PROFESSIONALISM AND ROLE OF MINING ENGINEERS IN DIVERSIFICATION OF NIGERIAN MINERAL SECTOR.

TOPIC:

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Being a speech delivered at the public Lecture/Investiture of Engr. (prof) D.O.N Obikwelu, SPX, FNSE as the 8th National Chairman of Nigerian Society of Engineers, Metallurgy, Mining & Materials Division on Thursday 28th September, 2017 in Abuja.

BY

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PROTOCOL

I feel highly honour and privilege to be invited as Guest speaker to the 8th public lecture /investiture of Nigerian Society of Engineers, Metallurgy, Mining & Materials Division (M3). I wish to congratulate our newly Chairman and commend the members of the division for sustaining the spirit.

When a guest speaker is given the option to choosing a topic, the expectation is high and more challenging as opposed to having a topic thrust on him by the convener, this is obvious, as one would be grappling with numerous potential topics at the same time and at the end of the day, one would still be wondering whether the final choice of the topic was indeed appropriate.

As we are celebrating the new Chairman of our division, it is important as professionals Engineers, under the watchful eyes of our regulatory body remind ourselves having acquired the prescribed knowledge, skills and some attributes, must pay back to the society in one way or the other. We have professional's colleagues who contributed significantly but silently unnoticed to the development of our dear country. The society recognized who are brag the most are seen and those who shout the loudest are heard. Mining engineers are forced by training to look downwards into the earth and the surrounding rocks, and that may account for the faces not being easily identified and recognized. You may recall that the present administration agenda in minerals and metals sector gears towards reviving the sector from its state of dormancy, diversifying the economy from it attaining our industrialization. This desired result cannot be achieved without the right professionals and enforcement of professionalism in the mining industry. It is the aggregate of the productive and creative talent of professionals that produces success and growth in any organization.

It is on this note, distinguished guests ladies and gentlemen, I hereby introduce my topic for today which I have captioned:

PROFESSIONALISM AND ROLE OF MINING ENGINEERS IN DIVERSIFICATION OF NIGERIAN MINERAL SECTOR.

NATIONAL DEVELOPMENT

The broad classification of nations into DEVELOPED and DEVELOPING based on the key parameters of economic performance and prosperity. Since the Industrial revolution of the 18th century, industrial growth has remained the major yardstick for the determination of economic well-being and development of any nation. Mankind were blessed with natural resources which when exploited and utilized improved the living standard of mankind. Among the natural resources include Oil and Gas, Solid minerals and Water.

The resources are converted to raw materials for industrialization, exploited to generate revenue that has sustained national economic growth and development, through the following;
- Industrialization is the engine that promotes economic growth and development
- Enablers are resources and technology
Minerals resources are unevenly distributed that is why some nations are richly endowed in resources than others. The presence of the resources does not translate to economic growth and development. The resources must first be discovered, exploited, developed and improved for any meaningful growth to be recorded. The success recorded by the developed economics or developed nations can thus be captured under the following broad indices:

- Human capacity building and utilization
- Natural resources development
- Discipline and respect for core values of accountability, transparency, honesty, mutual respect etc
- Effective leadership

From the National Universities Commission website, there are a total of 40 Federal universities in Nigeria. There 38 recognized and licensed State Universities in Nigeria today. There are 50 private owned universities in Nigeria, totaling 125. About 50 of these offer geosciences education, only two universities offers mining engineering degree courses. Similarly, of the 51 existing polytechnics, the Federal government owns 17, state governments 27, while 7 are privately owned, and only 6 polytechnics offer mining and mineral processing engineering diploma courses. The number of mining engineers graduated from the University is about twenty students per annum and the Polytechnics graduated about fifty students per annum.
Regulation

Regulation is defined as a law, rule, or other order prescribed by authority, especially to regulate conduct, practice or profession. It is also defined as laws through which governments can control privately owned businesses. The act of regulating or the state of being regulated, a principle, rule, or law designed to control or govern conduct, a governmental order having the force of law. Other definitions abound.

Profession

A vocation requiring knowledge of some department of learning or science, the body of persons engaged in an occupation or calling, e.g. the Engineering Profession.

