



The Nigerian Society of Engineers

PORT HARCOURT BRANCH

e-newsletter

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INTERVIEW WITH PROF. YOUPELE BEREDUGO ON THE TRAGEDY OF COLLAPSE STRUCTURES IN NIGERIA- ENGINEERING PERSPECTIVES

E- Newsletter: *Prof. Can you please tell us about your life and your professional background?*

Prof: I was born on the 5th of July 1934. I attended Government College Umuahia from 1948-53, then the University College of Ibadan from 1953-1955. Thereafter I went to Queens University Belfast, 1955-1958 where I obtained my Bachelor of engineering degree. Then I spent a year in Holland attending a one-year course in Hydraulic Engineering. I came out with a diploma in Hydraulic engineering. I went back to Queens University Belfast did a master in Civil Engineering, specialized in pipe foundation. Then I came back to Nigeria to work briefly with the Niger Delta Development Board as their Civil Engineer, Hydrologist. I went to ABU in 1963 as a lecturer. I was there till 1966 and left as a result of civil war and I had a short stay at the University of Nigeria from December 1966-1967, I had to run again because of the civil war. I finally went to Lagos where I worked in the Federal Ministry of Works, Housing, Materials and Research Division. In 1969 I left for Canada to the University of Western Ontario, where I did my PhD on foundation, especially Vibration and partially embedded foundation. I came back to Rivers State in 1971; worked with Shell until 1973 when I left for Rivers State College of Science and Technology (now RSUST). I was there until 1978, and then I resigned and went into private practice. I was in private practice until 1989 when the call of duty came, and I served as a Resident Electoral Commissioner here in Rivers State, Kaduna State, Niger State and finally Adamawa State where I was one of those who conducted the now famous June 12th 1993 election. After the election I came back and continued with my consultancy practice until 1998 when I went back to the University of Port Harcourt as a visiting professor. Finally left in 2003 and since then I have been in engineering consultancy practice not too vigorously but enough to keep me in touch with the profession. Briefly that is my life history.



Sir George Eze & Dr A. Ujile with Prof. Y. Beredugo

E- Newsletter: *Thank you very much. Based on your experience, what is your opinion on the causes of structural failure we experience in Nigeria? (Collapse buildings, overhead water tanks etc.)*

Prof: My little experience with failed structures are improperly designed foundation, secondly, use of sub-standard materials, thirdly, unqualified personnel being employed to design some of these structures, to supervise the construction of these structures and to participate in the actual construction of these structures. Now you will find that private buildings are constructed without any sub-soil investigations and designers simply assume bearing capacity value and design the structure. Soil is a very variable material. Therefore for any structure above a bungalow, a sub-soil investigation should be carried out by a qualified geo-technical consultant. Geologists are very good in this area because of their substantial knowledge but their knowledge stop with the identification of soil types but when you come to the usage of these soil types, I'm afraid they are lacking. Secondly, sub-standard materials: The blocks we are using are not normally tested to find out whether they possess adequate strength for use. The way they measure the mix is something else. If you observe in most building sites, they just pour sand and cement and mix with water without measurement. When you come to re-enforcement it's the same thing.

We have re-enforcement without any manufacturer's certification as to the strength of these materials. That is the construction side. Now when you come to the design, I'm afraid once again, unqualified people design some of these structures. Private people are not very keen on paying money to consultant to design structures for them. Some of them get draught men who will design these structures and in certain areas, wind load is a factor but very rarely do our designers take wind load into consideration when they are designing structures. But basically most of the failures I'm sure can be traced to these unqualified people who designed these structures and do the actual building. For example, years back along the East-west Road here in Port Harcourt a building construction was going and I noticed that the re-enforcement of the cantilever was placed at the bottom instead at the top. When I brought it to the notice of the contractor, he told me that he has been building for years and that's how its done and at times they even place it in the middle to make it stronger. I'm sorry to say, that the building collapsed. These are what I think that are responsible for collapsed buildings in Nigeria.

E-Newsletter: *Thank you very much. From your explanation, does it mean that engineering design calculations, building/construction codes are not properly considered by our Local Government Authorities who register and approve plans?*

Prof: With all due respect, except probably for Port Harcourt City Local Government most areas do not have qualified engineers. They have what they call superintendent of works and in most cases they are not qualified enough to certify the structural integrity or otherwise of the building. Owing to this fact, they are only interested in the payment of fees and anything goes. I'm also sorry to say that some engineers are not true to our profession. Because of the money they receive from all these draught men that prepare drawings, they go ahead to stamp their drawings. Basically as far as the approval is concern, I don't think that the Local Government are checking these drawings strictly.

E-Newsletter: *From your experience, is there any State or Local Government legislation authorizing experts to check drawings before construction?*

Prof: Plainly speaking, I don't know. But the Local Government has the responsibility to certify drawings for construction. They are expected to approve the drawings. In the good old days, there was the City Engineers, whose duty is to approve drawings. As a result of delay in approval, during Obasanjo's first regime, a directive was given that if drawings were not approved within three months, one can go ahead and construct. However it is the responsibility of local government to approve drawings. This approval entails making sure that the design is safe. But the problem is that most Local Government Engineers are not qualified engineers, not even technologist but quantity surveyors, architect etc.

