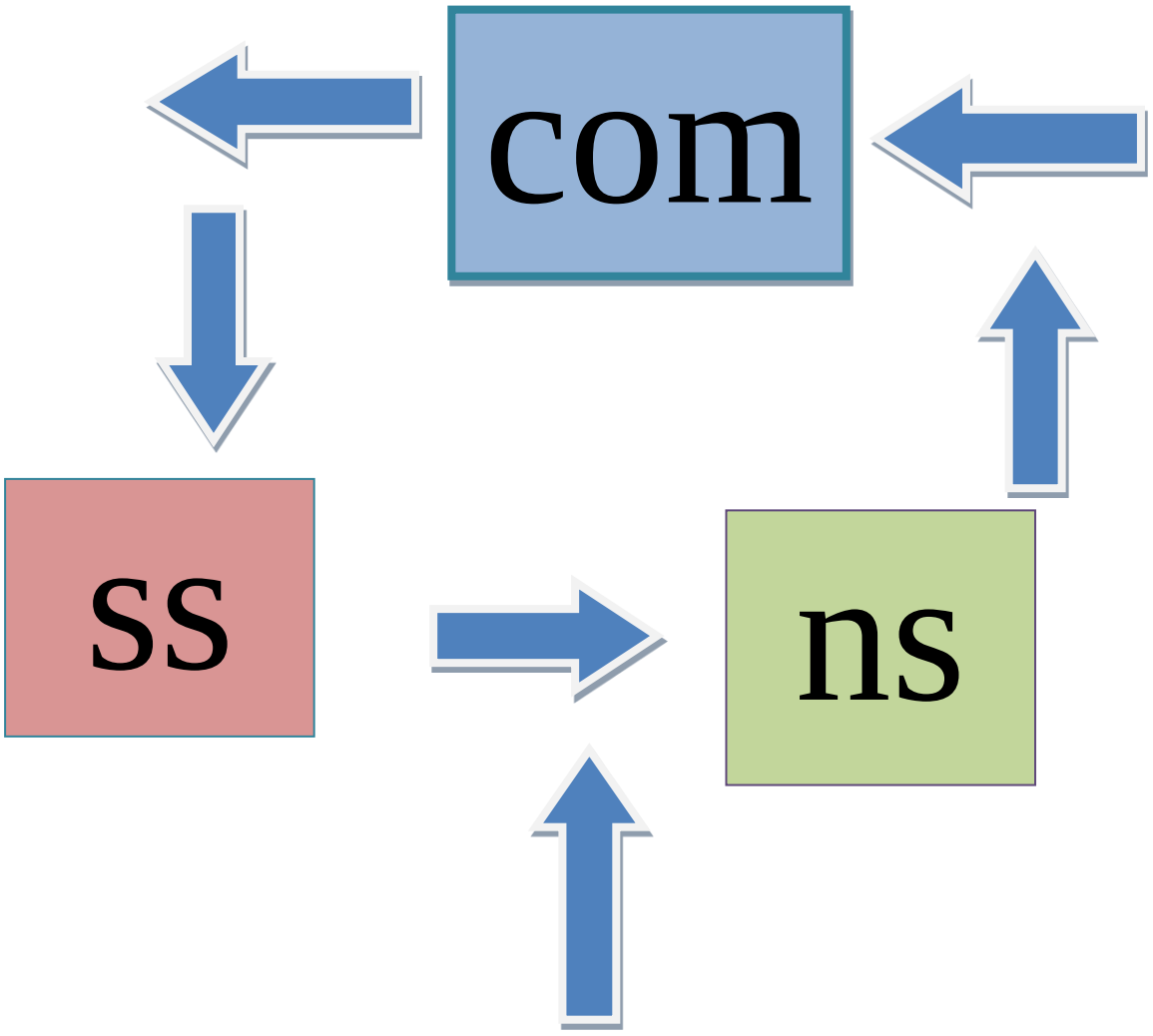


Figure 1. System of circulating water supply that operates in a closed loop

