

The Brief Review on the Planning and Architecture on the Water Canal

Vinit Jadaun

SOEIT, Sanskriti University, Mathura,
 Uttar Pradesh, India
 Email Id- vinit.poly@sanskriti.edu.in

ABSTRACT

Canals are canals that are frequently referred to as artificial waterways that are used to convey water and water-based vehicles. They may also help with irrigation. It resembles a man-made river in appearance. Under pressure, canals are utilized to convey free-flowing surfaces. This paper covers everything there is to know about water canal architecture and planning, starting with the fundamentals like what a water canal is and which countries built them, such as China, Russia, Brazil, Vietnam, India, and the United States, as well as the various types of canals based on variables like function and border cell. This research also looks at many basic elements of water canal design, such as how natural forces are always at odds with construction. For future cities in different nations, exploratory analysis is used to prepare water canals or to estimate the number of water canals that will be prepared in the future.

Keywords

Architecture, Canal, River, Water, Waterways.

1. INTRODUCTION

Canals are canals, sometimes known as artificial waterways that are used to convey water and water transport vehicles[1]. They may also help with irrigation. It's similar to a man-made version of a river. Canals are used to transport free-flowing surfaces under pressure. Typically, the engineering works will consist of a series of dams and locks that create a reservoir for low-speed current flow. These reservoirs are known as slack water levels, or simply levels[2]. When a canal runs parallel to a river and shares a part of its waters and drainage basin, it makes use of the river's resources by building locks and dams to raise and prolong the slack water level while staying in the valley. A canal, on the other hand, cuts over a top ridge's drainage divide and, in most instances, needs an external water source above the limit height [3]. Many canals, as well as other waterways that pass far underneath, have been built at heights that tower over valleys. Canals with higher-level water sources may carry water to a desired location, such as a city [4]. The Roman Empire's aqueducts were such water delivery channels. There are many kinds of canals, as shown in Figure 1, depending on a variety of factors such as function, boundary cell, and so on [5].

