HYDROMETEOROLOGICAL MEASUREMENTS IN ACCUMULATION ROVINARI

Irina-Ramona Pecingină, Uni*versity "Constantin Brâncuşi",* Tg-Jiu, ROMANIA
Roxana-Gabriela Popa, Uni*versity "Constantin Brâncuşi",* Tg-Jiu, ROMANIA

ABSTRACT: Rovinari-permanent accumulation of particular importance given the objectives of downstream villages and you need to protect. Meteorological and hydrological information system consists in observing, measuring, recording, processing meteorological and hydrological, drafting and sending them warning and alarming local emergency committees involved in defensive actions.

KEY WORDS: accumulation , Rovinari, hydro-meteorological parameters

1. INTRODUCTION

Dam is a type hydro dam construction sector gates and equipped with energy absorber.

Rovinari dam is located on the Jiu river provides water supply and cooling Rovinari power plant in Gorj county.

The water intake is located on the right bank of the river Jiu and was sized to capture a maximum flow rate of 64 m3 / s, flow necessary for cooling in an open circuit at the final stage of development.

Rovinari-permanent accumulation of particular importance given the objectives of downstream villages and they have to protect (Figure 1).

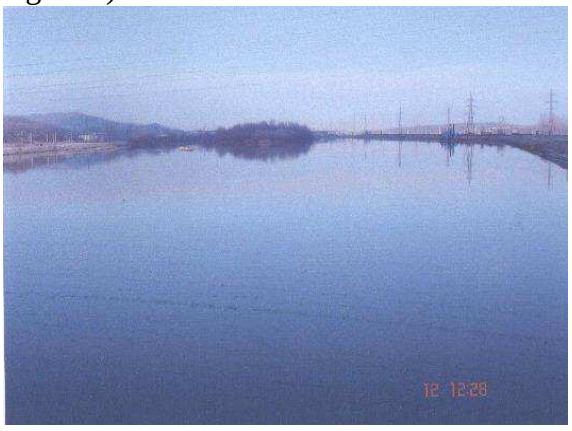

Fig. 1. Accumulation Rovinari

2. THE ORGANIZATION OF DEFENSE, SURVEILLANCE, ALARM

Meteorological and hydrological information system consists in observing, measuring, recording, processing meteorological and hydrological, drafting and sending them warning and alarming local emergency committees involved in defensive actions.

Gorj county area are located 19 hydrometric stations and 16 transmission stations daily rainfall.

In accordance with the regulations on construction management and quality assurance for the category of major dam outlet Rovinari fall into Class II important, being mandatory special tracking.

The surveillance system of the barrier dam, complete with video and visual observations of accumulation has the ability to detect the initial phase, any critical events.

Video and visual observations are made on the technical condition of buildings, a lake, dam and downstream river bed.

3. INSTALLATIONS AND APPARATUS FOR MEASURING METEOROLOGICAL AND HYDROLOGICAL PARAMETERS

Measurement of meteorological and hydrological is done using conventional means (Figure 2, table 1).

Fig.2 Hydrometric surprised wash located on the abutment opening

Tab. 1. Hydrometeorological and hydrometric devices and placed in area accumulation Rovinari

Device type	Emplacement	Measured parameter	Fashion collection
Mira hydrometric	Dam	the water level in the lake	read mira
Thermometer	Dam	air temperature	read thermometer
Rain gauge	Dam	rainfall	reading rain gauge
Ruler, cylinder	Dam	snow	reading ruler, cylinder
Video cameras	Dam	video observations dam - lake	

4. HYDROMETEOROLOGICAL DATA MEASUREMENT SYSTEM

Information on levels and flows recorded in the lake gauging stations upstream and developments critical thresholds laid down in AMCs are transmitted to the central system of water management and water departments dispatcher Jiu-Craiova.

The information is received from these automatic hydrometric stations:

- on river Tismana - SH Godinesti;
- on Bistrita river - SH Telesti;
- on river Jales - SH Stolojan;
- on the river Jiu - SH Sadu;
- on creek Susita - SH Vaidei, and will be taken into account by Tg-Jiu hydrological station for establishing weather warning.

Rovinari - permanent accumulation and regulation related works are designed both for flood control and protection of coal pits. Lake basin is located in a natural depression where a number of main tributaries converge on the right river Jiu Şuşiţa, Jaleş, Bistrita and Tismana tipped over accumulation.

During normal accumulation does not start, water leaking through the hauler to a rate of 250m3 / L / s when the floods do not occur in the basin of the lake. Regime waters are considered when accumulation becomes operational level in the reservoir and increase to levels corresponding increase flood.

Assurance level of 0.5% at the rate of 170 mdMN at an accumulated volume of 150,000 m^3.

The interpretation of the measurements made to take account of the riverbed and the precipitation regime.

Hydrological station Tg-Jiu and hydrometeorological processes all data sets based on key limnimetrice, tributary flows

which it shall dispatch Water Management System and on the headquarters of the outlet dam Rovinari.

Flooding is a natural phenomenon and are a natural component of the hydrological cycle of the earth. Floods, especially the great floods are some of the natural phenomena that have marked deeply marks human society, being the geographically most widespread disasters around the world and also the largest producer of damage and casualties. Meanwhile, major floods were the triggering factor and catalyst for big changes in the approach to this phenomenon from accepting floods as a quirk of nature, man's attempt to oppose nature through approaches like fighting floods to the flood defense until not long ago to prevent flooding.