Equipped with water cooling

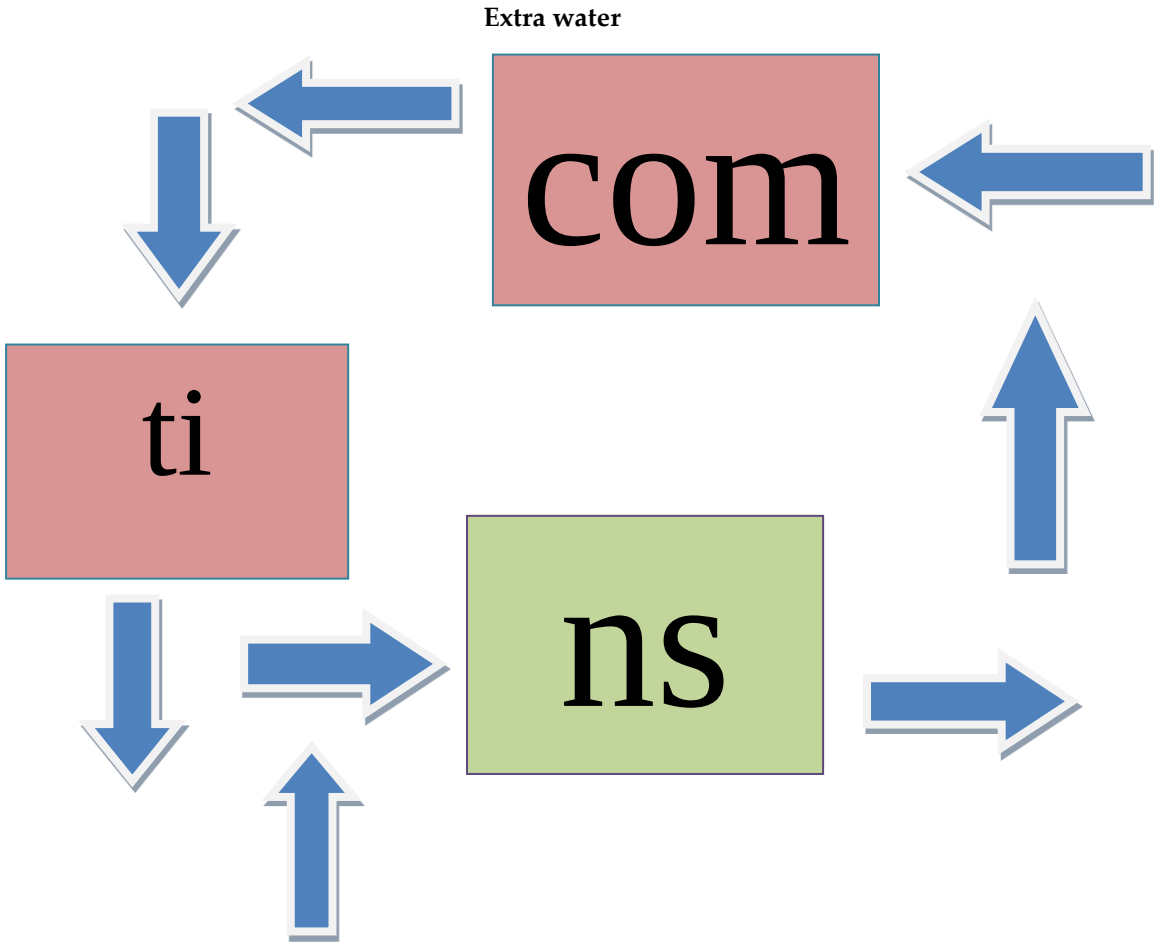
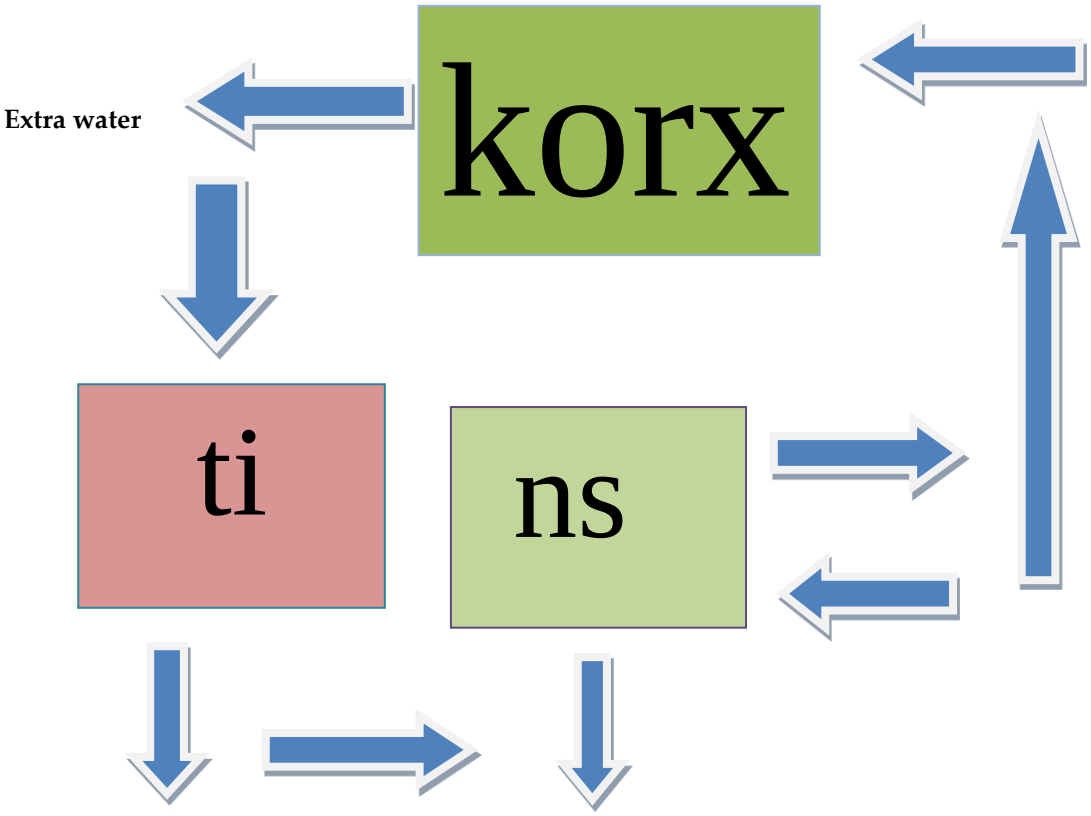


