

**SHORT NOTICE QUESTION AND ANSWER****EARTHQUAKE AT KOYNA**

4. SHRIMATI TARA RAMCHANDRA SATHE: † SHRIMATI LALITHA (RAJAGOPALAN) : SHRIMATI C. AMMANNA RAJA:

Will the Minister of IRRIGATION AND POWER be pleased to state:

(a) whether the Expert Committee appointed by the Government to go into the reasons of earthquakes at Koyna in September and December, 1967, has submitted any Report;

(b) if so, what are the findings/recommendations contained therein;

(c) what steps Government propose to take in the light of the Report; and

(d) if the Koyna Dam is in the seismic zone what precautionary measures Government propose to take in the matter?

THE DEPUTY MINISTER IN THE MINISTRY OF IRRIGATION AND POWER (SHRI S.IDDHESHWAR PRASAD): (a) The Expert Committee appointed by the Government of India has submitted a preliminary Report.

(b) The findings are:

(i) There is no evidence of a fault along the Koyna Valley in the lake area.

(ii) The reservoir is not responsible for the two major earthquake shocks of September and December 1967.

Recommendations have been made to conduct surveys, seismological mapping and collection of meteorological and Geophysical data.

(c) Studies as recommended by the Expert Committee are being carried

fThe question was actually asked on the floor of the House by Shrimati Tara Ramchandra Sathe.

out. Repairs to the dam will be undertaken soon.

(d) It is not yet clear whether the Koyna Dam is in the seismic zone. But as two major earthquake shocks have been experienced at Koyna, measures to strengthen the dam and other structures are under study. [THE DEPUTY CHAIRMAN *in the Chair*]

SHRIMATI TARA RAMCHANDRA SATHE: May I know whether there are any cracks either in the main structure or the super-structure, that is the tower and may I know whether these cracks are getting widened and whether the experts have suggested any remedies for that?

DR. K. L. RAO: Yes, a few cracks have been observed and it is proposed to carry out three types of repairs. The first is, for the cracks in the slabs in the spillway bridge, we propose to grout with epoxy, the new binding resin which will restore the original strength of the concrete. The second is, wherever we find any horizontal crack, as it happens to be in a few blocks, we will do the anchoring by prestressing wires. The third is, where-ever there is excessive leakage, it will be reduced by grouting. When the cracks themselves are minute, we have to examine them under microscope and there is no question of any widening.

SHRIMATI TARA RAMCHANDRA SATHE: Does he think that the dam is safe and the third stage can be proceeded with? May I also know whether the Government is considering to change the location of the Warna dam?

DR. K. L. RAO: The dam is perfectly safe. The only thing is that having experienced two shocks of a severe type, we have to ensure and take sufficient steps to see that the dam will be safe again under similar severe conditions. That is why some strengthening measures are under way and they will be done so that the question of safety is ensured completely under all circumstances. Regarding the Warna dam, there is no necessity for changing the site. The

only thing is, having had experience I of these shocks, the dam will be designed to ensure that it withstands these severe shocks.

SHRIMATI LALITHA (RAJAGOPALAN): How long will it take for them to get the report regarding the dam and when will they be able to furnish the report to this House? May I know if it is a fact that an expert scientist from Bombay has stated that because of the construction of this dam these earthquake tremors have been occurring there often? I would like to know whether the Government have studied this matter from this angle and may I know whether they have consulted any expert scientists on this matter?

DR. K. L. RAO: Regarding the first question, the final report will be available in June and as soon as it is ready, it will be placed on the Table. Regarding the second question, the answer has already been given that the reservoir has nothing to do with the severe shocks that occurred in September and December. That was the finding of the Expert Committee and the preliminary report.

SHRIMATI LALITHA (RAJAGOPALAN): May I know whether the Minister has consulted any earthquake experts on this matter as to whether the dam has any connection with the earthquakes? Even in Bombay there was a tremor when I was there recently.