E-Newsletter: *Based on the numerous structural failures, does it mean that our building and construction codes in Nigeria are not being applied or our attitudinal behavior that is responsible for the problem? Or our Local Government areas are not aware of the existing codes of practice?*

Prof: Fortunately, we have few standard codes of practice in Nigeria. Lagos City Council then had a building code but I doubt whether other states have building codes. It is as a result of this that the Nigeria Society of Engineers in collaboration with the Nigerian Standard organization is now undertaking a program to prepare codes of practice and standards for Nigeria. However, we used British Standards

when Nigerian standards were not available. The only standard I know of is NCPI code of practice for the use of concrete in building. It was prepared by the Nigerian Society of Engineers and it was a working stress method. We were in the process of trying to develop limit design code of practice but we didn't succeed in producing one. So for the moment we use mainly British codes. But conditions here are quite different from what is obtainable in Britain. For example, the British codes for concrete are based on the strength of the concrete at 28 days. Whereas in Nigeria the strength of the concrete can be different based on our climate. In fact experience has shown that within seven days short-rings can be removed from concrete mix. Our University teachers should do the basic ground work and bring recommendations that will enable our developers apply the local standards and codes.

E-Newsletter: *Do you think seven days is really proper for us to remove short-ring?*

Prof: Short-rings can be removed after 3days no matter the volume and capacity involved.

E-Newsletter: *Will you still attain the same working strength?*

Prof: Yes, Provided the concrete is properly mixed. That's another problem. It is quite safe to remove the short rings after 3days. The 7days strength I'm talking about is that instead of basing our design on the strength of concrete at 28 days, there is no reason why we can not base our design on strength of the concrete at 7days.

E-Newsletter: *Are you saying that 28days is the maximum?*

Prof: Not the Maximum but at 28days you find that the curve is reasonably flat up to 3months. You will find that increase of strength is minimal. And after 90days there is even sometimes a slight drop in strength. Whereas under Nigerian condition, after 7days, it's almost flat. I think we can explore the possibility of using the development of strength here in Nigeria in our codes instead of using the one in Britain. You do not reinvent the wheel. We have other countries having similar tropical climatic conditions; we should look at their codes and try to harmonize the codes of practice. We heard that European countries are now developing Euro code, so that the whole of Europe will use one code since they have similar climatic conditions. Similarly, we should be able to collaborate with other countries in Tropical Africa and develop a code of practice which can be used throughout Tropical Africa. I'm happy that NSE is very serious with the development of the new codes and the divisions are to prepare codes for their relevant areas of specialization.

E-Newsletter: *Don't you think it is necessary to carry out assessments to know actual causes of failure and to prevent future occurrences?*

Prof: NSE has a failure investigation committee that investigates all failures that occur and one would expect that we learn from these failures. In Engineering, failure is not a disorder which you think it is, because we learn from the failures. Failure does not occur only in Nigeria, it cuts across the whole world. We jokingly made the statement that when you look at the various professions medical doctors burry their mistakes, Lawyers live by their mistakes, but Engineers are buried by their mistakes. So talking of the risk factor, I believe we have a cost engineering division and recently there have been some problems between cost engineering division and the Nigeria Institute of Quantity Surveyors, because the Quantity Surveyors usually are just concerned with buildings and anything that has to do with real measurement, they are not interested. Somewhere along the line, they are trying to encroach on the Engineering area. They are claiming that they are the people to value machinery whereas, that's the responsibilities of the Mechanical Engineer, Electrical Engineer, and the Cost Engineer. So I hope that the Cost Engineering division will take up these issues of risk management and come up with a solution which can be embedded into the codes of practice which are now being prepared.

E-Newsletter: *Thank you so much for the experiences you have shared with us and we strongly believe that our audience, the reading public will enjoy it. But all the same we will like you to strike a little more on what should be done to actually enable the people who build houses or structures to ensure that soil investigation is carried out.*

Prof: I think this is a matter for the Local Government. Each Local Government should enact a By-law requiring sub-soil investigation to be carried out for any building beyond a bungalow by a qualified Geotechnical Engineer; and the requirement for approval is that you have a sub-soil investigation report. Another thing is that total settlement is not very dangerous, it is not good, it can make the structure unserviceable, but the dangerous one is the differential settlement. If one side of the structure settles more than the other then you get structural failures and your structure can collapse or your structure can become unserviceable. Other factors are quick sand, ground water level and the type of ground water. All these are contributing factors to the failure of structure. And I strongly believe that our Local Governments should enact bye-laws for any building beyond a bungalow.

E-Newsletter: *Once again thank you very much.*



EXCO Meeting for the month of August in session.

NSE PH BRANCH TECHNICAL VISIT TO ALADJA STEEL PLANT



JMD explaining DSC operations. with NSE PH to his left and DSCL Management staff to the right



Engr. Dr. Olie GM SMS Explaining Mill Operation with a sample

The details of the visit would be published in subsequent edition.

COREN 17TH ENGINEERING ASSEMBLY:

THEME : *VALUE FOR MONEY IN ENGINEERING PROJECTS: THE ROLE OF ENGINEERING REGULATION.*

VENUE: *INTERNATIONAL CONFERENCE CENTRE. ABUJA. DATE: 23RD-24TH SEPT, 2008.*

REGISTRATION FEE: #12,000. PRE-REGISTRATION: #15,000. AFTER 22ND AUGUST, 2008. TECH & CRAFTMEN : #6,000 FLAT.

PROGRAMME OUTLINE: DAY 1: 9:00AM-OPENING CEREMONY, 12:00PM: TEA BREAK, 1:00PM: TECH SESSIONS, 7:00PM: DINNER.

DAY 2: 9:00AM TECH SESSION, 12:00PM: TEA BREAK, 12:30PM: TECH SESSION, 2:00PM CLOSING

NOTICE! NOTICE!! NOTICE!!!

All members of NSE PH should pay their **annual branch dues** of N4000 and **compulsory levy** of N5000 towards the Engineer Resource Center to UBA ACC. NO: 0802080000194 (Port Harcourt main Branch). Also pay **National Annual Subscription** of N5,500.00 directly to AFRIBANK ACC No. 1420202215613 & forward all tellers to the secretariat for reconciliation. All payments should be made at the Bank