PROFESSIONALISM IN THE MINING INDUSTRY

- Professionals have the ability to steer positive growth and spell success in any organization. They encourage team spirit and are totally committed to using their intelligence, education and other abilities to help solve many problems facing the industry.
- The presence of professionals moulds a culture where work is of prime importance.
- Every minute of professional's working schedule is focused on bringing exceptional results of the industry.
- Professionals are open to the ideas of others and have confidence in their decisions backed wit data. They work for the interest of their employers or clients and take pride and obtain personal satisfaction in their work.
- Professionals are constantly challenged and are always looking for solutions to existing technology. They are able to overcome many obstacles and use adverse situations as an opportunity instead of a problem.
- A professional environment provides a good breathing space and enough opportunities for people to grow.

Engineering Profession

It is that profession which is involved in the planning, designing, composing, evaluating, advising, reporting, directing or supervising that requires the application of engineering principles and that concerns the safeguarding of life, health, property, economic interests, the public welfare or the environment, or the managing of any such act.

Regulating the Engineering Profession

Regulation in the engineering is established by various jurisdictions of the world to encourage public welfare, safety, well-being and other interests of the general public, and to define the licensure/registration process through which an engineer becomes authorized to practice engineering and/or provide engineering professional services to the public.
ROLE OF ACADEMIA, INDUSTRY AND PROFESSIONAL BODIES IN PROMOTING AND ENFORCING PROFESSIONALISM IN MINING INDUSTRY

ROLE OF ACADEMIA

- Academia has the responsibility of recognizing the needs and problems of the mining industry and identifying, recruiting, and motivating the kinds of individuals who will make positive contribution as a faculty member, specialty engineer or a line manager.
- It is the professor’s responsibility to instill in their students the idea that professionalism occurs not only in the offices, but also at mines.

ROLE OF INDUSTRY

- Engineering and geosciences graduates employed by the mining industry must be challenged and motivated to quicken their innovative and creative spirit. They require much more experience to attain the necessary standards.
- It is the industry’s responsibility to allow development of this talent and provide the professionals with a work environment where their education can be applied every day.
- In addition, the professional employee has the responsibility to keep up with rapid developments in the mining industry. Personal development programs, active participation in professional societies, and in-company transfers and promotions should be used to optimize the professional’s talents.

ROLE OF PROFESSIONAL BODIES

COREN MANDATES

Council for the Regulation of Engineering in Nigeria, COREN, was established as a statutory organ of the Federal Government of Nigeria by Decree No. 55 of 1970 as amended by Decree 27 of 1992, now Engineers (Registration etc.) Act, CAP E 11, 2004, which empowers it to:

- Regulate and control engineering practice in Nigeria in all its aspects and ramifications;
- Ensure that engineering is practiced by industry, government and professionals according to acceptable and prescribed standards and abiding by the ethics and cannons of the profession;
- Ensure appropriate training and use of engineering personnel and execution of engineering jobs by:
  (a) Ensuring that only registered engineering personnel are involved in the execution of engineering jobs;
  (b) Ensuring that only registered engineers head engineering departments and units;
  (c) Ensuring that only registered and licensed engineering firms are allowed to undertake engineering jobs;
  (d) Ensuring that opportunities for ‘Continuing Professional Development’ are provided for engineering personnel;
  (e) Ensuring that without proper registration with COREN, engineering personnel do not progress or function beyond legally prescribed levels.
  (f) Ensuring accreditation of engineering programs in Nigerian Universities.
COMEG MANDATES

Council of Nigerian Mining Engineers and Geosciences (COMEG) was established by decree No. 40 of 1990, and the first council was inaugurated in September 2000. COMEG is a regulatory body for all professionals in the extractive industries, which undoubtedly, constitutes the backbone of the nation's economy. These professionals include:- Geologists, Mining Engineers, Mineral Engineers, Petroleum Engineers, Metallurgists, Petroleum Hydro geologists, Hydrologists, Geochemists etc.

The enabling act establishing the Council of Nigerian Mining Engineers and Geoscientists (COMEG), act no. 40 of 1990, charges the council among other duties, in section 1-(2)(a) with "...prescribing and enforcing minimum standard of education and experience to be obtained by persons qualified to practice as registered Mining Engineers and Geoscientists." And in section 1-(2)(c) "... and reviewing those standards, from time to time as circumstances may require."

Also in part V, entitled "Training", Section 13 of the Act empowers council to approve courses; section 14 confers on Council powers for the supervision of institutions and examinations leading to approved qualifications, and section 15 stipulates power of Council to consider and report upon all matters relating to the professional and technical training and other qualifications required for admission to the profession (Chambers, 2013).

