



D.O. Lr. No. 8141/Reforms/A1/2023, dated: 04.11.2023

Dear Sri *Sibal*,

Sub: I & CAD Dept., - Kaleshwaram Project – Report of the committee constituted by NDSA to examine the reasons for sinking of the piers of Medigadda (Lakshmi) Barrage -Reg.

Ref: Chairman NDSA D.O No TE-16/3/2023-NDSA-MOWR, Dt . 01.11.2023

\*\*\*\*\*

We are in receipt of your D.O. Letter dated 01.11.2023, wherein the broad findings of the committee constituted by NDSA are communicated. We have studied your comments and suggestions comprehensively and noted that many of them are either unsubstantiated or made without a full appreciation of the facts.

In order to clarify the issues raised in your letter, the following para-wise remarks are submitted for your consideration:

1. It has been stated by you that only 11 out of the 20 documents required by you were sent to you. In this context it is informed that all the documents desired by the NDSA team were shown to the committee during the inspection and subsequent interactive meetings. Subsequently another NDSA committee letter was received on 27.10.2023 evening requesting to furnish the said 20 documents by 29.10.2023. Though we were given no working days to prepare the reports, which are considerably voluminous, we sent 17 of the documents to the committee through email on 29.10.2023. the remaining 3 documents were sent on 1<sup>st</sup> November. Copies of the documents are appended at Annexure-1. However, without checking the details submitted by the SDSO a comprehensive indictment of the Kaleshwaram project was communicated to us in a hasty manner.

2. We are surprised that conclusions have been made about the causes of failure of Laxmi barrage without any investigative work by the committee. As you are aware that, the correct causes can be determined only after proper inspection of the foundation and other related structures, which are currently under water. Currently a coffer dam is under construction by the agency to divert the water and facilitate the thorough inspection of the affected portions of the barrage. Only once this investigative work is completed, we would be able to assess the correct reasons for the sinking of the piers in the barrage. As such at this point of time, we are unable to agree to your conclusions.
  
3. In the third paragraph it is stated that primary reason for the failure is the settlement of the raft which could be due to various reasons including failure of the upstream secant piles due to barrage load. It is to inform that the upstream and downstream secant piles in Medigadda barrage are provided with a flexible joint with the main raft. The prototype for this flexible joint was developed by CWC and used in the Tapovan project in Uttarakhand. This would eliminate the possibility of barrage loads directly impinging on the piles. (Annexure-2)
  
4. Further, the secant piling activity is carried out in accordance with the prescribed BIS standards and other relevant guidelines. The alignment of secant piling on upstream and downstream of blocks and cross cutoffs in double piers is done by constructing the RCC Guide wall. RCC Guide wall is constructed all along the alignment of secant piles, the primary secant pile of PCC is driven alternately leaving the RCC Secondary Pile. The verticality is observed on the pile driving machinery provided with dial gauge for ascertaining the verticality. Secant piles are driven through the Guide wall by maintaining the verticality and no deviation in verticality has been observed in the Guide wall as no damage occurred during the driving of Secant piles.

Additionally, the secant piles are provided with pile caps that are connected with connecting slab between pile cap and raft junction by providing the copper water stopper and rubber water stoppers as per extant guidelines. The gap between the pile cap and rafts are water tightened by providing water stoppers at junctions. The materials used in the Secant piling are tested regularly as per IS codes for Cement, Coarse aggregate, Fine Aggregate, Steel in the field labs and the Cube Compressive strengths are done for 7 days and 28 days, the acceptance criteria for different grades of concrete are carried out as per the IS 456 and IS 10262.

We would also like to emphasize that stringent quality control checks have been conducted while executing of the Secant piles and plinth connection between Raft and cutoff. The tests conducted for Secant piles and Raft are herewith enclosed at Annexure- 3. We therefore are the opinion that your comments related to poor quality control during project execution are unsubstantiated.

5. The barrage has been designed as RCC raft duly following the IS Code 6966 - Part 1(1989) and CBIP Manual No 179-Volume 1 & 2. The stilling basin floor is designed as RCC raft duly considering the uplift pressures. Pressure Relief Valves are also provided as a drainage arrangement in the stilling basin to relieve the uplift pressures on stilling basin raft. (Annexure-4)
6. The need for revision of the apron design is already in the notice of the SDSO and field staff. Detailed modeling studies have been done jointly with IIT Hyderabad. The final recommendations are here with enclosed for your kind perusal and we would be happy to receive your specific comments on them, if any. However due to the continuous rains in the basin and flows in the barrage for the last 3 years, an opportunity to implement the modification was not available till date. (Annexure-5)
7. In the 8<sup>th</sup> para, your letter has made certain observations regarding non observance of NDSA provisions by the concerned authorities.

