HSR (LONDON),
HOUGHTON STREET REVIEW JOURNAL
ISSN: 2058-5519|Impact factor-15.9
http://houghtonstreetreview.com/index.php/hsr

Qarshi magistral kanalining ayrim uchastkalarini rekonstruksiya qilish va ekspluatatsiya samaradorligini oshirish

Berdiyev Shavkat Jo'rayevich
QarDTU "Melioratsiya va yer kadastri" kafedrasi v.b professori:
ORCID: https://orcid.org /009-0003-3012-3925
+99891 453-11-36
Hasanov Sunnatillo Isroil o'g'li
QarDTU "Gidravlika" mutaxassisligi 2-kurs magistri
https://orcid.org/0009-0005-3433-7693
+99895 343-53-00
doi:https://doi.org/10.5281/zenodo.23488759

Annotatsiya. Ushbu maqolada Qarshi magistral kanalining ayrim uchastkalaridagi loyqa cho'kindilari, qirg'oq yemirilishi va gidrotexnik inshootlarning eskirishi muammolari hamda ularni bartaraf etish bo'yicha rejalashtirilgan rekonstruksiya ishlari ko'rib chiqilgan. Maqolada kanalni tozalash, qirg'oqlarni mustahkamlash, darvozalar va ko'targich mexanizmlarni yangilash orqali suv ta'minotini barqarorlashtirish imkoniyatlari tahlil qilingan.
Kalit so'zlar: Qarshi magistral kanali, gidrotexnik inshootlar, rekonstruksiya, ekspluatatsiya, loyqa cho'kindilari, suv ta'minoti.

Kirish

Qarshi magistral kanali Qashqadaryo viloyatidagi yirik sug'orish tizimlaridan biri bo'lib, 1975-yilda ishga tushirilgan. Kanalning umumiy uzunligi 105,2 km bo'lib, 212 ming gektar sug'oriladigan maydonni suv bilan ta'minlaydi. Kanalning bosh qismidagi maksimal suv sarfi 350 m^3/sekund ni tashkil etadi.

Kanalda 5 ta to'suvchi inshoot, 165 ta suv oluvchi inshoot va 3 ta suv tashlama inshoot mavjud. Bu inshootlar turli kanallar va nasos stansiyalarini suv bilan ta'minlashda muhim vazifani bajaradi.

Kanal va undagi gidrotexnik inshootlar 40 yildan ortiq vaqt davomida foydalanilgani uchun texnik eskirish, loyqa cho'kindilari to'planishi va qirg'oq yemirilishi muammolari yuzaga kelgan. Shu sababli kanalning ayrim uchastkalarini rekonstruksiya qilish va ekspluatatsiya samaradorligini oshirish dolzarb masala hisoblanadi.

Tadqiqotning maqsadi — Qarshi magistral kanalining ayrim uchastkalaridagi texnik muammolarni aniqlash hamda rekonstruksiya orqali suv ta'minotini barqarorlashtirish imkoniyatlarini ko'rib chiqishdan iborat.

Metodlar

Tadqiqotda Qarshi magistral kanali va undagi gidrotexnik inshootlarga oid loyiha hujjatlari, texnik ko'rsatkichlar va rejalashtirilgan ish hajmlari tahlil qilingan.

Kanalning loyqa cho'kindilari to'plangan uchastkalari, qirg'oqlari yemirilgan joylar va eskirgan gidrotexnik inshootlar aniqlangan. Shuningdek, rekonstruksiya uchun taklif etilgan tuproq, beton va graviy ishlari hajmlari hamda zatvorlar soni ko'rib chiqilgan.

Tadqiqotda quyidagi asosiy ko'rsatkichlardan foydalanilgan:

HSR (LONDON),
HOUGHTON STREET REVIEW JOURNAL
ISSN: 2058-5519|Impact factor-15.9
http://houghtonstreetreview.com/index.php/hsr

- Kanal uzunligi — 105,2 km.
- Sug'oriladigan maydon — 212 ming gektar.
- Bosh qismdagi maksimal suv sarfi — 350 m³/sekund.
- Birinchi bosqichda tozalanadigan kanal uzunligi — 23,7 km.
- Tuproq ishlari hajmi — 2415,5 ming m³.
- Beton ishlari hajmi — 895 m³.
- Graviy ishlari hajmi — 390 m³.
- Almashtiriladigan zatvorlar soni — 15 dona.

