

Rubber Dam





Rubber Dam

Introduction

The rubber dam has become a kind of new-type water conservancy project building as the development of macromolecule synthetic material industry. The dam tube is made of high strong synthetic fibers as its strength skeleton and synthetic rubber as its anti-abrasion layer. It has taken place of such construction material as the soil, stone, wood, steel, etc. which are used from ancient time. And it is an innovation of the construction material.



The first rubber dam install in Los Angeles at 1958 by Bridgestone Co.

Over than 4000 rubber dam install until now in the world
Japan, China, USA, Australia, France, England & Italy countries
have installed more rubber dam in the world.

Rubber Dam

The properties of Rubber Dam

The rubber dam has the following features compared with the ordinary dams:

- Simple Structure
- b. Saving Materials Including Steel, Wood and Stone.
- Low Cost
- Short Period of Construction
- Light Weight
- Good Performance of Anti detonation
- Large Span
- Not Hindering Water
- Effectual Stagnant of Water
- Novel and Beautiful
- Convenient Management
- Low Cost of Transportation.



Rubber Dam

(II) Application scope of rubber dam

The main application scope of rubber dam contains the following aspects:

a. The rubber dam can be built on spillway or overflowing weir followed by abrupt slope section. It doesn't block water from downstream. And the dam body doesn't quiver easily. On the aspect of effective usage of water sources, the rubber dam can increase the height of the level of the spillway or overflowing weir, which helps to use water sources effectively and give play to the potential benefit of the reservoir or the power station. Storing of water to produce electricity and preventing floods is a pair of contradiction. Storing water as much as possible to make the water level high is necessary in order to improve the generating capacity; on the other side, it is necessary to reduce the height of the blocking water building to reduce the lost caused by floods and make the two sides of the river safe. The appearance of rubber dam solves the problem effectively. The dam will be filled to block the water to increase the level of the water in non-flood season, which helps to enrich the quantity of the water and make effective usage of it; the air or water in rubber dam will be discharged completely to help discharge the floodwater.



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The Arc Type Rubber Dam Built on a Dam in Zhejiang Province of China





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The Arc Rubber Dam Built on a Dam in Shanxi Province of China





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- b. The dam can be built on rivers on plain area. The main features of rivers on plain area are steady currents, wide section of the river. As below is the rubber dam with totally 1300 meters long with large span.

It has played a positive role in irrigation, shipping and preventing flood.



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- (c) The rubber dam can be used on coastal bank as tide-blocked sluice to prevent seawater from corroding the fresh water.
- (d) The rubber dam can be used to irrigate the groundwater.
- (e) The rubber dam can be used to beautify the urban garden. The main aim of first generation of the rubber dam is irrigation and the color is black. Due to the unique advantages of it and the appearance of colorful rubber dam, the rubber dam has been used rather more than before. It has been used to beautify the urban garden and improve the ecological environment on a large scale.