DR. K. L. RAO: That is why I submitted that we have consulted a series of experts. Actually we are consulting about seven experts in this connection—two from Japan, one from the U. K., one from Russia and three from France and the experts have stated that the reservoir has nothing to do with the severe earthquake shocks. Regarding the shock the Lady Member has experienced when she was recently in Bombay, it is the after-effect. When a severe shock occurs, it will be followed by after-shocks for a number of days, maybe for a year.

SHRIMATI C. AMMANNA RAJA: May I know whether the buildings in the zone are supposed to be unsafe and that is why the Government of Maharashtra have suggested some other pattern for construction in that area?

DR. K. L. RAO: Naturally when an earthquake of this type occurs, the buildings that are usually constructed there consisting of stone and Mangalore tiles will not be sufficient and that is why when this unfortunate earthquake occurred, so many lives were lost. Therefore, hereafter these structures in that area will have to be designed in such a way that they will be able to stand the earthquake shocks and that is what is being done.

SHRI M. M. DHARIA: Is the Minister aware that some of the engineers in that area have expressed some conflicting opinions and they have written some articles and even in Kesari, some leading articles have appeared stating that the present Koyna dam is in danger because of the various tremors yet being felt there and that it may not be possible even for this Koyna dam in existence to bear the burden and after the rainy season perhaps it may cause tremendous harm to the locality concerned? Under these circumstances, will the Minister clarify that there is no such danger and that all possible precautions will be taken prior to the beginning of the rainy season and that there should not be any fear whatsoever? Otherwise, the people shall have to be told about it. In that context, may we know his views on the matter?

DR. K. L. RAO: We have consulted various experts, both Indian and foreign. We are consulting as many as seven foreign experts. Four have come and gone and they are going to come again. The fifth is coming on the 7th and the others are coming on the 17th of this month. All the precautions are being taken to ensure that we get the best advice on the subject. Regarding the safety of the area, I can positively say that there is no

question of any danger and all the strengthening measures we are taking and we hope to complete them by the next monsoon to ensure that even under very severe conditions like what occurred in December, there will be no danger. I am sorry that some leading articles have been written on the subject. Our attention has not been drawn to them. We shall see them and issue a contradiction.

**श्री सुन्दर सिंह भंडारी :** मैं माननीय मंत्री महोदय से जानना चाहता हूँ कि डैम के ऊपर एक टावर बना हुआ था और अगर डैम को किसी प्रकार का खतरा नहीं है तो टावर को तोड़ने का फैसला क्यों लिया, यह फैसला चाहे उस समय जल्दी में ले लिया गया हो लेकिन अब उसको क्यों तोड़ा जा रहा है। नम्बर एक।

दूसरा यह कि अगर मकानों को भूकम्प के धक्कों से बचने योग्य बनाने की आज हम सावधानी बरत रहे हैं तो फिर उस इलाके के मकानों को तो भूकम्प के धक्के से बचा सकें इस प्रकार का बनाना जरूरी समझते हैं और दूसरी तरफ हम यह गारन्टी भी देना चाहते हैं कि बांध के क्षेत्र को कोई धक्का नहीं लगेगा, इन दोनों में किस प्रकार से वह मेल बैठायेंगे इसको समझने की कोशिश करें।

DR. K. L. RAO: Regarding the tower it is true that it was built for architectural reasons, for architectural beauty, this high tower. Now, it is always one of the important rules that in places where earthquakes occur, high structures, very thin structures like towers should not be there, because they would always be subject to very severe damage when earthquakes occurred.

SHRI SUNDAR SINGH BHANDARI: Did the damage occur to it after this earthquake?

DR. K. L. RAO: Naturally, because Koyna was considered an area where no earthquakes of this type would occur; that was the opinion of the geologists till recently. And now that a thing like this has occurred it is natural that we should see that such high structures should be removed. As I submitted, it is purely an architectural tower; it has no functional value at all.

SHRI SUNDAR SINGH BHANDARI: It has cost something.

DR. K. L. RAO: Yes, these architectural towers do cost; of course architecture always costs something, and it is natural that when you construct a big dam you would like to have a few architectural features. And that if what happened. Anyway that has been pulled down because now it does not serve any purpose and its presence there will unnecessarily cause damage to the other areas round about. Regarding houses the hon. Member is quite right when he said that, having got this experience, we should see that in future he-uses in that area must be constructed in a way that they are not damaged to any earthquake effects, and that is what is being tried.