Natijalar

Tahlil natijasida kanalning asosiy muammolari loyqa cho'kindilarining to'planishi, kanal kesimining qisqarishi, qirg'oq dambalarining yemirilishi va gidrotexnik inshootlarning eskirishi ekanligi aniqlangan.

Kanal o'zanida to'plangan loyqa cho'kindilari suv o'tkazish qobiliyatini pasaytirgan. Bu esa suv ta'minotida uzilishlar va suv sarfining keskin kamayishiga olib kelgan.

Kanalning burilish joylarida bir tomonda loyqa massalari to'planib, ikkinchi tomonda qirg'oq dambalari yemirilgan. Ayrim uchastkalarda beton qoplamalar ham buzilgan.

Rekonstruksiya uchun birinchi bosqichda kanalning 23,7 km qismi tozalanishi, 2 ta to'suvchi va 2 ta suv oluvchi inshoot ta'mirlanishi rejalashtirilgan. Bundan tashqari, PK 366 va PK 539 dagi to'suvchi inshootlar hamda R-4, R-24 kanallarining bosh inshootlari rekonstruksiya qilinishi ko'zda tutilgan.

Rejalashtirilgan ishlar natijasida kanalning suv o'tkazish qobiliyati tiklanishi, qirg'oqlarning barqarorligi oshishi va gidrotexnik inshootlarning ishonchli ishlashi kutilmoqda.

Muhokama

Qarshi magistral kanalidagi muammolar asosan uzoq muddatli ekspluatatsiya va muntazam texnik xizmat ko'rsatishning yetarli darajada amalga oshirilmasligi bilan bog'liq. Loyqa cho'kindilarining to'planishi va inshootlarning eskirishi suv ta'minotining uzluksizligiga salbiy ta'sir ko'rsatgan.

Rekonstruksiya ishlari kanalning loyihaviy parametrlarini tiklash, qirg'oqlarni mustahkamlash va gidrotexnik inshootlarni yangilash imkonini beradi. Bu esa suv ta'minotidagi uzilishlarni kamaytirish va avariya xavfini oldini olishga xizmat qiladi.

Bundan tashqari, rekonstruksiya bilan birga muntazam ekspluatatsiya tadbirlarini yuritish zarur. Kanal o'zanini vaqti-vaqti bilan tozalash, qirg'oqlarni nazorat qilish, darvozalar va ko'targich mexanizmlarni tekshirish suv ta'minotining barqarorligini uzoq muddatda ta'minlaydi.

Rekonstruksiya ishlarining samaradorligi suv ta'minotining yaxshilanishi, gidrotexnik inshootlarning texnik holatining yaxshilanishi va qishloq xo'jaligi ekinlari hosildorligining oshishi bilan baholanadi. Loyihada hosildorlikni 3–5 foizga oshirish kutilmoqda.

Xulosa

Qarshi magistral kanalining ayrim uchastkalarini rekonstruksiya qilish suv ta'minotini barqarorlashtirish va gidrotexnik inshootlarning ishonchli ishlashini ta'minlash uchun muhim ahamiyatga ega.

Kanal o'zanini tozalash, qirg'oqlarni mustahkamlash, eskirgan darvozalar va ko'targich mexanizmlarni almashtirish orqali suv o'tkazish qobiliyati tiklanadi.

HSR (LONDON),
HOUGHTON STREET REVIEW JOURNAL
ISSN: 2058-5519|Impact factor-15.9
http://houghtonstreetreview.com/index.php/hsr

Rekonstruksiya bilan birga muntazam ekspluatatsiya va texnik nazoratni yuritish lozim. Bu yondashuv suv resurslaridan samarali foydalanish, suv ta'minotidagi uzilishlarni kamaytirish va qishloq xo'jaligi hosildorligini oshirish imkonini beradi.

