

A Review on Constructional Overview Of Rubber Dam

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Abstract- Rubber dams are inflatable and deflatable hydraulic structures. Thousands of rubber dams have been installed worldwide for various purposes: irrigation, water supply, power generation, tidal barrier, flood control, environmental improvement, and recreation. Furthermore, rubber dams have been used in cold areas where the temperature is as low as – 40°C. The simplicity and flexibility of the rubber dam structure and its proven reliability are key considerations in its wide scope of applications.

Based on the management practices of 20 rubber dams in Hong Kong in the past 35 years, interviews with rubber dam experts and practitioners, and the investigation to the construction of a recent rubber dam, this paper provides a detailed discussion on various issues related to the construction, operation, maintenance, and repair of rubber dams. Rubber dams are inflatable and deflatable hydraulic structures. Thousands of rubber dams have been installed worldwide for various purposes: irrigation, water supply, power generation, tidal barrier, flood control, environmental improvement, and recreation.

Keywords- construction, hydraulic structure, maintenance, operation, repair, rubber dam.

I. INTRODUCTION

The rubber dam is relatively recent technology breakthrough. Rubber dams are placed across channel stream and weir crest to increase the upstream water level when inflated and because of that rubber dams.

Inflatable dams are flexible cylindrical structures attached to rigid base. The dams are tubes made of rubberized material. The material is a multilayer fabric made of synthetic fiber which may be rubberized on one or both sides and coated with plastic film.

The fabric is quite flexible and yet exhibits very large resistance characteristic and inflated by air, water or combination of air and water. Their height ranges up to 6m and their length may reach up to 150m.

The thickness of the material ranges from 25mm to 35mm and present dams have 30 to 40 year life span according to manufacturer.

Inflatable rubber dams are cylindrical rubber fabrics placed across channels, streams and weir or dam crests to raise the upstream water level when inflated. The membrane is a multi-layer fabric made of synthetic fibre (usually nylon) and rubberised on one or both sides. The fabric is quite flexible and yet exhibits good wear-resistance characteristics. A layer of stainless steel mesh or ceramic chips can be embedded in the surface layer to reduce or prevent vandal damage.

II. LITERATURE SURVEY

The rubber dam is relatively recent technology breakthrough. It was introduced to hongkong in the early 1960s. To date, 20 rubber dams have been installed in Hong Kong. Most of the dams are used to impound water for irrigation. Due to its inflatable and deflectable characteristics, the rubber dam is excellent for flooded mitigation and environmental protection. When a dam is inflated, it blocks water. When the river level reaches a preset value, the dam deflates automatically and the flood risk is reduced. Furthermore, silt deposit, debris, garbage, and animal wastes behind the dam can be removed by regular deflation.

Since immortal, it has been operates, endeavor to creates the inexhaustible storage of water for irrigation purpose. And dam is the ultimate solution to it. This need was created to construct the dam. Since then up until now, number of different types of dams is constructed. And one of such dam is rubber dam. a French engineer, Mr. Mesnager in 1947, invented the board worked on the project in the fitness In 1959, the first inflatable rubber dam was installed in the USA as a part of water supply project for the city of los angles. The American engineer responsible for the first and subsequent installation was Mr.imberston. In 1960, the first electricity board ordered its first rubber dam in aubas on the Vezere River. In the following decade, ten inflatable rubber dams were installed in france of which four were for French electricity board. Half of these dams still operating and

working efficiently. In addition, after this period up until was about 2000 rubber dams were installed in USA and 1500 rubber dams were installed in Japan. However, today unfortunately India does not have any rubber dam. The nearest dam site to India is Bangladesh. In Bangladesh, a city called Cox Bazar has this type of dam.