At the 7th induction ceremony and 1st geosciences and mining assembly held on Thursday, 24th October 2013, the number of registered Geologists, Mining Engineers, Metallurgist and Mineral Engineers by Council of Mining Engineers and Geosciences certified to practice is two thousand and twenty three (2023) of which two hundred and twenty six (226) are mining, metallurgist and minerals engineers compare to one thousand eight hundred and seventy two quarries (1,872), four hundred and three small scale mining operations (403), two hundred and two mining leases (202), eight hundred and forty five artisanal small mine cooperatives (845) and two thousand five hundred and forty exploration licenses (2,504) totaling 5,339 licenses valid issued licenses. All the certified registered professionals cut across the academic line, industries, and investors

MINING ENGINEERS: ROLES AND RESPONSIBILITIES

Who is a Mining Engineer?

A Mining Engineer is a professional who applies scientific knowledge and experience gained by study and practice to make minerals of economic value from earth's crust available safely for the benefit of mankind. In the process other disciplines are utilized.

From the definition above it could be seen that the mining engineer is a unique specialist who has the complicated role of using other engineering personnel as well as other normal disciplines to effect the state and economic extraction, processing and sale of mineral raw materials for use in industry, for any mining operation to succeed he MUST be involved fully from the beginning to the end. Because the activities in solid mineral sector have increased dramatically, the role of mining consultants has now become much more obvious. Because there are a lot of other service that the mining engineer requires to successfully carry out his operation, his discipline becomes very specialist and no one else can successfully carry out such function. The services of mining consultants are needed at all time but during a period of economic stabilization like now, his service are needed. This is so because there is no room for wastage of fund. The mining engineer is trained to handle all resources input prudently so that his operations are economic and safe. The economy of the country, to us is not depressed but it is being stabilized and harnessed. The mining engineer is trained at all time to work under strict economic condition and safely.
Mining operation is risky. This is because the process of looking for the deposit and finding out whether it is viable or not is risky, takes a long period. Also consumption patterns are subject to sudden changes which the producer has no control over. Also there are host of other factors that can adversely affect the economics of a mining project.

Mining operation are normally capital intensive. It is duly the mining engineer that has the training that will enables him to choose the correct equipment and material handling process that is the best for the type of deposit and minerals.

Safety is a key factor when planning a mining operation. Safety cost money and is normally a key integral consideration towards the planning of a mining operation.

SERVICE NEEDED BY THE MINING ENGINEER

The Geologist

After carrying out the initial and exploration work to detect the presence and 'out line' of the deposit, the mining engineer takes over and supervised the final serious ore reserve delineation work the classification of such ore reserve is arrived at. Based on that, the mining engineer plans the mine and goes through the various stages till production start. At that stage the service of a MINING geologist is required to provide the mining engineer, the Geologist control of deposit as mining is carried out.

Chemical Engineers

Mineral samples from the exploration sites are analyzed by chemist to know the chemical composition and physical properties.

Environmentalist

Environmental Impact Assessment (EIA) must be conducted and a report submitted before the mining operation commence.

Mechanical Electrical and Civil Engineers

After the mining engineer has decided on the equipment he need for the mining operation, these professionals then come in and design and or recommend the appropriate equipment. The mining engineer selects the correct ones and then installation and construction of infrastructure is carried out. After the commission, maintenance of the various equipment and infrastructure is carried out by the various engineers. Provide survey service as well.

Economist

When the reserves have been obtained a mining economist examines the reserves and ascertains the calculation. Texts the availability of the reserve by arriving at limit of pay ability (LOP) based on all the necessary inputs. The LOP changes with any changes in the cost of operation including capital. He carries out other economic, financial analysis based on the mining engineer’s needs for financiers.

Financiers

The mining engineer proposes a financial plan in the form of a feasibility study to financiers. The financiers should have their own mining consultants that can ascertain the various technical inputs.
General Service

The mining engineer needs the service of all other discipline that is normally needed in any going enterprise; such service will include accounting, Personnel management, health and welfare and public relations, etc.