Figure 2. System of circulating water supply that operates in a closed loop Equipped with water purification



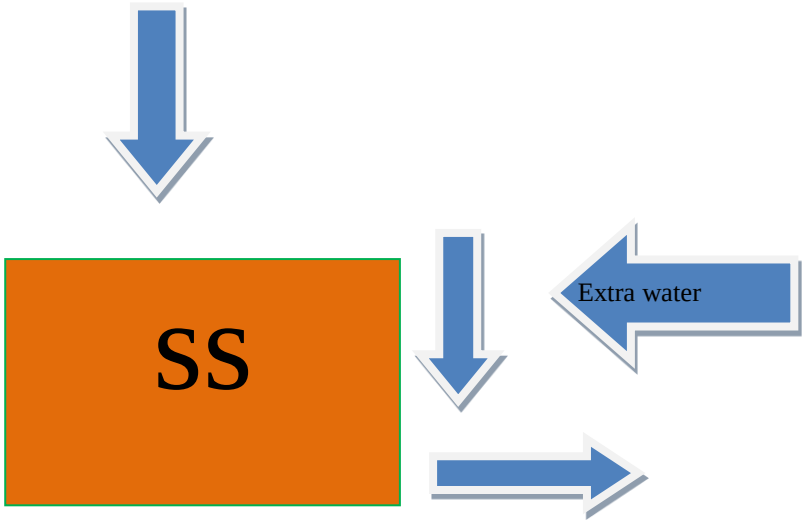


Figure 3. System of circulating water supply that operates in a closed loop Equipped with both purification and cooling.