SHRI SUNDAR SINGH BHANDARI: That was not my question. My question was something else.

मैंने यह कहा था कि जब आप हाउसिंग का कंसट्रक्शन धक्के प्रूफ बना रहे हैं अब भी, तो इसका मतलब यह है कि इस एरिया में अर्थक्वेक्स रिकर हो सकते हैं इस बात की सम्भावना को आप स्वीकार करते हैं और जब अर्थक्वेक्स रिकर हो सकते हैं, यह सम्भावना आपने मकान बनाते समय ध्यान में रखी तो इस डैम को फिर कोई खतरा नहीं होगा और यह बिल्कुल सफ है इसमें शंका करने का कोई कारण नहीं—इन दोनों चीजों को आप किस तरह से एडजस्ट कर के एक आर्ग्युमेंट के रूप में बतायेंगे।

THE DEPUTY CHAIRMAN: I think you have made yourself clear.

DR. K. L. RAO: Well, this is not really an area where earthquakes should occur or would occur, but in so far as we have had this contrary experience, naturally, we should take all precautions, and the houses built in future will be earthquake proof. Similarly the dam; we are going to strengthen the dam, take such measures to strengthen the dam and other structures in that area as to ensure their safety against earthquake shocks.

SHRI KOTA PUNNAIAH: May I know. Madam, whether it needs any alterations and repairs and, if so, the amount required?

THE DEPUTY CHAIRMAN: What needs alterations?

SHRI KOTA PUNNAIAH: The dam.

DR. K. L. RAO: It does not require any alterations whatsoever. Only a few cracks have occurred and have got to be repaired and the grouting at a few places, as I submitted already, it strengthened.

SHRI KOTA PUNNAIAH: What is the amount required?

DR. K. L. RAO: It is not possible to estimate it; a small amount, not very much.

THE DEPUTY CHAIRMAN: Mr. Ramachandran.

SHRI G. RAMACHANDRAN: Since I could not catch your eye madam, in time I have lost the inspiration for that question.

SHRI A. G. KULKARNI: As the hon. Minister has asserted that there is no damage to the dam and there will be no damage henceforth because of these cracks, may I bring to his notice that during the previous period also some Japanese team had gone to the Koyna dam and had asserted that there would be no earthquake there and there would be no damage to the dam? Still then the earthquake occurred and now, yesterday, even on the floor of the Maharashtra Legislative Assembly it

was stated by the Deputy Minister for Irrigation that there were some cracks at the bottom of the dam. May I know on what technical authority the hon. Minister for Irrigation is stating that there will be no damage to the dam?

DR. K. L. RAO: This happened when Professor Omato was here in September. He saw this structure at the time and then he felt that there could be no severe earthquake shocks in this area because it was considered by the most able of the geologists that it was not an area where very severe earthquakes could occur. But in so far as they have happened to be here we have got to take necessary precautions. In the case of earthquakes nobody can say when they occur or when they will occur. And with regard to the cracks, I have already mentioned that there are a few horizontal cracks in a few blocks observed, not at the very bottom, but at the level of what we call 2060, about a hundred feet below water level, crest level, and that is where we are taking strengthening measures, and once we take these strengthening measures there will be no question of any damage to the safety of the structure even when severe earthquakes occur.

## WRITTEN ANSWERS TO QUESTIONS

### LOANS ADVANCED BY THE R.F.A.

•412. SHRI BABUBHAI M. CHINAI: Will the Minister of FINANCE be pleased to state the total amount of bad and doubtful debts advanced by the Rehabilitation Finance Administration?

THE MINISTER OF STATE IN THE MINISTRY OF FINANCE (SHRI K. C. PANT): Out of Rs. 11.22 crores advanced by the erstwhile Rehabilitation Finance Administration a sum of about Rs. 10.31 crores inclusive of interest, has been recovered and a sum of Rs. 3.62 crores inclusive of interest, is still outstanding from the loanees. Loans which are bad and doubtful are