Foydalanilgan adabiyotlar

1. O'zbekiston Respublikasi Qishloq xo'jaligi vazirligi. "Qarshi magistral kanali va undagi gidrotexnik inshootlarni rekonstruksiya qilish loyihasi" taqdimoti. Qarshi, 2015-yil.
2. O'zbekiston Respublikasi Qishloq xo'jaligi vazirligi. "Kapital mablag'lar hisobidan 2016-yilda amalga oshirish rejalashtirilayotgan loyiha ishlari" loyiha hujjati. Qarshi, 2015-yil.
3. O'zbekiston Respublikasi Vazirlar Mahkamasi. "Suv resurslaridan oqilona foydalanish va irrigatsiya tizimlarini rivojlantirish" bo'yicha me'yoriy hujjatlar.
4. O'zbekiston Respublikasi Qonuni. "Suv va suvdan foydalanish to'g'risida"gi Qonun.
5. Qodirov B. "Kanal va dambalarning texnik holatini baholash hamda rekonstruksiya qilish masalalari". Toshkent.
6. Mirzayev N. "Gidrotexnik inshootlarni ekspluatatsiya qilish va ta'mirlash". Toshkent.
7. "Hydraulic Structures and Their Maintenance in Irrigation Systems". Journal of Irrigation and Drainage Engineering.
8. "Sediment Management in Irrigation Canals". International Journal of Water Resources Development.
9. "Rehabilitation of Aging Irrigation Infrastructure". Irrigation and Drainage Systems journal.
10. Food and Agriculture Organization of the United Nations (FAO). "Guidelines for the Rehabilitation of Irrigation Systems". Rome.
11. World Bank. "Improving the Performance of Irrigation and Drainage Systems". Washington, D.C.
12. International Commission on Irrigation and Drainage (ICID). "Maintenance and Rehabilitation of Irrigation Canals". New Delhi.
13. Qishloq xo'jaligi vazirligi rasmiy sayti — https://agri.uz
14. Lex.uz — O'zbekiston Respublikasi qonun hujjatlari milliy bazasi — https://lex.uz
15. International Commission on Irrigation and Drainage rasmiy sayti — https://www.icid.org

Reconstruction of Selected Sections of the Karshi Main Canal and Improving Operational Efficiency

Abstract. This article examines the problems of sediment accumulation, bank erosion, and deterioration of hydraulic structures in selected sections of the Karshi Main Canal, as well as the planned reconstruction works aimed at solving these problems. The article analyzes the possibilities of stabilizing water supply through canal cleaning, embankment strengthening, and renewal of gates and lifting mechanisms.

Keywords: Karshi Main Canal, hydraulic structures, reconstruction, operation, sediment accumulation, water supply

.

HSR (LONDON),
HOUGHTON STREET REVIEW JOURNAL
ISSN: 2058-5519|Impact factor-15.9
http://houghtonstreetreview.com/index.php/hsr

Introduction

The Karshi Main Canal is one of the largest irrigation systems in the Kashkadarya region. It was commissioned in 1975 and has a total length of 105.2 km, supplying water to 212,000 hectares of irrigated land. The maximum water discharge in the head section is 350 m³/s.

The canal includes 5 regulating structures, 165 water intake structures, and 3 water discharge structures. These structures perform an important function in supplying water to various canals and pumping stations.

Since the canal and its hydraulic structures have been in operation for more than 40 years, technical deterioration, sediment accumulation, and bank erosion have become significant problems. Therefore, reconstruction of selected sections and improvement of operational efficiency are relevant issues.

The purpose of this study is to identify technical problems in selected sections of the Karshi Main Canal and to examine possibilities for stabilizing water supply through reconstruction.

Methods

The study analyzed project documents, technical indicators, and planned work volumes related to the Karshi Main Canal and its hydraulic structures.

Sections with sediment accumulation, eroded banks, and outdated hydraulic structures were identified. In addition, the proposed volumes of earthworks, concrete works, and gravel works, as well as the number of gates, were examined.

The following main indicators were used in the study:

- Canal length — 105.2 km.
- Irrigated area — 212,000 hectares.
- Maximum water discharge in the head section — 350 m³/s.
- Canal length to be cleaned in the first stage — 23.7 km.
- Volume of earthworks — 2,415.5 thousand m³.
- Volume of concrete works — 895 m³.
- Volume of gravel works — 390 m³.
- Number of gates to be replaced — 15 units.

