MONITORING OF SPECIAL BUILDINGS IN CONNECTION WITH REQUIREMENTS OF ENVIRONMENTAL PROTECTION

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***Abstract**: Action in the event of a hydraulic flood or accident is an important activity but also civil defence and water management. From an environmental perspective, special constructions (dams and reservoirs) cause a lot of changes in natural ecosystems:*

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- *rivers are broken" in two and reduced flow downstream of the dam, often occurs unassuming the survival of aquatic organisms;*
- *also, many changes take place upstream of the dam, the suspensions transported by river are decanting and waiting for small spaces that are home to small animals which live on the bottom;*
- *downstream flow variations caused by using the water from the dam lake, adversely affect aquatic flora and fauna;*
- *changing microclimate lake area are located.*

These buildings subject to deformation due to certain factors such: as changes in the ground water level, earthquakes, changing river levels, etc. Their deformation is often pursued to ensure that the structure presents a deformation behavior safely.

Therefore it is important to monitoring these buildings to safety assessment and preventing disasters in the future.

In our work, in order to support our point of view, we present clear examples, i.e.: the Poiana Mărului dam.

***Keywords:** monitoring, environmental protection, movement, deformation*

1. Aims and Background

Action in the event of a hydraulic flood or accident is an important activity but also civil defence and water management. From an environmental perspective, special constructions (dams and reservoirs) cause a lot of changes in natural ecosystems:

- rivers are "broken" in two and reduced flow downstream of the dam, often occurs uninsuring the survival of aquatic organisms;
- also many changes take place upstream of the dam, the suspensions transported by river are decanting and waiting for small spaces that are home to small animals which live on the bottom;
- down stream flow variations caused by using the water from the dam lake, adversely affect aquatic flora and fauna;
- the lake area microclimate changing are located.

These buildings subject to deformation due to certain factors such: as changes in the ground water level, earthquakes, changing river levels, etc.

Of particular importance is the behaviour monitoring of such construction, as a proper follow-up, can be prevented unwanted events that can turn into real social disaster, economic, environmental, etc. and also can be overcome, to some extent the effects of errors in design, construction and even in operation. The behaviour monitoring of such construction methods is made by both physical and topographic methods.

Therefore monitoring these buildings to safety assessment and preventing disasters in the future it is important.

In our work, in order to support our point of view, we present clear examples: Poiana Mărului dam.

2. Experimental Description

The Ruieni Fall was executed during 1981-2004, the two hydro units with an installed capacity of 140 MW of hydropower Ruieni being commissioned in 1993 respectively 1995. The hydro central produces 126.3 GWh annually. Poiana Mărului dam was completed in 2004: a construction of clay-core rockfill, 125 m high. This has allowed an accumulation of a volume of 90 million cubic meters.

Figure 1. Satellite Imagine with the dam Poiana Mărului

Topo-geodetic measurements made at the Poiana Mărului dam aimed to determine horizontal and vertical movements of the benchmark tracking berms planted on it. Displacements are obtained by difference between the coordinates that portion determined initial rates measurements and the same elements determined in the current tranche.

The behaviour monitoring of the Poiana Mărului dam began in 1991 during its construction and it is made with the microtriangulation method. Network consists of six microtriangulation pillars, B1, B4, B5, B6N, B7 and B8 and of 39 tracking markers placed on berms downstream the dam.