To investigate the frequency and influencing factors of rubber dam usage for endodontic procedures among general dentistry practitioners and specialized practitioners (endodontist) in Tianjin. Methods. Three hundred questionnaires were distributed among practitioners from 3 different types of medical institutions in Tianjin. Data were collected and analysed using Chi-square tests. Results. There were 63.3% of respondents who have used rubber dam (response rate 82.7%, valid response rate 76.3%). However, only 0.4% and 3.1% of them recognized using rubber dam "every time" during caries direct restoration and root canal therapy, respectively. There was no significant difference in rubber dam usage between male and female practitioners. Among the respondents, practitioners with working experience between 5 and 10 years showed the highest usage rate (76.3%), while practitioners working more than 20 years showed the lowest (53.2%). The endodontists gained the highest and the most frequent usage rate and the best rubber dam technique mastering skills. Practitioners working in those stomatological departments of general hospitals showed the lowest rubber dam usage rate. Conclusions. The prevalence of rubber dam usage in Tianjin city is still low. The practitioner's gender, years of professional experience, general or specialized field, and the type of dental setting they work for are the factors that need to be considered during making policy and executing training.

The inflatable flexible membrane dams (IFMD, or rubber dams) were developed in the early 1950s - Flexidam - Imbertson. They are installed in stream and river beds, generally being bolted into a concrete foundation. They are used to divert water for irrigation, temporarily raising existing dams, flood control, water retention for aquifer recharge, reducing or preventing salt water intrusion into fresh water areas, protect low-lying coastal areas from tidal flooding, enabling fish passage past diversion works, by deflation, and for sewage retention/separation during flood events.

III. CONSTRUCTION OF DESIGN OF RUBBER DAM

Rubber dam is a relatively new type of hydraulic structure compared with still sluice gate, weir, and cause way, etc. which is made of high strength fabric adhering with rubber forming a rubber bag. The barrage, made of rubber,

will be filled with air, so that it can be inflated or deflated as per requirement. The concept of rubber dam and its application in India was yet to develop to gain from its advantages though the system has been used in great extent countries like China, Australia, etc. It is used in site specific cases where it may prove to be a very good alternative to costlier permanent structures.

A rubber dam has many advantages, such as simple hydraulic structure, short construction time perfect seismic performance and low resistance to water flow in flood season etc. General description of system various configuration and type working principle and comparative analysis has been presented in this paper. Combine with water management of urban areas this could be a very effective tool of river water management, especially for cities near the banks of rivers. The first case study of rubber dam is on the river Janjawati Rubber dam have been used in China over the past 40 years as cheaper water conservation structure comparatively conventional gated structure like barrage especially in small and medium river. Rubber dam is different types of hydraulic structure compared to a conventional water retaining structure with gates and weirs to release the surplus water, such as dams and barrages such type of water retaining structure (rubber dam) themselves could also serve the purpose of releasing the surplus water over the body of dam by emptying field water or air from the dam, which are mostly used for flood release. Rubber dams have been used in China over the past 40 years as cheaper water conservation structures. Rubber dam have wide prospect in the world since they can be used specially for irrigation, hydropower generation, environmental improvement and recreation purpose. Rubber dams are not known to have other than beneficial impact on environmental & ecology. Rubber dams have certain definite advantages within their applicability range.

The main part of the Rubber Dam is rubber bag, pump house and concrete floor (with which rubber bag is attached with steel pad and platen). The water coming from the upstream side is directly entered to the pump house. Then with the help of different valve and pump motor, the water is used to inflate the rubber bag. After the use of water for irrigation purposes, the bag is then emptied by valves and the bag is sinking at the river bed. Generally gravity drainage system is used for emptied of the rubber bag. So, it does not create obstruction for the passing of water in rainy season and also passage of boat freely through the River.

Rubber dams are long tubular-shaped fabrics placed across channels, streams and weir crest to raise the upstream is a Multi-layer fabric made of synthetic fiber, which may be rubberized on one or both sides, and possibly coated with

plastic film. The fabric is quite flexible and yet exhibits very large resistance characteristics.

The inflatable flexible membrane Dams (IFMD, or rubber dams) were developed in the early 1950s. In open Channels, they are used to divert water for Irrigation, for raising existing dams, for flood controls other applications include remedy measure to prevent dam overtopping and control of chemical spills in streams. Inflatable dams can be filled with water, air or both.

The present trend suggests an increased Use of air-filled membranes because they can be deflated or inflated more rapidly, and they are little affected by freezing conditions. Characteristic dimensions cover typically lengths of about 100 m with specially made membranes up to 200 m wide, dam heights usually less than 5 m but some special might be up to 10 m high.