Results

The analysis showed that the main problems of the canal are sediment accumulation, reduction of the canal cross-section, erosion of embankments, and deterioration of hydraulic structures.

Sediment accumulated in the canal bed has reduced water conveyance capacity. This has led to interruptions in water supply and a sharp decrease in water discharge.

At certain bends of the canal, sediment has accumulated on one side, while embankments have eroded on the other side. In some sections, concrete lining has also deteriorated.

In the first stage of reconstruction, it was planned to clean 23.7 km of the canal and repair 2 regulating structures and 2 water intake structures. In addition, reconstruction of the regulating structures at PK 366 and PK 539, as well as the head structures of the R-4 and R-24 canals, was planned.

As a result of the planned works, the water conveyance capacity of the canal is expected to be restored, the stability of embankments is expected to improve, and the reliable operation of hydraulic structures is expected to be ensured.

HSR (LONDON),
HOUGHTON STREET REVIEW JOURNAL
ISSN: 2058-5519|Impact factor-15.9
http://houghtonstreetreview.com/index.php/hsr

Discussion

The problems in the Karshi Main Canal are mainly related to long-term operation and insufficient regular maintenance. Sediment accumulation and deterioration of structures have negatively affected the continuity of water supply.

Reconstruction works make it possible to restore the design parameters of the canal, strengthen embankments, and renew hydraulic structures. This helps reduce interruptions in water supply and prevent accidents.

In addition, regular operational measures should be carried out together with reconstruction. Periodic cleaning of the canal bed, monitoring of embankments, and inspection of gates and lifting mechanisms will ensure long-term stability of water supply.

The effectiveness of reconstruction works is assessed by improved water supply, improved technical condition of hydraulic structures, and increased agricultural crop yields. The project expects an increase in crop yield by 3–5 percent.

Conclusion

Reconstruction of selected sections of the Karshi Main Canal is important for stabilizing water supply and ensuring the reliable operation of hydraulic structures.

Cleaning the canal bed, strengthening embankments, and replacing outdated gates and lifting mechanisms will restore water conveyance capacity.

Reconstruction should be accompanied by regular operation and technical monitoring. This approach will promote efficient use of water resources, reduce interruptions in water supply, and increase agricultural productivity.

References

1. Ministry of Agriculture of the Republic of Uzbekistan. (2015). Project Presentation on the Reconstruction of the Karshi Main Canal and Its Hydraulic Structures. Karshi, Uzbekistan.
2. Ministry of Agriculture of the Republic of Uzbekistan. (2015). Project Documentation on Planned Projects to Be Implemented Using Capital Investments in 2016. Karshi, Uzbekistan.
3. Cabinet of Ministers of the Republic of Uzbekistan. Regulatory Documents on the Rational Use of Water Resources and the Development of Irrigation Systems.
4. Republic of Uzbekistan. Law on Water and Water Use.
5. Qodirov, B. Issues of Assessing the Technical Condition and Reconstruction of Canals and Dams. Tashkent, Uzbekistan.
6. Mirzayev, N. Operation and Maintenance of Hydraulic Structures. Tashkent, Uzbekistan.
7. Hydraulic Structures and Their Maintenance in Irrigation Systems. Journal of Irrigation and Drainage Engineering.
8. Sediment Management in Irrigation Canals. International Journal of Water Resources Development.
9. Rehabilitation of Aging Irrigation Infrastructure. Irrigation and Drainage Systems.
10. Food and Agriculture Organization of the United Nations (FAO). Guidelines for the Rehabilitation of Irrigation Systems. Rome, Italy.
11. World Bank. Improving the Performance of Irrigation and Drainage Systems. Washington, D.C., USA.
12. International Commission on Irrigation and Drainage (ICID). Maintenance and Rehabilitation of Irrigation Canals. New Delhi, India.
13. Ministry of Agriculture of the Republic of Uzbekistan. Official website. https://agri.uz

HSR (LONDON),
HOUGHTON STREET REVIEW JOURNAL
ISSN: 2058-5519|Impact factor-15.9
http://houghtonstreetreview.com/index.php/hsr

14. LexUZ. National Database of Legislation of the Republic of Uzbekistan. https://lex.uz
15. International Commission on Irrigation and Drainage (ICID). Official website. https://www.icid.org