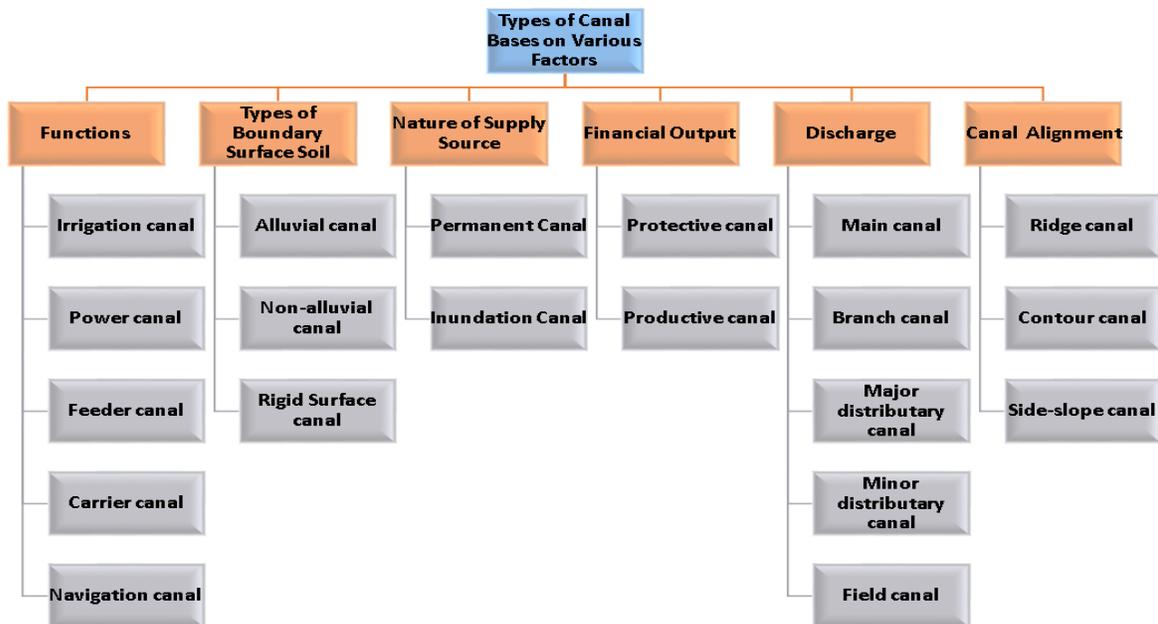


Figure 1: Classification the Water Canal On The Basis of the Various Factors

1.1 Base on Nature of the Supply Sources:

- Inundation Canal
- Permanent Canal

• Permanent Canal

A permanent canal is one that has water available throughout the year. This kind of canal is typically directed by a permanent source of supply water sources. There are many permanent hydraulic elements for water control and distribution in this kind of canal. A permanent canal is also known as a perennial canal [6].

• Inundation Canal

An inundation canal is a kind of canal that only gets water when there is a flood. These canals redirect water from rivers during floods to help control the amount of water in rivers. A canal head regulator regulates the flow entering the canal.

1.2 Base on the Functions of the Canal

- Power Canal
- Irrigation Canal
- Carrier Canal
- Feeder Canal
- Navigation Cana

1.2.1 Irrigation Canal

An irrigation canal is a canal that is oriented along the limits of cultivable areas in order to deliver water for agricultural purposes.

1.2.2 Power Canal

A power canal is a canal built specifically for the generating of hydraulic power.

1.2.3 Feeder Canal

A feeder canal, as the name implies, is built to feed two or more other canals or branch canals.

1.2.4 Carrier Canal

A carrier canal is a multi-purpose canal that serves as both an irrigation and a feeder canal. It signifies that the carrier canal supplies water for direct irrigation as well as feeding the other canals.

1.2.5 Navigation Canal

The term "navigation canal" refers to a canal built specifically for the purpose of navigation. In order to handle huge ships, vessels, and other vessels, the water level necessary in a navigation canal is typically much greater.

1.3 Base on the Type of the Boundary Surfaces of the Canal

- Alluvial Canal
- Rigid Surface Canal
- Non-Alluvial Canal

1.3.1 Alluvial Canal

An alluvial canal is one that is excavated in alluvial soils such as silt, sand, gravel, and other similar materials.

1.3.2 Non-Alluvial Canal

A non-alluvial canal has a border surface made out of non-alluvial soils such as clay, loam, rock, and the other materials.

1.3.3 Rigid Surface Canal

Non-alluvial canals include rigid surface canals, but the canal's border surface is lined artificially with a hard layer of lining material such as concrete, stones, cement and so on.

1.4 Based on Financial Output

- Protective Canal.
- Productive Canal.

1.4.1 Protective Canal

Protective canals are rescue projects designed to safeguard a certain region from a lack of water. A protected canal's main aim is to fulfill the requirements of farmers during times of hunger.

1.4.2 Productive Canal

Productive canals will produce enough revenue to cover their maintenance and running expenses, as well as the original investment made in the canal's construction. If it returns 6% of its original investment each year, it is deemed excellent. Table 1 lists the top ten nations in terms of the number of kilometers of water canals they have built.

Table 1: The Various Countries Which is Top 10 Position Who Constructed the Water Canal with the Amount in Kilometer of Water Canal

Countries	Amount in Km
China	110000
Russia	102000
European Union	52332
Brazil	50000
Vietnam	47130
United States	41109
Colombia	24725
Indonesia	21579
Democratic Republic of the Congo	15000
India	14500

Canals that are productive will generate enough cash to pay their maintenance and operating costs, as well as the initial investment made in the canal's development Figure 2 shows the top ten nations by number of kilometers of water canal built. China has the most water canal area of any country, whereas India ranks tenth.