In this context we would like to inform though Dam safety Act was effective from 13.12.2021, the regulations made thereupon did not provide clarity regarding the height and other details of the specified structures. The Telangana SDSO has sought several clarifications from NDSA in this matter. The NDSA has conducted a meeting in the virtual mode on 15-03-2023. Clarification regarding assessment of height of dam for inclusion in the List of Specified Dams was communicated by NDSA in the mail dated. 01.04.2023. As a matter of fact the NDSA has appreciated the role of the Telangana SDSO in development of the revised guidelines. As per these clarifications Medigadda, Annaram and Sundilla Barrages were included to the List of Specified Dams **only on 12-07-2023**. Since the inclusion of Medigadda Barrage to the updated list was in the month of July, 2023, pre monsoon inspection could not be carried out. Other inspection reports as required under the Act are already submitted and the Post monsoon inspection will be carried out in November 2023. We assure that all the provisions of Dam Safety Act 2021 are being scrupulously complied with. (Annexure-6)

8. The suggestions made vide paras 9,10, and 11 are already known to the dam authorities and as explained to the committee during the meeting, action on the restoring full operations of the barrage has already been initiated. Operations of the barrage will only be started after the agency rectifies the damages.
9. The comments pertaining to Annaram and Sundilla barrages are unsubstantiated as the expert committee did not even visit the two barrages. However, we assure you that both the barrages are included in the list of specified dams under the NDS Act and the SDSO is taking all the necessary measures to fully comply with the provisions of the Act.

In conclusion we would like to submit that diversion structures such as barrages are subjected to multiplicity of loading conditions like the surface flows, sub-surface flows, uplift pressures, scours and exit gradients, tail water level etc. These challenges individually and

collectively are considered in the design process for Medigadda barrage in various combinations. The BIS have published 3 codes specifically meant for various aspects related to the Design of Barrages in addition to guidelines on various related aspects like Cement, Concrete, Steel etc that are used in the construction of Barrages. Further, the CBIP have also published manuals on Barrages in two volumes to support for deeper understanding. The CDO of Telangana state, which is considered as a premiere institution of the country, has diligently followed the said guidelines cited above for all the Projects, more specifically for the prestigious projects like Kaleshwaram. The Irrigation Department of the State is also known for it's excellence and the world renowned structures like Nizamsagar, NSP, Srisailam, Pochampad etc are the pride of the nation.

The Kaleshwaram Project has been approved by the Technical Advisory Committee of the Jal Shakti Ministry on 06.06.2018 after thoroughly examining all the aspects like Hydrology, Costing, Irrigation Planning, environmental clearances etc. In particular the design of the barrage has been extensively studied by the Costing Directorate of the CWC with respect to functionality and costing. The then Chairman of the Central Water Commission, Sri S. Masood Hussain along with CWC Chief Engineers visited Kaleshwaram project on 9<sup>th</sup> April 2018. The Chairman appreciated Telangana government for speedy execution of work and said that they had not seen any irrigation project of such magnitude and described the project as an "Engineering Marvel".

Further, the completion of the Kaleshwaram project, has had tremendous positive impact on the economy and ecology of the state. Agriculture production in the state has increased by 300 percent. The average groundwater level has increased by over 7 metres due to supply of surface water for irrigation and recharging of underground aquifers. A tremendous growth is seen in fisheries and tourism sectors. The overall positive impact of Kaleshwaram Project has resulted in Telangana leading in India with highest per capita income of Rs 3.17 Lakhs, up from about 1.28 lakhs at the time of formation of the state.

We therefore request you to cooperate with the state agencies in speedy and effective restoration of this prestigious and beneficial project in a purely professional manner without any extraneous considerations, as this would be of tremendous benefit to people of Telangana state.

Encl: Annexures 1 to 6

With regards.

Yours Sincerely



(Dr. Rajat Kumar)

1/2

To,  
Shri Sanjay Kumar Sibal,  
Chairman, National Dam Safety Authority (NDSA),  
Sewa Bhavan, R.K. Puram, New Delhi.