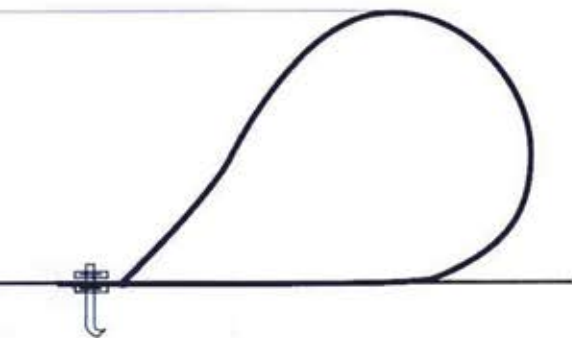


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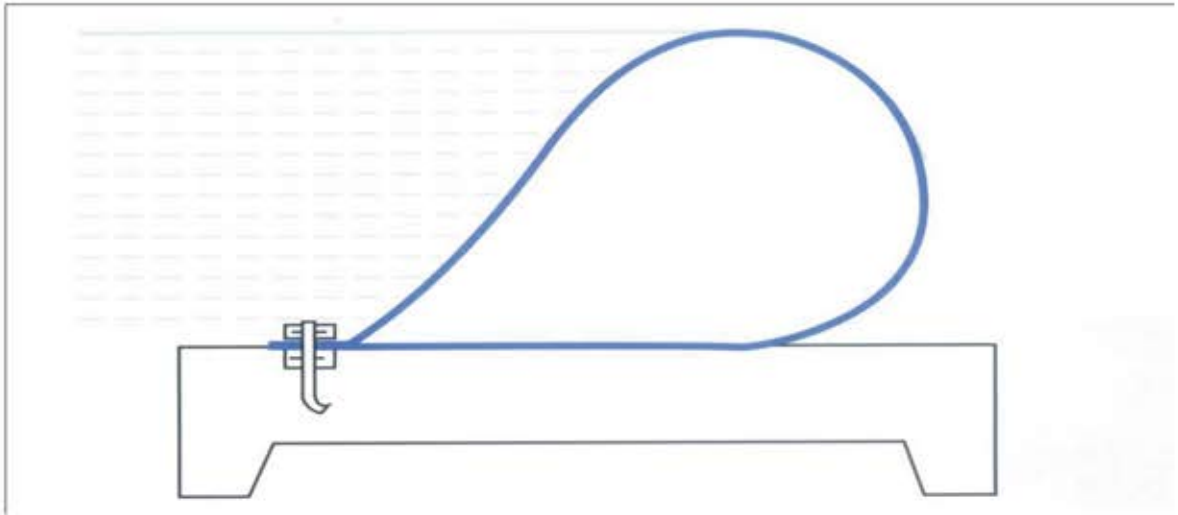
Structure of rubber dam:

Rubber dam which is a tube type dam filled with water or air is anchored on bottom board to form a seamless bag.

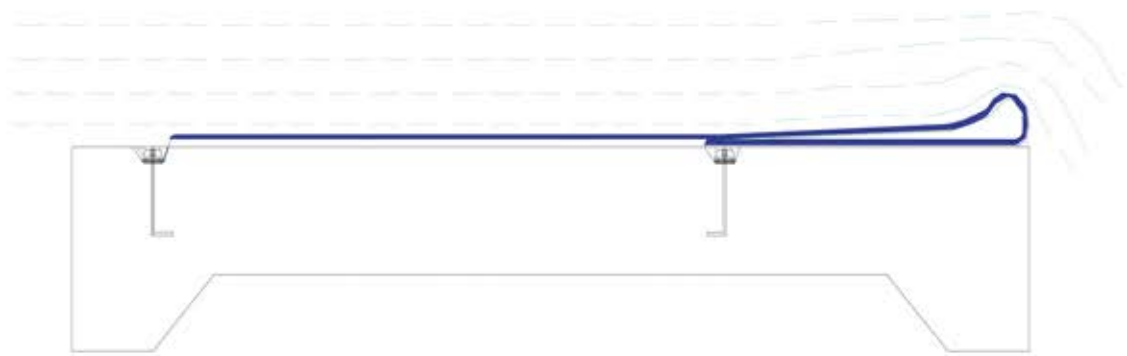
The height of the dam can be adjusted and the top of the dam can let the water overflow. So the dam plays the function of warding water off and overflowing weir. When it doesn't need to block water, the water or air in the dam tube will be discharged completely to resume the original overflowing section of the river.



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The Sketch of Rubber Dam Filled of Air



The Sketch of Rubber Dam Deflated

Rubber Dam

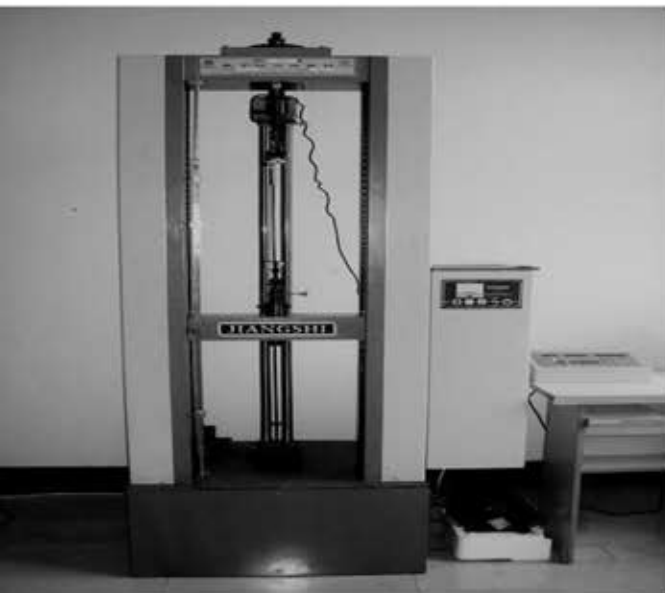
Rubber Dam Bag

The main materials of making rubber dam bag are rubber and canvas. The canvas is used as strength skeleton and the rubber is used to prevent the air or water leakage, protect and connect every layer of canvas. The rubber dam apt to wear out because of long time of immersion in the water, eroding of rivers and grit so there are special requirements of the material.

