

Nile Basin Initiative (NBI)
Eastern Nile Technical Regional Office (ENTRO)
Cooperation in International Waters in Africa (CIWA)
(AF-2)
Terms of Reference

**Dam Safety Surveillance and Instrumentation specialist, (DSSIS-
International-2)**

1. BACKGROUND AND INTRODUCTION

Dam failure is a very low probability risk that, however, could result in catastrophic consequences on lives, property and environment. Hence, putting in place the appropriate institutions and mechanisms to ensure integrated planning, operation and management of this infrastructure (i.e. dams, hydroelectric power plants, etc.) is an important to avoid adverse trans-boundary impacts.

ENTRO, with strong support from its governance and NCORE support have made significant progress to lay the foundation for standard dam safety practice in the sub basin and reduce the risk of dam failure. However, there is a lot that remains to be done in order to ensure the safety of and continued economic performance of these dams which are situated on a transboundary river.

Dam surveillance and instrumentation provide data for monitoring the safe performance during the various phases of a dam's life including design; construction; first filling of the reservoir; evaluation of long-term, in-service performance (normal operation); and to manage or predict unsatisfactory performance. The use of instrumentation to monitor the performance of dams is widely accepted as a prudent component of a successful dam safety program to manage and minimize the risks to the public posed by dams.

A well designed and executed instrumentation and surveillance monitoring program can provide information that is needed for a solid understanding of the ongoing performance of a dam and may help detect early warning signs of trouble. Monitoring programs, including instrumentation, surveillance and visual inspection, provide dam owners with the knowledge that a dam is performing as expected and the ability to detect a change in performance.

ENTRO had conducted a training workshop on basic concepts of dam safety management as part of NCORE-CIWA program. Dam surveillance and instrumentation were among the different topics addressed in the training program. This is a continuation of the previous training program and the topics will be addressed in more detailed theoretical and practical approach.

2. OBJECTIVE

As it is mentioned above, the objective of dam instrumentation and surveillance is to make a timely and precise diagnosis of dam behavior that allows for the prevention of undesirable consequences. The monitoring system and surveillance programmes have to be designed or redesigned considering potential failure modes associated with the higher levels of risk. They should be able to identify any abnormal behavior which could lead to potential reduction of safety.

The overarching objective of the training program is to sustain the key achievements made in the previous N CORE-CIWA program and putting strong national institutional setup in place to properly operate and manage complex and transboundary dams in the Eastern Nile.

More than 95% of Eastern Nile storage dams are embankment types, some of these are composite type (an embankment dam with concrete spillway or concrete main dam with embankment saddles or flanks). The specific objective this training program is to provide classroom and hands on training on Instrumentation and Surveillance of dams in general and embankment dam in particular. This enhances the technical capacity of Eastern Nile dam safety experts and to keep up to date on instrumentation and monitoring technologies.

3. SCOPE OF WORKS

The overall scope of work for the DSSIS includes, but not limited to, the following major activities. .

- Prepare training materials on activities, procedures and requirements to undertake standard Surveillance and Instrumentation monitoring for embankment dam.
- Provide a technical training addressing the following , but not limited to , key issues;
 - Basic elements of a monitoring and surveillance plan for embankment dam;
 - Visual Inspections; during first impoundment, some years after impoundment, and long term operation;
 - Monitoring parameters and instruments/devices, with frequency of observations;
 - Instrumentation data collection, management , analysis and interpretation
 - Maintenance and ageing of monitoring systems;
 - Recent instrumentation developments and applications;
 - Data and report compilation and documentation management;
 - Assessment of condition and behavior of dams;
 - Prioritization of maintenance, remedial and upgrading monitoring systems.
- As a case study as part of the workshop, lead the field work on observation, collection of surveillance and instrumentations reading and the group discussion during the analysis and interpretation of recorded data.
- Prepare a summary report on key findings of the training workshop and recommendations for further enhancement of monitoring instrumentation and surveillance in the Eastern Nile countries;

- Participate and take part in the training workshop organized for policy and decision makers;
- Other similar tasks in line with the objectives of this consultancy, as agreed with ENTRO.

4. PROJECT DELIVERABLES

The DSSIS shall deliver the following products:

Task	IDE1 Deliverable	Target Date
1.1	Training materials on activities, procedures and requirements to undertake standard Surveillance and Instrumentation monitoring of embankment dam including analysis and interpretation techniques with case studies;	One month after commencement
1.2	A summary report on key findings of the training workshop and recommendations for further enhancement of monitoring instrumentation and surveillance in the Eastern Nile countries;	One month after training workshop

5. IMPLEMENTATION ARRANGEMENT

The Regional dam safety coordinator, representing ENTRO, is responsible to coordinate and lead the activities.

The services to be provided by ENTRO include the following:

- I. Be responsible for the overall implementation of the project and managing the interfaces between this Consultancy and other relevant activities.
- II. Organize and facilitate the training program with the help of the Consultant.
- III. Provision of Office space suitably furnished with electricity, telephone and internet connections;
- IV. Facilitate access to the different government departments/utilities//institutions with data and information relevant to the consultancy.

6. QUALIFICATIONS AND EXPERIENCES

The DSSIS shall have some familiarity of the Nile basin and its socio-political and environmental context. In addition he shall have the following minimum qualifications and experiences:

In addition he shall have the following minimum qualifications and experiences:

Advanced university degree (M.Sc. or above) in Dam/Hydraulic/Structural Engineering or related fields and at least 20years of work experience in the following key areas:

- Extensive experience in design, construction supervision and operation of dam projects, including those on trans-boundary Rivers;
- Involved in a project's instrumentation program and experience of how parameters measured by instruments are used to evaluate performance of dams;
- .
- Experience as member of Dam Safety Review panels or peer reviewing of technical reports related to dams design, construction, operation and maintenance.
- Experience in development of dam safety guidelines and regulatory frameworks
- Experience in development and implementation of dam safety monitoring systems, Emergency Action Plan and Operation, Maintenance and Surveillance manuals
- Experience in organizing technical consultation to stakeholders.
- Strong analytical and report writing skills.
- Fluency in English.
- Experience in the Eastern Nile region an advantage.

7. LEVEL OF EFFORT, BUDGET AND SCHEDULE

The DSSIS shall provide a total of 25staff day over a period of 5 months. He will undertake up to two trips in this period.

Payment shall be effected upon submission of invoices to ENTRO as well as submission and acceptance of deliverables. Reimbursable expenses will include international travel (economy class), accommodation and daily subsistence allowance at the ENTRO rate, in accordance with ENTRO policies.