STAGES OF A MINING OPERATION

In the current Nigerian context, the stages that successful mining operations have to go through include:

(i) Having a duly registered company and entering into the industry. The permission to enter into industry will not be given unless you have a MINING ENGINEER or Geologist.
(ii) Acquisition of mining titles in liaison with local community, mining Engineer/Geologist.
(iii) Prospecting of the titles by GEOLOGIST/MINING ENGINEERS.
(iv) Ore Reserve calculation by mining engineer
(v) Prefeasibility study by MINING ENGINEER
(vi) Design of mine and mining operation based on prospecting result related to soil strata characteristic by MINING ENGINEER
(vii) Selection of equipment based on criteria above by MINING ENGINEER.
(viii) Acquisition of equipment by other engineers.
(ix) Construction and installation of equipment and infrastructure by other engineer update feasibility study by MINING ENGINEER.
(x) Commissioning of mine operation by MINING ENGINEERS
(xi) Running of the mine by MINING ENGINEER monitoring of operation based on feasibility study by Mining Engineer
(xii) Processing of mine product by PROCESSING ENGINEERS.
(xiii) Marketing and sale of finished product by MINING AND PROCESSING ENGINEER/MARKETERS.

During the stages of mining operation above, it is seen that the mining Engineer has to cope satisfactorily in the field with the following to ensure that the mineral is extracted and processed safely and economically.

I. Techniques of Operations/Extraction and Processing;
All machines and equipment must be working properly and performing based on feasibility study.
II. Liaison with Local community MUST be cordial otherwise economic and safe operations cannot take place.
III. Compliance with law; the operations in the field must comply with the mining laws and the workers must operate under the laws of the country. Safety is paramount.
IV. Welfare; this is very important issue that is often ignored. Enhanced welfare of the workers will enable them give you enhanced performance.

THE MINING CONSULTANT

The mining consultant must be a mining engineer who has enough knowledge and experience to advice on all issues that relate to the operations in the mining industry. As enumerated above, he is a specialist in the mineral industry no one is.

He should be able to advice and guide any new comer appropriately to ensure that the stages are well understood. There is no room for speculations.
LIKELY AREAS FOR CONSULTATIONS

New Comers

i. These groups' needs to be properly advised on the totality of the operations from entry through the processes enumerated in the stages of mining operation above, to the sale of products and the market potentials.

ii. The consultant should use his experience to cause the new comer to see areas where some costs should be saved instead of emphasizing on the capital intensiveness of mining.

iii. He should be told that he should as far as possible find the operation right to prosecuting from his own source of funds and not from borrowed funds. The consultant should maximize his earnings after the reserves are known and deposit viable.

iv. Relationship with local inhabitants is very important and this should be checked out very early.

Clients already in the industry;

i. There may be the need for a feasibility study. In that case, the deposit must be tasted through the appropriate prospecting method to ascertain accuracy of reserve and to obtain criteria for choice of mining method and mine design as well as equipment selection.

ii. Advice to start from the point the project has reached i.e prefeasibility or feasibility study

FEASIBILITY STUDIES

Feasibility studies on a mining project relate directly to the ability to extract, process and sell the mineral economically and safely. This MUST be accurate. The other services are just as important and must be looked into in details and seriously.

The study must be taken seriously enough so that if as a consultant, the client wishes you to implement it, you should accept happily bearing in mind that if failure is arrived at during implementation, provide all the provisions in the study are met, you should be held responsible.

Financial institutions need a bankable feasibility study; the report should ensure accurate reserve estimation.

The operation can be monitored using the feasibility study and also improve on the accuracy of the available data.

CHALLENGES

- Lack of Mining and Mineral processing Engineers
- Inability to regulate effectively especially as it relates to quacks by the Professional bodies
- Low confidence of Engineering Personnel with COREN.
- The incursion of foreign firms dominating Engineering jobs in Nigeria.
- Low motivation arising from poor Emolument for members of Engineering Family.
- Lack of awareness on the important of the mineral sector.
- Inadequate facilities for training.
- Similar Professional Associations.
- Lack of understanding among the regulatory function of COREN and Council of Nigerian Mining Engineers and Geoscientists (COMEG).

CONCLUSION AND RECOMMENDATIONS

As professional Engineers it is our duty to regulate engineering practice in all its aspects and ramifications, involved in the monitoring of all engineering activities across the country. The role of professionals in the
The exploitation of minerals resources for industrial development has been highlighted in this paper. The mineral resources have not been properly delineated and reserves have not been worked out. With the Government increased interest in the sector by allocating more funds to the sector. The Engineers and Geoscientist have to be conscious at all times of their critical roles and must apply modern techniques and show professionalism in their approach to work. This is necessary with increasing demands for metallic and the non-metallic materials by the emerging metallurgical and materials processing industries in the World. Mining is a specialized and complicated operation and a professional is trained to carry out the operation safely and economically is no one else than mining engineer.

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