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A Case Study of Dam Instrumentation for Gunjwani and Nira Deoghar Dam

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Abstract: Instrumentation is very important pre & post-construction of dam is safety. The instruments examine the behavior and stability of the dam. The instrument should be installed under expert guidance in the proper place in the body of the dam. The proper purpose of instrumentation is very portentous use to different parameters with the help of instrument action. We obtain accurate results that we can maintain the health of the dam. Changes in this performance are necessary because dam presentation is directly responsible for the effects of dam failure. The conclusion has arrived to study of all instrumentation is the very necessary successful execution of dam instrumentation for safety purposes. The study parameters of the earthen dam for safety purposes has studied in this paper.

Key words **– Dam instrumentation, Dam Safety**

I. INTRODUCTION

The safety of dam plays an important role protect national investment. Dam failures can result in significant loss of life destruction of property and server, environmental consequences. To ensure the safe operation and longevity of dam continuous monitoring and instrument play a crucial role. Different types of instrumentation are required for various type of dam and rivers. As per IS specification we needs parameters like piezometer, water level sensors, automatic rain gauge, seismometer, plumb bob. All the instrument should study up to different boundaries. There are near about 11% of dam which are properly instrument. The approximate cost of work out to nearly 2% of total cost of construction.

In the case fully automatic data system is use that the measurement abuse any problem. They valuation should be part of the structure process that identified failure modes unique to a dam and develops appropriate response of instrument.

II. OBJECTIVES

1. To study safety measured body of dam.
2. To simulative records for structural behavior of dam.
3. To identify parameters of primary significance to integrity of dams.
4. To outline the instrumentation and technique employed in surveillance.
5. Instruments provides the information to the engineer about the health of dam.
6. The present age instrumentation has become necessity of functioning, safety measures.

III. PROBLEM STATEMENT

As we known dam is a National property. Effects of dam failure of an environment life it required preventive measures. So it is main part to instrument proper monitoring for appropriate safety, function of dam avoid the failure of dam.

After doing survey we understand that majority of dams are instrumented but the instrument are not in use because unskilled labour and not having proper information of the instruments.

IV. METHODOLOGY

Data is collected about dam safety and instrumentation different dams are visited and various data is collected. Different case study of dams are prepared. It required basic information which needed on the dam. Near about in Pune region are not covered there instrument study. By studying various instrument present some of the dam in working condition a plot the dam instrumentation.

V.STUDY ANALYSIS

The study about different types of dam material use for construction. Failure occur on instrument organized are studied. The detailed information about Gunjwani and Nira Degohar from case study is mentioned below.

CASE STUDY – GUNJWANI DAM

Sr. No.	Attribute	Value
1.	Name of Dam	Gunjwani Dam
2.	River	Kanandi
3.	Location	Near Chapet Tal. Velhe, Dist. Pune, State Maharashtra
4.	Purpose of Dam	Irrigation, Hydroelectric
5.	Type of Dam	Earthen Dam
6.	Catchment Area	
	1. Main Dam	50.613 sq.km
	1. Average rainfall	
7.	Length of Dam	1730m
8.	Maxi. Height above Foundation	52.82 m
9.	Spillway	
	1. Type of spillway gate	Radial gate
	2. Length	12 m
	4. No. of Spillway	2

CASE STUDY – NIRA DEOGHAR DAM

Sr. No.	Attribute	Value
1.	Name of Dam	Nira Deoghar Dam
2.	River	Nira
3.	Location	Near Nigudghar, Tal. Bhor, Dist. Pune, State Maharashtra.
4.	Purpose of Dam	Irrigation, Hydroelectric
5.	Type of Dam	Earthen
6.	Catchment Area	
	1. Main Dam	50.614 sq.km
	2. Average rainfall	1800 to 2200 mm
7.	Length of Dam	1730m
8.	Maxi. Height above Foundation	52.82 m
9.	Spillway	
	1. Type	Radial gate
	2. Length	12 m
	3. No. of Spillway	2

2.2 **INSTRUMENTATION**

1. EMBANKMENT PIEZOMETER

These instruments used measures water pressure within dam and its foundation. They are installed at various depths and location to monitor pore water pressure and assess the stability of dam. They are positioned within dam body and the foundation at critical location, such as the downstream toe, upstream phase and along dam depth.

2. PLUMB BOB

At the time of earthquake plumb bob plays an important role. It gives the information that the earthquake has affect the dam or not. It will adjust and change the level of Plumb Bob it cause to the failure dam. It is the main instrument is use in the dam.

