E CONF SERIES

International Educators Conference
Hosted online from Toronto, Canada
Website: econfseries.com 7th June, 2025

OPERATION PROCEDURE OF WASTEWATER PUMPING STATIONS

Rizayev Abdumalik Nabiyevich [1.a],
Kuvondikov Kuvonchbek [2.a],
Raimov Muzaffar [3.a]
Tashkent State Transport University, Professor [1.a];
Tashkent State Transport University, assistant [2.a];
Tashkent State Transport University, student [3.a]

Annotation:
This paper presents the operational procedure of wastewater pumping stations, focusing on their role in urban water management systems. It outlines the main components of a pumping station, including pumps, control panels, sensors, and emergency systems, and describes their functions in lifting and transferring wastewater to treatment facilities. The study emphasizes the importance of regular maintenance, automation, and monitoring for efficient and uninterrupted operation. Additionally, the paper highlights safety standards and environmental considerations associated with the operation of such infrastructure. The findings contribute to improving the reliability and sustainability of wastewater management systems.

Keywords: Wastewater, pumping station, operation procedure, sewage management, maintenance, automation, control systems, monitoring, environmental protection, urban infrastructure.

INTRODUCTION

Large volumes of wastewater are generated as a result of the activities of settlements, industrial facilities and other infrastructure. Wastewater lifting pumping stations play an important role in efficiently and safely transporting this water to treatment facilities. These stations serve to overcome problems related to terrain, distance and gravity, and to continuously move wastewater.

MAIN BODY

1. Pump stations types

Water the waters lift pump stations following to types divided into :

- **Central (main) pump stations :** Big in size sewage the waters highway collectors through cleaning to the facilities transmits .
- **Intermediate pump stations :** Big sewage in systems lowland in places will be placed and the flow up raises .
- **Local (small) pump stations :** Apartments , industry enterprises or buildings at the level works .

2. Structure and technician devices

Pump station main technician devices of the following consists of :

Reception chamber (reservoir)

Water waters first become this to the place falls . Here sand , large bodies , and sediment from substances cleaning begins .

Pumps

Usually **centrifugal pumps** , sometimes and **range or peristaltic pumps** is used . They following to the requirements answer to give need :

- High work fertility ;
- Corrosion resistant from the material prepared to be ;
- Water in the waters large particles to hold can internal structure .

Electric motors

Electricity supply based on worker motors to pumps movement gives . They voltage , current , load and rotation to the speed looking at managed .

Pipes system

Pressure under water up or next collector to the system transmits . Usually following from materials is prepared :

- Polyethylene (PE)
- Polyvinyl chloride (PVC)
- Metal (rare) cases)

Automatic management system (ATS)

Pumps to work fall and stop order automatic control does . Level sensors , pressure meters and alarm systems through The ATS is managed by : is based on :

- Water level ;
- Pump work time ;
- Temperature and pressure indicators ;
- On the network emergency situations .

Performance principle

Pump station work order step by step as follows done increases :

1. **Water water come falls :** Gravity through or small stream through sewage waters acceptance to the camera come falls .
2. **Level sensor to work falls :** Water level in advance designated to the level when reached , level meter (electronic) liquid level sensor) gives a signal .
3. **Pumps to work falls :** Automatic in a way chosen The pump (s) are running. begins and water up raises .
4. **Pressure pipes through water transmitted :** Pump water designated to the height or far remote cleaning to the facility sends .
5. **Water level when it drops , the pump turns off :** Sensors using this The process is also automated .

Backup and security measures

Modern pump at the stations following security and backup systems there is :

- **Backup pumps :** If the main pump not working if left , automatically in a way backup pump to work falls .
- **Backup electricity supply :** Electricity energy when disconnected , diesel generators automatic in a way electricity supply provides .
- **Automatic signaling :** Water level too much outside when rising or malfunction face when giving dispatcher to the point warning will be sent .

Pumps turn with operation (rotation)

Far term and reliable work for pumps rotational in order — in turn This is used . method :

- Equipment too much more than from work not to be released ;

- Every one of the pump balanced to work ;
- Technical service to show to facilitate service does .

Pump stations management

Many modern pump stations **SCADA** (Supervisory Control and Data Acquisition) systems through This is managed . to the following opportunity gives :

- From a distance control and management ;
- Work status about statistic information collection ;
- Pumps efficiency observation ;
- Emergency to the circumstances fast answer to give

Technical service and exploitation

Permanent technician service show following work own inside takes :

- Pump aggregates check and lubrication ;
- Electricity equipment from the test transfer ;
- Sensor and automation systems adjustment ;
- Filter and ventilation holes cleaning ;
- Emergency to situations readiness according to test exercises transfer

CONCLUSION

Water the waters lift pump stations engineering infrastructure main from the joints is one of them . effective performance not only sewage the waters safe to transport , maybe the environment from pollution protection to do service does . Technical service , modern automatic , reliable pipes and continuous monitoring system with such stations far long-term , stable and ecological safe activity shows .

REFERENCES

1. “Oqova suvlarni tozalash inshootlari” – Qodirov S., Toshkent, “O‘zbekiston Milliy Ensiklopediyasi” nashriyoti, 2020.
2. “Suv ta’minoti va kanalizatsiya” – Nazarov U., Karimov D., Toshkent, 2018.
3. “Nasoslar va nasos stansiyalari” – Karimov B. X., Toshkent, “Fan va texnologiya”, 2016.

4. “Gidravlika va gidravlik mashinalar” – Raxmatov S., Toshkent, “Ilm Ziyo”, 2019.
5. “Inshootlarni avtomatlashtirish va SCADA tizimlari” – Toshkent arxitektura-qurilish instituti darsliklari, 2021.
6. Quvondiqov, Q. (2023). On the Issue of Efficiency in the Transportation of Oil Products by Main Pipeline. International Journal of Trend in Scientific Research and Development (IJTSRD).
7. Quvondiqov, Q. (2021). Suv ta'minoti, oqova suv, gidravlika va suv resurslarini muhofaza qilish sohalarida yangi yutuqlar. X МЕЖДУНАРОДНАЯ НАУЧНО-ПРАКТИЧЕСКАЯ КОНФЕРЕНСИЯ.
8. Quvondiqov, Q. (2023). Neft mahsulotlarini magistral quvurlar orqali tashishda nasos rejimi va nasos stansiyalarida elektr energiyasining xarajatlari. Замонавий архитектура, бинолар ва иншоотларнинг мустаҳкамлиги, ишончлилиги ва сейсмик хавфсизлик муаммолари.
9. Obidjonov, A., Umarov, U., Babaev, A., Quvondiqov, Q., & Umarova, D. (2023). Purification of borehole and domestic waters in rural conditions of Uzbekistan using filters and their hydraulic calculation. In E3S Web of Conferences (Vol. 401, p. 01084). EDP Sciences.
10. Umarov, U., Quvondiqov, Q., Obidjonov, A., Babaev, A., & Ochildiyev, O. (2023). Selecting wastewater treatment filters using local raw materials. In E3S Web of Conferences (Vol. 401, p. 03019). EDP Sciences.