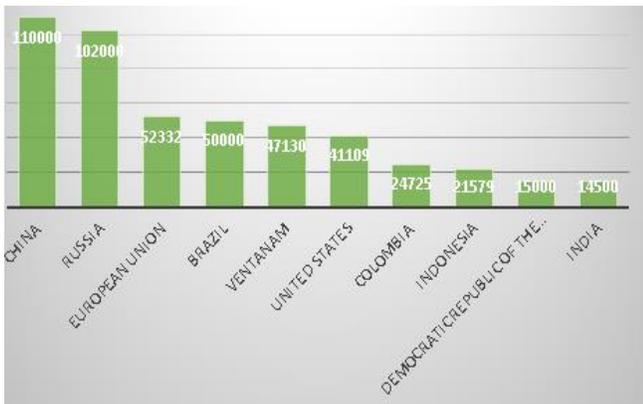


Figure 2: Bar Graph of the Various Countries Which is Top 10 Position Who Constructed the Water Canal with the Amount in Kilometer of Water Canal

2. LITERATURE REVIEW

Numerous researchers study and evaluate the subject of human activities' effect on water bodies and watershed management. Here are a few examples. LiudmylaRuban's research shows that the paradigm of cohabitation with the planet's aquatic environment is changing due to a variety of factors, one of which is climate change. The need of establishing new rules for the coexistence of people and water on the planet is now a reality. According to their study, water areas must be regarded as an object of urban landscape and planning design. There are three main ideas that reveal the meaning of the topic, according to the precepts of creating Water areas: considering people as habitat climates, investigating differences in current generations' status in illumination of a need to adapt to climate change, and going to study a nation's memory in a historical solo exhibition and in the process of looking for chronological national memory. Water is taken into account in the research depending on its physical state [7]. RI Kemenkes investigated and analyzed not just canals, but also precincts, using a predefined urban design concept, which is necessary for the creation of comprehensive design principles for a regulated but active canal front development. The data gathered from a range of credible literary sources contributes to the argument over whether or not urban design standards are necessary when interpreting a canal front. The variables and sub variables generated from a comprehensive knowledge of many concepts, facts, and ideas are crucial components of the design process. As a consequence, it is only reasonable to assert that a case-specific example and on-site implementation depend heavily on a set of parameters [8]. Anand G. Pagare et al. studied ancient water management systems in Aurangabad and found a clean and appropriate supply of water. And it was planned by Ambar in 1617 for a population of 7 00000 people. Engineers of the period brought down Nahar in Aurangabad town on the high hills around the city from the east, south, and north as conditions permitted. In the city of Aurangabad, there were a number of Nahars with clean minerals underground drinking water. Residents of Aurangabad have had access to this water supply system on a daily basis for over 300 years, and it is completely free. This research goes into great depth on the Nahar system's technical aspects. It was formerly the 's largest flood control system, based on symphonic activities, and it was in good functioning

condition, but it recently broke down, and the rupture and break down have started, and the system has been destroyed. They will analyze and study parameters such as GPS mapping of aqueducts and manholes, water quality parameters (biological, chemical, and physical), and recommend represents the changes such as Nahar renewal, water filtration crops for specific terminals, replacement of old piping systems, various fixing methods to improve water quality, and public service moisture use such as dredging [9]. SushmaJaju et al. investigate if new irrigants can replace traditional dental irrigants. The research and literature available demonstrate the advantages and disadvantages of each irrigant under review, and none of them completely fulfill the criteria of a perfect endodontic treatment irrigant. While the quest for the ideal root canal irrigant continues, these new irrigants may be used as a complement to NaOCl [10].