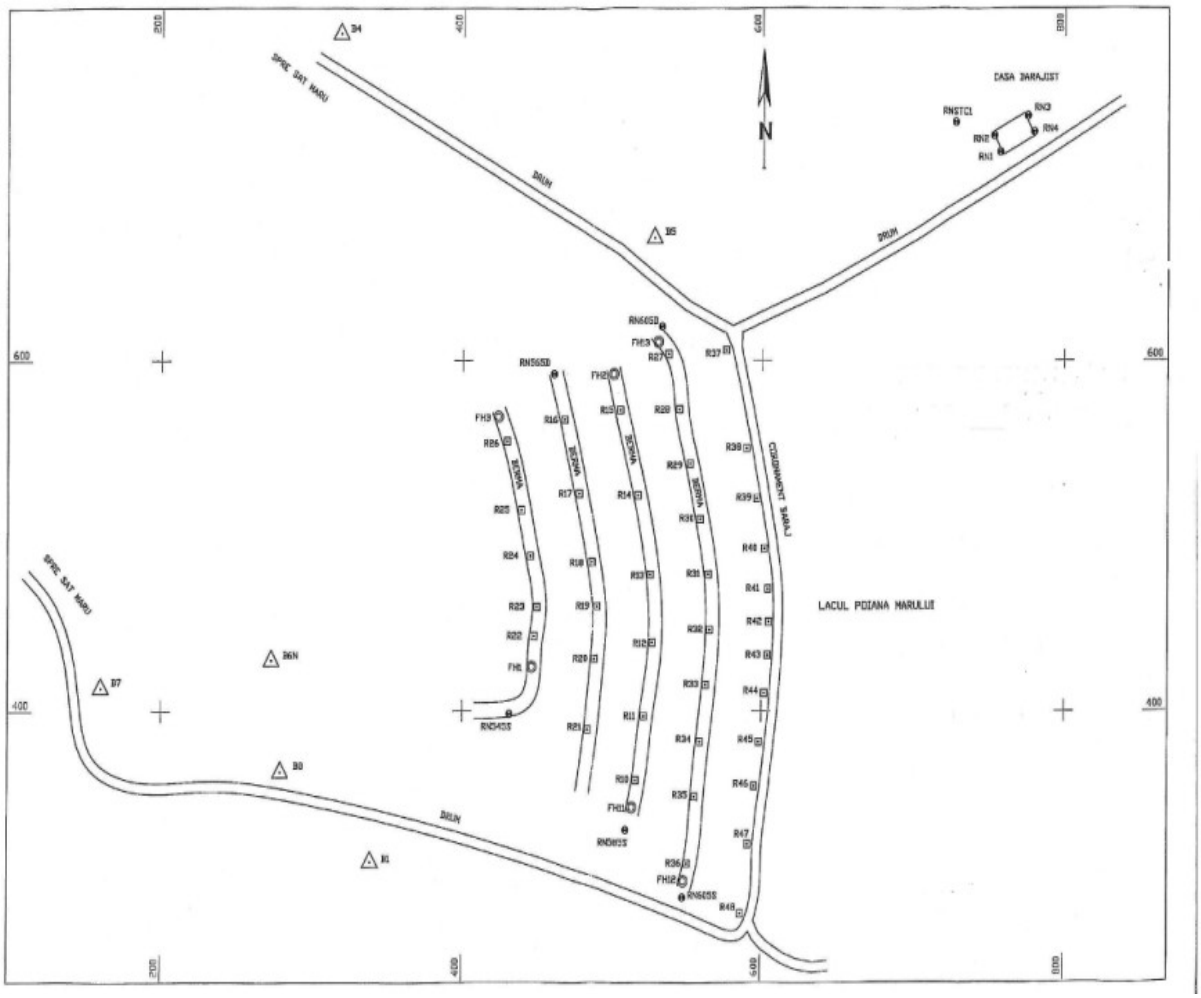

Figure 2. Sketch of tracking network Poiana Mărului dam3. Conclusions

Junction elements in surface and underground surveying the triangle linking method in which the expected values measured quantities are obtained by methods described provide a coordinated transfer guidelines and increased accuracy. Such precision may also be correlated with the measured quantities to meet the values of the quantities determined initially imposed.

3. Results and Discussions

The network tracking points were determined with an average precision of 2.20 mm.

To compensate for azimuth observations were determined as B5 and B6N fixed pilasters. The deviations of the network points were obtained with an average accuracy of 2.20 mm. Maximum deviations were determined for tracking markers were -289.3 mm on X-axis - landmark R14 and - 491.5 mm on Y-axis - R19 landmark. These deviations are calculated from the base portion. Previous measuring cycles face movements are much smaller. Thus R14 landmark moved on the X- axis (where the maximum recorded) of 3.8 mm and R19 landmark moved 8.6 mm on Y axis. The maximum from the previous measuring cycle was made by R16 landmark: 21.9 mm on X axis and 34.8 mm on Y axis.

In conclusion, analyzing the landmark tracking deflection values, compared with the previous measuring cycle, both horizontally and vertically, we can say that they are relatively small and in ranges from normal for a rock fill dam.

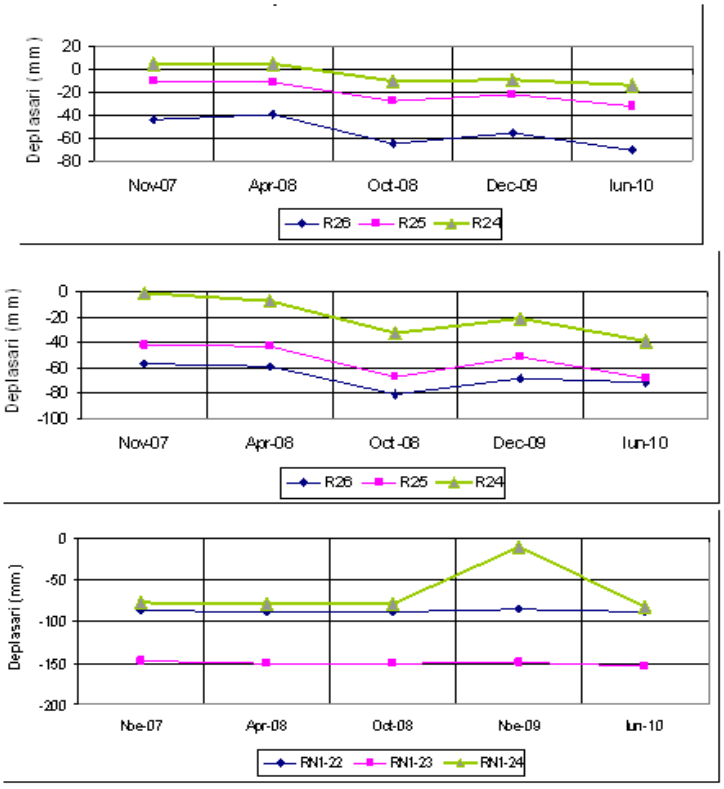

Figure 3. Example of standard deviation from the tracking network data processing

4. Conclusions

Monitoring hydraulic construction is a systematic activity of data collection and specific information from direct observations and from certain parameters measurements which define the status and progress of construction safely state, in relation with the actions which are subject to assessing the degree of safely presented by a construction work at a time. Monitoring reveals this way the cases where structural safety is damaged and it imposes the extent to prevent breakage. The main objective of monitoring hydro constructions is to have safe buildings. This activity consists in assessing their technical state on the entire period of existence and realising investments in time, i.e. their monitoring, which is NECESSARY.

5. References

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