The membrane is usually deflated for large overflows. It is however common practice to allow small spillages over the inflated dam.

During overflows, vibrations might result from fluid-structure interactions and the instabilities might damage and destroy the rubber membrane. Several failures were experienced in practice a deflector is installed on the downstream face of the rubber dam to project the nappe away from the membrane, hence preventing rubber membrane vibrations.

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It is however common practice to allow small spillages over the inflated dam. During overflows greater than 20% over-topping, vibrations might result from fluid-structure interactions,[1] and the instabilities might damage or destroy the rubber membrane. Several failures were experienced (e.g. CHANSON 1996). In practice, a deflector (i.e. fin) is installed on the downstream face of the rubber dam to project the nappe away from the membrane, hence preventing rubber membrane vibrations.[10]

There are more than 2000 inflatable rubber dams around the world. Durability can be excellent: recently, a 35-year-old dam in eastern Ontario, Canada was replaced, and while still functional in both freezing winter conditions when it was air filled, and water filled in summer, it was deemed to have served its useful life, and was replaced.

The balgstuw near Ramspol is an inflatable rubber dam. It is situated between the Ketelmeer and the Zwarte Water in the Netherlands. This dam is built to protect the villages against the rising water of the Ketelmeer. It is the biggest inflatable rubber dam of Europe.

The Adam T. Bower Memorial Dam (formerly known as the Sunbury Fabridam) is the world's longest inflatable dam.[2] The dam is located just below the confluence of the Western and Main Branches of the Susquehanna, between the towns of Shamokin Dam and Sunbury, Pennsylvania.

The dam is 2,100 feet (640 m) long. When it is raised in the summer time, it creates the 3,000 acre (12 km²) Lake Augusta, which is used for recreation.[3] The dam and lake are part of Shikellamy State Park.

In 2001, the dam was renamed for Adam T. Bower, Chief Clerk of the Pennsylvania House of Representatives from 1967–68 and Director of Services during the Pennsylvania Constitutional Convention of 1967-68, by Act 2001-5 of the Pennsylvania General Assembly.[4]

The longest single span (190m) rubber dam is located in Molino de Suso, Spain. Qingdao Hua Chen Industrial Science and Technology Company Limited has built the longest rubber dam with 3.7m high and 1,110m long in Asia.[citation needed] As the largest manufacturer of rubber dam in China, Qingdao Hua Chen has built more than three thousand rubber dams all over the world.

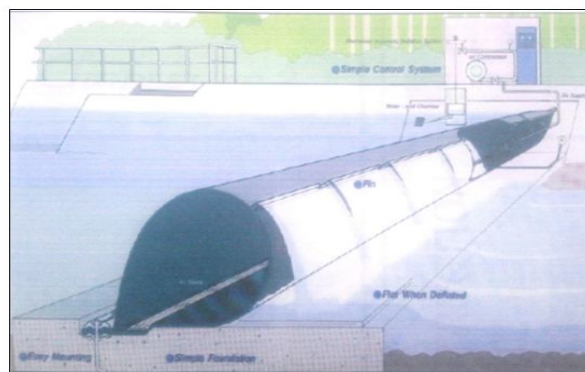


Fig-1 Structure of rubber dam

IV. CONCLUSIONS

Rubber dam is very much important for our country because day by day groundwater are degraded and we can unable to be utilize surface water completely, therefore rubber dam is a solution for that problem because cost of construction and time period of construction is very much less compare to conventional dam. Before ordering the rubber dam body from foreign country, we can manufacture rubber dam bag in India, but has to know the specification of the rubber dam. This specification is made as per design consideration of that rubber dam.

Although the construction technology of inflatable rubber dam has achieved rapid development in our country, there is still a certain distance from the developed countries on the technology level. Therefore, it is necessary to increase the investment of science and technology in the research of inflatable rubber dam construction technology and formulate the national standards and norms of inflatable rubber dam construction and improve the appropriate quality assurance system.

Water filled rubber dam is a tear-shaped rubber dam filled with stabilizing water. Normally, it is considered to be expensive and slow to fill but more stable to provide optimal control over upstream water levels compared with air filled rubber dam.

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