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A Review on Designing of Dam And De-silting

Jayjit Shelke[1], Pranay Dhopte[1], Sagar Talegaonkar[1], Dhanshree Gilbile[1], Miss. Radhika Kherde[2]

[1]Student, Civil Engineering Department, Dr. Babasaheb Ambedkar College of Engineering and Research, Nagpur, Rashtrasant Tukdoji Maharaj University, Nagpur, Maharashtra, India

[2]Department of Civil Engineering, Dr. Babasaheb Ambedkar College of Engineering and Research, Nagpur, Rashtrasant Tukdoji Maharaj University, Nagpur, Maharashtra, India

ABSTRACT

This paper presents a survey report of design of dam with de-silting. Siltation is most often causes by soil and sediment spill. Due to silting capacity of live storage of reservoir decreases rapidly as well as silt also effects on the durability of structure of dam and the usual method of river flow diversion involves construction of tunnel and cofferdams. The cost of diversion work could be as high as 10-20% of total dam construction cost. The cost of diversion works depends on factors such as the tunnel dimension and intended tunnelling support measures during and after excavation. The quality of the rock through which the tunnel should be excavated and dimension of the upstream and downstream cofferdams. The optimum diameter and the total diversion cost are directly related to the river flood discharge. According to report of hydro power plant in India, there are various renewable resources like sun, wind, water, ocean and tidal. The power generation using hydro resources offers sustainable zero energy input cost, zero greenhouse gases emission, low operation and maintenance cost. These are currently near 17% of the world total power generation is based on hydro resources and it share to renewable power generation is 70%. All the systematic process which are discuss in paper.

Keywords: sedimentation causes and effect de-silting for dams, diversion tunnel and hydro power plant

I. INTRODUCTION

Dam are said to be an important source of water supply and high importance for various other reasons. As the sediments accumulate in the reservoir, so the dam gradually losses its ability to store water for the purposes for which it was built means storage capacity of reservoir is reduce. Generally, reservoir are built in river for water supply, power generation, discharge regulation and flood control. The reservoir capacity can be divide in three portion such as dead storage volume, live storage volume and the flood control storage volume. Construction of dam may take up to 10 or more years. In thus period, the river has to be diverted in other to create a dry environment for the construction of dam. The usual method of river flow diversion involves construction of tunnel and cofferdam. The tunnel is excavated in either of the abutment to divert the entire river flow, both its normal and flood discharge around the site the cofferdam are water tight structure usually embankment, construction of upstream and downstream of site to isolate the area that has to be kept dry. The entrance is located at upper side of the upstream cofferdam and discharge into the river in lower side of downstream cofferdam.

In hydro power plant the water is utilized to move the turbine which is turn and run the electricity generators. About 26% of energy is contribute by

hydro power to India. According to 2010 census of India planning commission, nearly 28.8% of India are below poverty line. In many villages household have no access to electricity. Basically the potential energy of the water storage in the dam gets converted into the kinetic energy of the moving water in the penstock. The kinetic energy get converted into electric energy with help of turbine and generator combination. A 30% supply of water is fulfils with the help of hydro power plant.

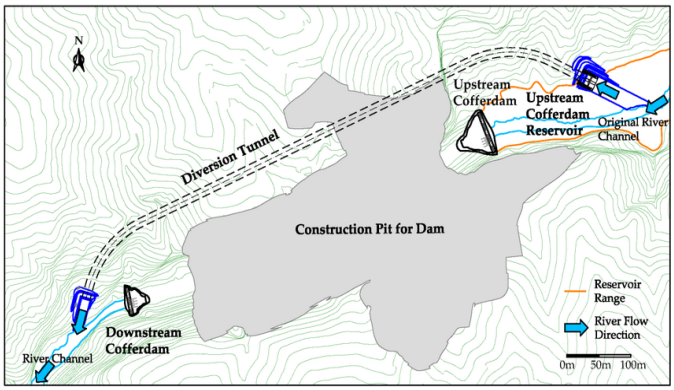

Figure 1. tunnel with coffer dam.

The literature reviews studied are discussed below:

(SaeedSedighizadeh, Abbas Mansoori, Mohammad Reza Pirestani and Davoud Sedighizadeh)[1]: In there paper they shows that the basic assumptions employed in this study to attain the necessary guides in the selecting optimum tunnel and cofferdam in dam diversion works. Tunnel excavation includes surveying, drilling (and blasting in the drill and blast method), mucking, drainage, ventilation and lighting. Immediately after excavation of each longitudinal segment of the tunnel, support measures for the exposed area of the tunnel are required in various degrees. To provide for better stability, more durable surface and smoother flow conduit, the water carrying tunnels are often lined with formed reinforced concrete. The cost of civil works is related to specifications of the project such as the locality and topography, availability of the required materials and equipment, quality of the soil and the rock, the execution methods adopted by the contractor, and un-anticipated situations regarding water, weather and ground, among other factors.

(Mr.Pratik Ghorpade, Mr.Anand Chavan, Ms. Harsada kadam, Mr. Sanjay Patil)[2]: In there refrence paper they studied that the de-silting is an artificial technique mainly used for the management of silting of reservoir. By using D-silting artifice decrease the volume of dead storage and increasing the live storage of reservoir with improving storage capacity of dam. Also improve life of dam structure with management of sediment and silting in reservoir. Generally, reservoirs are built in rivers for water supply, power generation, discharge regulation and flood control. The reservoir capacity can be divided in three portions, the dead storage, the active or live storage volume and the flood control storage volume.In this method mainly conisderd the horizontal hydraulic pressure and gravitational force present on the silt.