3. DISCUSSION

This article covers everything about the architecture and planning, on water canals from the fundamental like water canal definition and of which implies water canal Canals are waterways canals, also called as artificial waterways, that are used to carry water and to the services water transport vehicles. They may also help with irrigation. It may be likened to a man-made version of a river. Canals are used to conveyance free surfaces flow with pressure. The engineering works would usually comprise a series of dams and locks that create reservoir of the low speed currents flow. Slack water levels, or simply levels, are the term given to these reservoirs. This article also give the different nations which built the water canal such as China, Russia, Brazil, Vietnam, India, United States etc. and the multiple kinds of canals based on numerous factors such as function, boundary cell, are also supplied in this paper. This article also covers the some essential item design of water canal such Natural forces are always at conflict with architecture. Buildings are always part of larger systems, built around gravity, time, and temperature. Designers have tried to offset natural forces by constructing hybrid areas as well as structures, artificial sites where natures meet manmade, all over the globe. Canals, which reflect this interconnectedness, show a desire to control nature's flows. These ephemeral spaces are now enabling new programming and initiatives to explore contemporary life and urban energy. This article also talks about the ManitRastogi, a New Delhi-based urban designer, developed a design after analyzing the Yamuna's network of 18 main nullahs and 20 000 smaller ones, the primary canal upon which New Delhi was built. Morphogenesis offers a multi-step technique to clean up the polluted waterways. The first step is to clean the riverbeds and recycle the garbage. To do so, the company proposes utilizing organic reed beds and aerators to filter sewage entering rivers, which is both environmentally good and economically efficient. The Yamuna River is an important water supply, and their actions will assist to restore it.

4. CONCLUSION

This article concludes that the design of water canal is made by appropriate planning and the categorization the water canal are done on the basis of the different criteria such as on the basis of function, nature of the supply sources etc. This study also suggests that Canal architecture naturally deals with liminal situations. While canals may be built via damming, dredging, or

The Brief Review on the Planning and Architecture on the Water Canal

altering existing river courses, these operations typically go hand-in-hand with wider urban growth. Here, buildings and bridges are built to handle various fluxes, both human and material. This study also concludes that among all nations the greatest number of water canal area in China is on top place and India is on the 10th position among all countries. For future cities different nations exploratory analysis is utilized for the water canal preparation or future projection of preparation of number of water canals in various countries.

REFERENCES

- [1] Cunico AM, Da Graça WJ, Veríssimo S, Bini LM. Influência do nível hidrológico sobre a assembléia de peixes em lagoa sazonalmente isolada da planície de inundação do alto rio Paraná. *Acta Sci - Biol Heal Sci*. 2002;
- [2] Sibilla S, Sciandra MC, Rosso R, Lamera C. Hydraulic approach to Navigli canal daylighting in Milan, Italy. *Sustain Cities Soc*. 2017;
- [3] D'Hoore B, Quataert P. The fortress, a house with a vision. *WIT Trans Ecol Environ*. 2008;
- [4] Peris S, Morales J. Use of passages across a canal by wild mammals and related mortality. *Eur J Wildl Res*. 2004;
- [5] Yupho S, Jomsueb T, Pujinda P. Unique Land Use Pattern and Travel Behavior on Waterborne Transport. *Environ Proc J*. 2017;
- [6] Wright KR. Incamisana: Engineering an inca water temple. In: *World Environmental and Water Resources Congress 2017: International Perspectives, History and Heritage, Emerging Technologies, and Student Papers - Selected Papers from the World Environmental and Water Resources Congress 2017*. 2017.
- [7] Ruban L. Principles of architectural and landscape design of water areas. *Czas Tech*. 2018;6:29–40.
- [8] Kemenkes RI. *Pedoman Strategi Komunikasi Perubahan Perilaku Dalam Percepatan Pencegahan Stunting Di Indonesia*. Kementerian Kesehatan Republik Indones. 2018;
- [9] Pagare A, Sawant A, Lokhande K, Patil M, Bansode P, Gour D. Naher-E-Ambari – A Case Study: Rebirth and Recommendation for Medieval Water Supply System. 2018;(8):19–27.
- [10] Jaju S, Jaju PP. Newer root canal irrigants in horizon: A review. *Int J Dent*. 2011;2011.