3. Results

This is the production facility of the firm. The cooling system is referred to as the SS cooling system, the pumping station is known as the NS pumping station, and the treatment facility is called the ti treatment facility. An effective approach to address the contamination of water bodies is the implementation of closed-loop circulating water supply systems, which focus on the generation, disposal, and reduction of pollutants. In closed-loop circulating water supply systems, water is recycled multiple times without undergoing any treatment, and this water is not discharged into open water bodies. Fresh water is introduced into closed loop circulating water supply systems only when the water level decreases or the existing water becomes unsuitable for usage. Closed-loop circulating water supply systems should prioritize water efficiency in all technological processes, optimize the reuse of wastewater components, minimize capital and operating costs, eliminate the need for regular sanitary and hygienic maintenance by personnel, and prevent environmental pollution. Purified water should be equivalent in quality to technical water. Newly constructed and operational firms should incorporate closed-loop circulating water supply systems. The indicators of water supply systems can be compared as follows:

- Precise measurement of water usage, including the amount of freshwater used per unit of product.
- Identification of reagents that can be utilized for wastewater purification.
- Comparison of electricity and heat consumption.
- Determination of the total quantity of product generated during wastewater treatment.
- Evaluation of economic factors, such as profitability and the annual impact on spending, assessed through fund capacity.

4. Discussion

At the firm, specific permission for water discharge is given, and the water consumption complies with the criteria of GOST. The firm utilizes a single subterranean artesian well located within its premises for its water supply. The well has a depth of 60 meters and a capacity of 63 cubic meters per hour. The well is outfitted with an EVS 8-16 - 80 water traction pump. Throughout the operation of the firm, water is not sourced from

any other water sources. The water obtained from the well is transparent, lacking any color or flavor as determined by chemical analysis using Hossa. It has a little concentration of sodium chloride and calcium, which can be attributed to its salt content. The minerality level is 0.185 grams per liter. The firm has a daily water requirement of 284.36m3 (81.62 thousand m3/year). The water is used as follows: - 13.05m3/day (81.62 thousand m3/year) for farming and drinking purposes. - 271.31m3/day (41.7 thousand m3/year) for production reasons.

The allocation of water consumption based on usage is presented in the subsequent tables.

Table 1 The amount of water used in the enterprise for production and other purposes

Indicators	Water demand			
	Regulatory account		Real	
	м3/сутка	Минг м3/йил	м3/сутка	Минг $м^3$/йил
Total water content	284, 36	81,62	189,00	57,64
From open water bodies	284,36	81,62	189,00	57,64
From groundwater	13,05 271,31	39,92 41,7	10,00 179,00	3,05 54,59
From the city or other water network	-	-	-	-
For farm and drinking purposes	25	9,125	25	9,125
For production purposes	-	-	-	-

5. Conclusion

this study sheds light on the critical issue of water usage in car washing facilities and proposes effective solutions to mitigate its burgeoning demand. Through the implementation of closed-loop circulating water supply systems, significant reductions in water consumption, ranging from 10-50 times, are achievable, thus offering a promising

avenue for sustainable water management practices in industrial settings. The absence of chemical contamination in wastewater generated from various sources within the firm underscores the feasibility of adopting environmentally friendly approaches. These findings have implications for businesses seeking to optimize water usage and reduce environmental impact. However, further research is warranted to explore the long-term efficacy and scalability of closed-loop water supply systems across diverse industrial contexts, as well as to develop strategies for addressing potential challenges associated with implementation and maintenance.

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