(Roshni Bhoi,Dr.S.M.Ali)[3]: In this experimental studies the main source of hydroelectricity is the water which is readily available in India.Water power can be use in various forms. the most important way is the hydroelectric dam,were water store is responsible for the turbine rotation and there by capture the energy which is use to run the generator. These are classified according to the power generation capacity.

- Large hydro power: >100 MW
- Medium hydro power: 30-100 MW
- Small hydro power: 1-30MW

These are generally use to feel a small community or rural industry where grid is not available. The water is store behind the dam. These reservoir is located very high as height of reservoir decide the force of water flowing to the turbine. Depending on the load demand the water is allow into the turbine. The water flow through to the turbine through the penstock which are designed to transport water from intake to turbine without any cavitations problem. The height of water at the water reservoir and amount of water into the penstock determine the total power

generation by a hydro plant. The water strikes the blade of the turbine and the potential and kinetic energy of water is converted to the rotational energy which drives the blades of the turbine.This rotating sharft produce alternating current in the coils of the generator the production of the magnetic field which is furthure converted to the electrical energy by electro magnetic field mechanism.Thus,hydroelectric power plant produce electricity from the energy of water.

(Bidasaria M)[4]: In this study they work on Indira Sagar Project in M.P., a multipurpose project, a 92 m high dam on Narmada river was required to be constructed but during off monsoon period flow of 300 cumecs of river Narmada was to be diverted so that dam can be constructed. For this, it was necessary to construct a 24 m high coffer dam to divert the off monsoon flow through a diversion tunnel from left abutment. This coffer dam was to be founded on a complex geological strata.

(R.Ajalloeian, A.R.Samadi Soofi, and M.Salavati)[5]: In this paper they introduce that from the study. In recent year, following the increasing need to creat space undergroung with larger scale and in greater depth in poor areas, identifying more and more of the earth is evident. In relation to construction of dam,geological survey is the most important parts of studies which can be useful and valuable information about the design of underground space offer.Dam are considerd as one of the most important civil structure.

(Neena Isaac, T.I.Eldho0)[6]: In there paper they shows that the storage capacity of hydro power reservoirs is lost due to the sediment depositipon. Removing the sediment deposition hydraulically by drawdown flushing is one of the most effective methos of restoring the storage capacity.For the hydraulic model studies, a 1:100 scale geometrically similar model was constructed.

(H.Chanson, Patricks James)[7] : The authors have documented several case studies illustrating reservoir failures causes by siltation and catchment erosion. The failure cases are use to introduce students to the complexity of the reservoir management and sedimentation. The main lesson is the importance of designing a reservoir as a complete system, including hydrology, soil conservation practice, sediment transport principles and hence the siltation process.

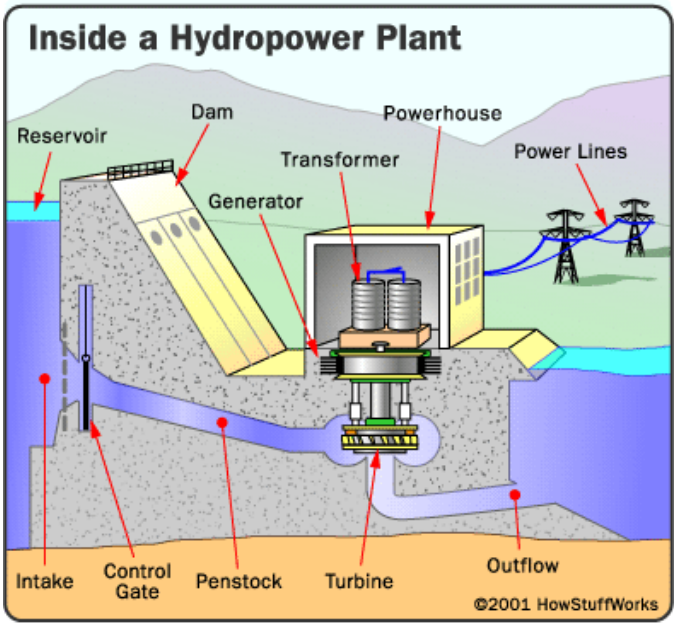

Figure 2. hydropower plant.

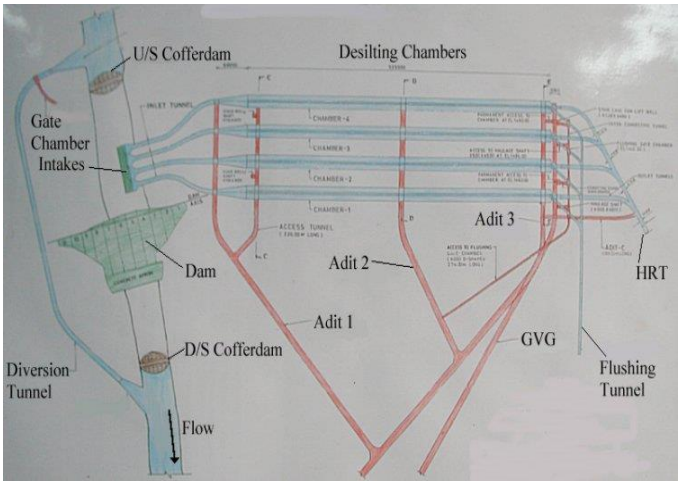

Figure 3. De-silting

II. DISCUSSION

All paragraphs must be indented. All paragraphs must

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III. CONCLUSION

Although a conclusion may review the main points of the paper, do not replicate the abstract as the conclusion. A conclusion might elaborate on the importance of the work or suggest applications and extensions. Authors are strongly encouraged not to call out multiple figures or tables in the conclusion—these should be referenced in the body of the paper.

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