3. RAIN GAUGE

The rain gauge is the device which measures the rain fall. It is very simple and effective method to measure rain fall. The rain gauge is divided into two types :-
Manually gauge and Recording gauge.

4. WATER LEVEL SENSORS

These instruments measure the water level in the dam reservoir. They can detect changes in water level that could indicate a problem with the dam's in hydraulic system. They provide critical data for monitoring water storage and assessing flood risks.

5. SEISMOMETER

It is employed to measure and record ground vibrations and seismic activity in and ground dam structures. They are designed to detect and measure ground motion caused by earthquakes, ground vibrations from nearby construction activities and may affect the dam stability. Seismometer measuring the movement in horizontal as well vertical direction. The seismometer gives the output in seismograph manner. The seismograph manner.

All the above explained instruments are as shown below :

Fig.1 Piezometer

Fig.2 Plumb Bob

Fig.3 Rain gauge

Fig.4 Water Level Sensors

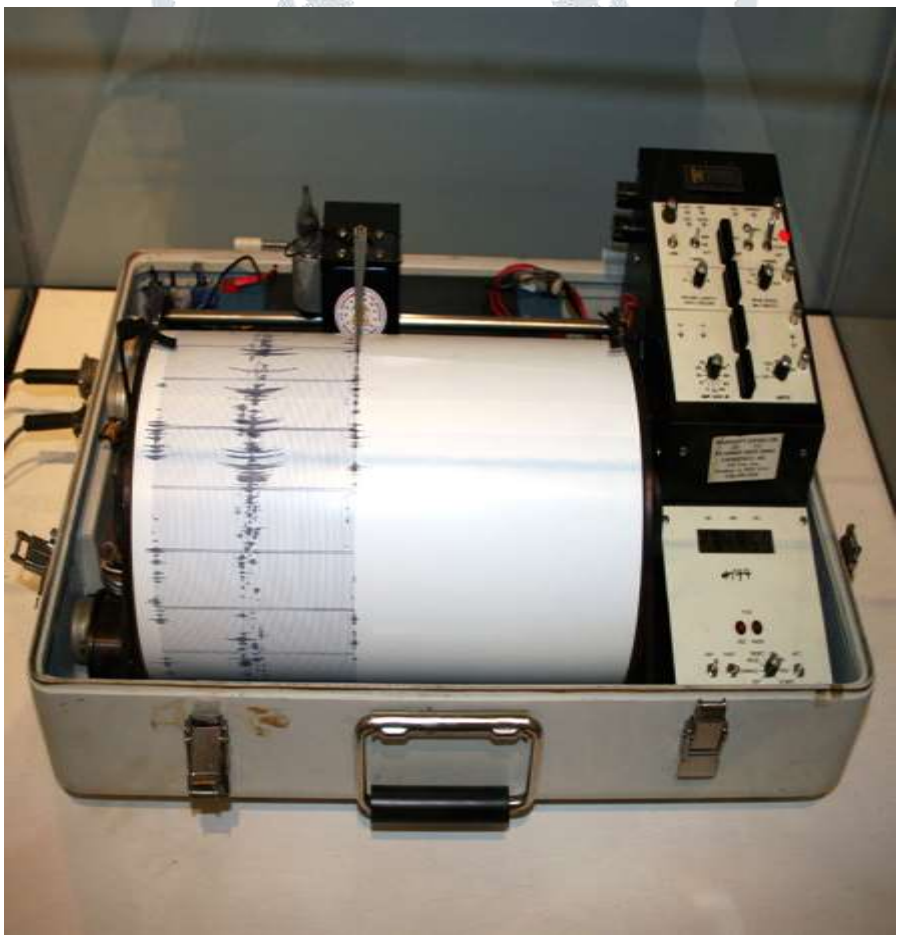

Fig.5 Seismometer

CONCLUSION

1. The instrumentation program should be installed to identify problems related to structural, geotechnical terms clearly defined.

2. The measurements of all the quantities are necessary in the problem can be studied and planned properly and comprehensively with the help of proper instrumentation program.

3. Proper coordination between the dam in charge, instrumentation specialist and other site authorized person should be there to keep all the instruments in proper working condition.

4. The results obtain with the help of instruments should be made available and properly analyzed.

5. After analyzing all the data obtained from the instruments. It should be used to make proper changes in the instrumentation of the dam.

6. With the help of proper instrumentation, the health of the dam can be maintained.

7. The downstream area of the dam can be kept safe with the proper implementation of the instrumentation.

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