(I) The Rubber materials of Dam Bag

The basic requirements of rubber dam bag are as following:

- a. Atmosphere aging resistant
- b. Erode resistant, wearable, water-fast and cold weather resistant in cold area
- c. Enough tensile strength
- d. Good craftsman





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The general span life of rubber dam is 15 years to 20 years so the rubber materials must satisfy the requirements as following:

Item		Unit	Outer Layer of Rubber	Middle & Inner Layer of Rubber	Bottom Layer of Rubber
Tensile Strength≥		MPa	14	12	6
Elongation≥		%	400	400	250
Permanent Elongation Distortion≤		%	30	30	35
Hardness（Shore A）		°	55～65	50～60	55～65
Brittleness Temperature≤		℃	—30	—30	—30
After Test（air 100℃×96h）	Age at Tensile Strength≥	MPa	12	10	5
	Elongation≥	%	300	300	200
Effect of Liquid Test（fresh water 70℃×96h）	Tensile Strength≥	MPa	12	10	5
	Elongation≥	%	300	300	200
	Volume Expansion≤	%	15	15	15
Ozone Cracking of Rubber Deterioration(10000ppmm,air at 40℃,20% elongation, no cracking)		min	120	120	100
Abrasion Resistance≤		cm ³ /1.61km	0.8	1.0	1.2
Flexibility, no cracking		Millions of times	20	20	20



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(II) Canvas Materials of Rubber dam

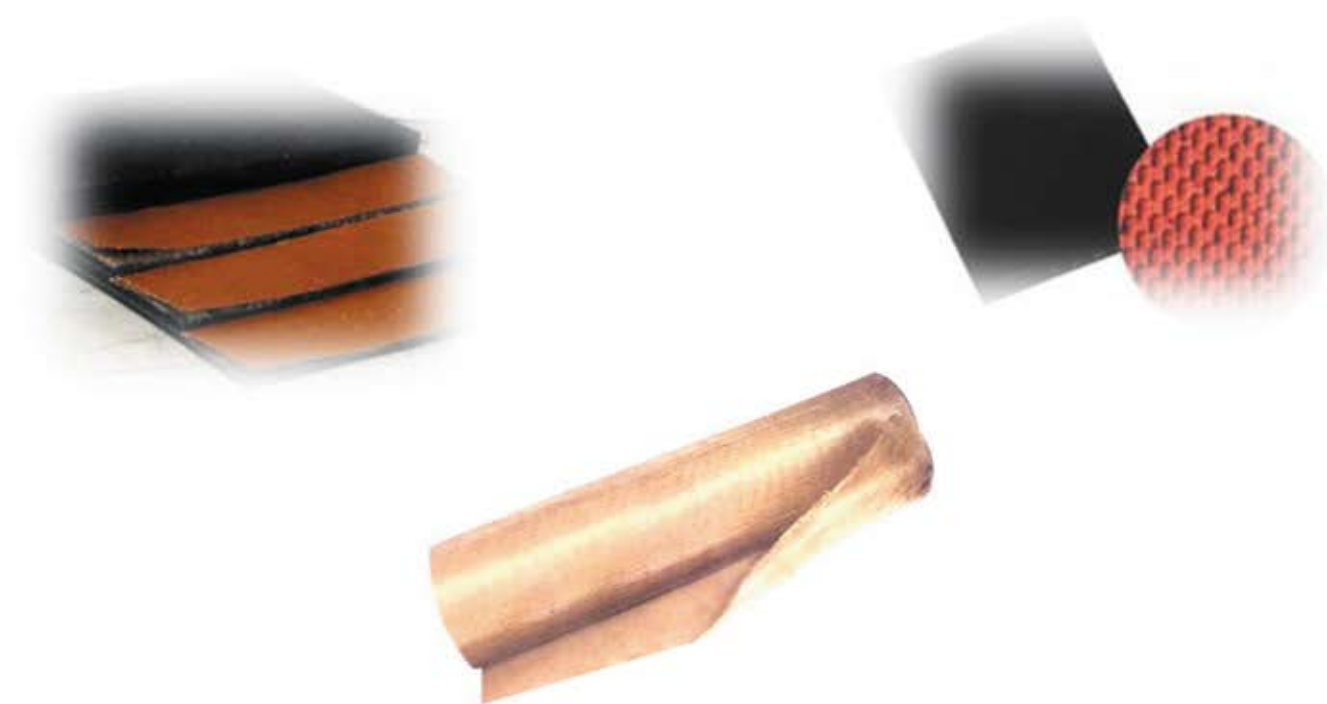
The canvas is used as strength skeleton and the maximum height of the dam depends on the strength of the canvas. The canvas must satisfy the following requirements:

- a. Enough and stable tensile strength, tare resistant
- b. Good flexibility, erode resistant and good durability
- c. Be agglutinate with the rubber well

Note: the commonly used canvas is polyamide or polyester fibred canvas at present.

(III) The Manufacturing Process of the Rubber Dam Bag

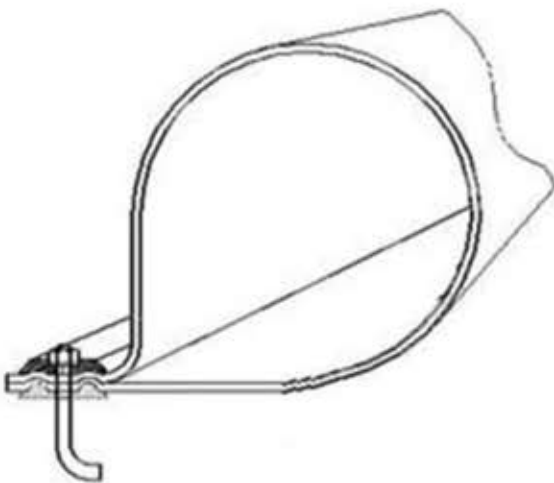
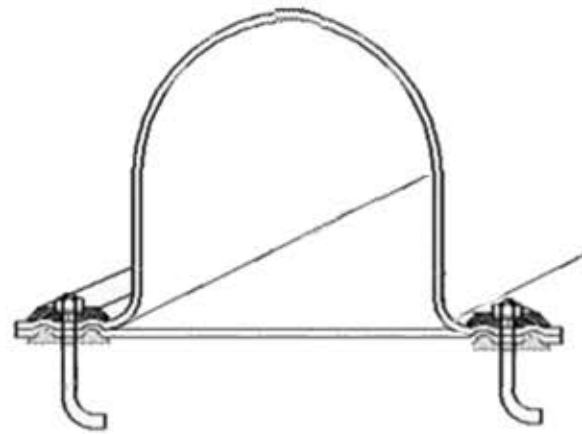
The canvas as the strength framework is the middle layer of the dam bag. Firstly the canvas needs to be immersed into the rubber. After that the canvas will be covered by rubber. Then make the layer vulcanized to form a piece of rubber dam bag sheet. At last pieces of this type of sheets will be joined together to form dam bag according to different sizes required.



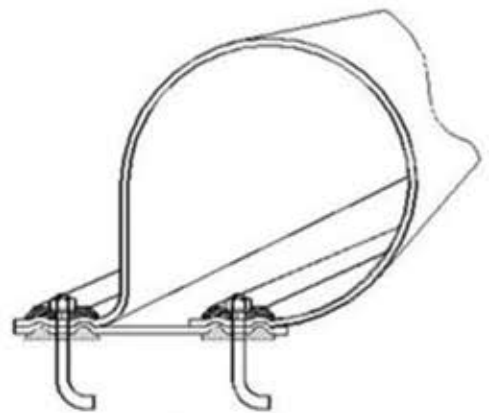
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Anchoring System

The anchoring system is the main component of rubber dam project. On the one hand it must bear the tensile strength of the dam bag, on the other hand, it must be sealed and air tight or water tight.



Single Anchorage



Dual Anchorage



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Installation Stages





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Different layer in installation



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Hydro mechanical System For Rubber Dam