Gorj county is characterized by a rainfall with a maximum main spring (March-May) due to heavy rainfall that usually this season overlap melting mountain in the upper basin.

Also falls exceptional rains in the upper watershed and medium enterprises are likely to cause floods over the lower and middle rivers. This phenomenon mostly affects localities bordering the river Jiu. The fall of rainfall in a short time (50 l / m) in different areas of the county, can cause partial flooding of settlements, a situation favored by the relief configuration (which does not allow water run off). (Figure 3).

Between anthropogenic causes include a reservoir dam failure, but that ultimately can be unpredictable due to the increase of water over the odds certainly unreasonable in a river basin deforestation, changes in riverbed drainage through various technical works.

Fig.3. Rainfall and the occurrence of floods

The frequency of observations and measurements

Frequency measurement is considering two situations of exploitation (or behavior) of the dam Rovinari namely:

- situation normal operation;
- operating exceptional situation;

Situation normal operation refers to:

- all bodies hydromechanical equipment drain the lake in running
- gradient in the lake below the level stipulated in the regulation of exploitation
- dew point below 60 l / m integrity and accumulation goals surveillance system
- breaching the limits of carefully measuring and control devices.

Overcoming or failure of one of the criteria specified for normal operation situation entails entering the operating exceptional situation characterized by three states: the state of attention, alertness, alarm status

- The state of attention - simple deviation from the normal situation, exhibit no dangers, there will be more measurements and observations in order to highlight the causes;
- Alertness - potentiality of danger, take measures to limit the evolutionary phenomena;
- Alarm status - evolutionary phenomena can not be limited, the plan kicks in warning and alarm.

Table 2 presents measurements hydrometeorological accumulation program Rovinari.

Frequency of making direct observations in normal operating situations and exceptional operation is presented in table 3.

Tab. 2 Hydrometeorological measurement program accumulation Rovinari

AMC	Supervised parameter	Frequency measurements	
		Normal situation	Exceptional situation
Mira hydrometric	Water level in the lake	4 / d (6,12,18,22 hours)	1/hour
Thermometer	air temperature	4 / d (6,12,18,22 hours)	4 / d (6,12,18,22 hours)
Rain gauge	rainfall	the appearance	the appearance
Highlights leveling	vertical displacements	1/year	immediately after the event

Tab.3. Frequency of making direct observations in normal operating situations and exceptional service

Object	Frequency measurements	
	Normal situation	Exceptional situation
Lake	Weekly	Daily
Locks	Daily	Schedule
Bief upstream	Weekly	Daily
Bief downstream	Weekly	Daily
AMC (topo-geodetic network)	Measurements	Measurements

Tab. 4. Critical thresholds hydrometric stations in the accumulation Rovinari

parameter watched	The device or method	Stock control and critical situations	critical thresholds
In front retention levels	hydrometric visual observations	- NNR raising the lake over 50 cm	- attention
		- descents in lake levels exceeding 0.5 m / day over 4 consecutive days	- attention
		- NNR over raising the lake by 75 cm, with or without maneuvering gates	-attention

Section barred catchment area of 3085 km^2 is reception. Annual average flow of the river Jiu accumulation section is 46.52 m3 / s. Ensuring minimum flow at 95% under natural conditions.

Debts corresponding to the different probabilities of exceeding are:

- flow calculation to ensure 1% - Q = 750 cm / s (flow calculation)
- Check to ensure flow of 0.1% - Q = 1035 m / s (flow check)
- Airflow solid annual average: 9.84 Kg / s.

In the Carpathian foothills, after the exit of the gorge of the river Jiu, we see a sharp increase in the flow of silt phenomenon can be explained by changing lithology harsh mountainous area, with another brittle in the Carpathian foothills.

Hydrometric station at Rovinari, solid flow measured between 1997-2015 is presented in table 5.

Tab. 5. Solid flow rate measured in the 1997-2015 range hydrometric station Rovinari

Year	Solid flow (kg/s)	Year	Solid flow (kg/s)
1997	21,3	2007	5.17
1998	15.2	2008	5.66
1999	7.45	2009	4,68
2000	7.40	2010	23,1
2001	13.9	2011	39,9
2002	7.40	2012	8,40
2003	7.42	2013	6,79
2004	7.52	2014	5,62
2005	19.5	2015	6,20
2006	9.65		

4. CONCLUSIONS

Rovinari-permanent accumulation of particular importance given the objectives of downstream villages and you need to protect. Meteorological and hydrological information system consists in observing, measuring, recording, processing meteorological and hydrological, drafting and sending them warning and alarming local emergency committees involved in defensive actions.

REFERENCES

[1.] Popovici A., Dams for water accumulation, Vol.1.Ed. TEHN Bucharest 1992

[2.] Popovici A, Isar D, Paunescu C, Ilinca C., Considerations on incidents occurring in operation stavilelor segment, Hidroelectrica, 2008

[3.]. Isar, D., Considerations on the operational reliability stavilelor, Scientific Bulletin,UTCB 2010.

[4.] . Priscu R., Safety and risk in the major dams, hydro-technical constructions,1974