



The Nigerian Society
of Engineers

*in
collaboration
with*



United Nations Industrial
Development Organization
(UNIDO)

2023 NATIONAL ENGINEERING CONFERENCE, EXHIBITION AND ANNUAL GENERAL MEETING “ABUJA 2023”

THEME:

**RE-ENGINEERING
THE MANUFACTURING SECTOR
FOR COMPETITIVENESS AND
ENHANCED ECONOMIC GROWTH**

Venue:

International Conference
Centre, Abuja

Date:

27th November -
1st December, 2023

BOOK OF ABSTRACTS



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OF
THE NIGERIAN SOCIETY OF ENGINEERS (NSE)
2023 CONFERENCE
VENUE: INTERNATIONAL CONFERENCE CENTRE, ABUJA
DATE: NOVEMBER 27TH – 1ST DECEMBER, 2023

**WELCOME ADDRESS BY THE PRESIDENT OF THE NIGERIAN SOCIETY OF ENGINEERS
AT THE OPENING CEREMONY OF THE 2023 ENGINEERING CONFERENCE,
EXHIBITION AND ANNUAL GENERAL MEETING**



Dear distinguished delegates, It is with great honour that I welcome you to the 2023 National Engineering Conference, Exhibition and Annual General Meeting of the Nigerian Society of Engineers (NSE), tagged ABUJA 2023. The annual flagship event of our great Society is a platform for discourses that not only enhance the professional competence of the Engineers but also contribute to the economic growth and development of our nation, Nigeria and, by implication, the advancement of technology worldwide. It is the largest convergence of Engineers from across Nigeria and the Diaspora, for the purpose of learning, networking and recreation. This year's conference will be inciting as the planning committee has worked assiduously to assemble programmes and technical papers that will provoke thoughts on the salient and inherent issues around the theme and sub-themes of the conference.

The theme of this year's conference is **"Re-engineering the Manufacturing Sector for Competitiveness and Enhanced Economic Growth"**. The theme of the conference was informed by the continuing decline of activities in the manufacturing space of Nigeria's economy. Nigerian Engineers are concerned about the gradual erosion of the little record Nigeria had on her non-oil export performance in the 1960s and 1970s. There were once days of export of textile, coal, tyres, hides and skin, and many other products from Nigeria. The rubber plantations in the South have disappeared, the coal mines in the East are no more, the textile hubs in Kaduna and Kano are moribund, and so is the tannery industry across the North. Many international conglomerates that bolstered the manufacturing sector of Nigeria's economy at some points have wound up their businesses and left. Therefore, the manufacturing sector which has traditionally played an important role in driving economic growth has been faced with increasing challenges of shortage of skilled labour, regulatory burdens and lack of investment in technology and infrastructure. The saddest narrative in the manufacturing trajectory of Nigeria is the gigantic Ajaokuta Steel Manufacturing Company, a government-owned concern that should have been the fulcrum on which manufacturing activities revolved, never rolled out one length of steel since it was built. I will leave further discussion on that to the experts that will be deliberating at the technical sessions of the conference.

According to a ResearchGate report, the manufacturing sector contributed 14%, 19.02% and 15.70% of Nigeria's nominal GDP in 2021, 2022 and the first quarter of 2023 respectively. In terms of real-time growth, the manufacturing sector recorded a real GDP growth of 2.31% in the first quarter of 2023, 2.35% in 2022 as against 3.35% in 2021, which revealed a reduced productivity in the sector. Recognising that transforming the manufacturing sector is critical for driving economic growth by stimulating innovation and providing the roadmap for developing a skilled workforce, we struck an alliance with other critical stakeholders to execute the conference with greater impact.

Therefore, I announce that this conference is organized in collaboration with the United Nations Industrial Development Organisation (UNIDO) and the Manufacturers Association of Nigeria (MAN), with gargantuan support from Industrialists as BUA Group and other corporate organisations whose identity you can get from the logos in the composite banners around this hall. On behalf of the Council and the entire membership of the Nigerian Society of Engineers, I sincerely appreciate the support of BUA Group, our major sponsor, and our other partners for standing with us on this important patriotic assignment.

I thank you for listening and welcome you all once again to ABUJA 2023.

Engr. Tasiu Sa'ad Gidari-Wudil, FNSE
President



It is a great honour for me to stand before you this morning, on behalf of the Conference Planning Committee (CPC), to welcome you all – our distinguished guests and delegates – to this annual flagship programme, the *National Engineering Conference, Exhibition and Annual General Meeting* of The Nigerian Society of Engineers (NSE), holding here at the International Conference Centre, Abuja, FCT.

Having served in the same role in the past two conferences, I was overwhelmed at the opportunity extended once again to me by our dear Engr. **Tasiu Sa'ad Gidari-Wudil** FNSE, the President of The Nigerian Society of Engineers and, indeed, the entire Council, to lead the 2023 Conference Planning Committee yet again. I am grateful for the rare privilege.

The 2023 edition, which aptly highlights “*Re-engineering the Manufacturing Sector for Competitiveness and Enhanced Economic Growth*” as its theme, offers delegates a gamut of opportunities to examine all the factors responsible for the declining state of the manufacturing sector of our nation. While having the ensuing engagements and conversations, it is expected that participants will succinctly analyse the socio-economic challenges as well as the current policy direction. It is expected also that we will amplify the indices for re-engineering the sector in order to meet the demands of the 21st century globalization structure and best industry practices, to achieve competitiveness and enhanced economic growth for our dear nation.

Apart from its almost equidistant location from the fringes of Nigeria, the Federal Capital Territory offers lots of proximate advantages that should promote a closer interface of industry professionals with a fairly new national government that is committed to its “*Renewed Hope Agenda*”. There is no doubt, therefore, that participants and critical industry stakeholders at this conference would take full advantage of the opportunities that beckon, to make vital contributions that would engender more confidence by strengthening the stakes of policy implementation in the manufacturing sector of our nation's economy.

More than ever, I am certain that at the appropriate time, the President of our Society would cheerfully further welcome our **Distinguished Guest of Honour**, President of the Federal Republic of Nigeria, His Excellency, **Bola Ahmed Tinubu**, GCFR; the **Special Guest of Honour**, Vice President, Federal Republic of Nigeria, His Excellency, Sen. **Kashim Shettima**, GCON; His Excellency, Senate President, Senator **Godswill Akpabio**, CON, FNSE; our **Host**, the Honourable Minister of FCT, His Excellency, **Nyesome Wike**, CON as well as our **Keynote Speaker**, Alhaji **Abdulsamad Rabi**, CON and host of other Dignitaries.

Please permit me at this point once again to welcome you and to wish all our guests and delegates a fulfilling deliberation.

A handwritten signature in black ink, appearing to read 'Etido Inyang'.

Engr. Etido Inyang FNSE
Chairman, Conference Planning Committee

PREFACE FOR NSE 2023 ANNUAL CONFERENCE

PREFACE TO 2023 NSE CONFERENCE BY CHAIRMAN TECHNICAL COMMITTEE

It is yet another Annual Conference and General Meeting (AGM) of the Nigerian Society of Engineers holding again in Abuja at International Conference Centre (ICC). As a tradition, of the conference, Engineers, Researchers, Academia, industrialists, Policy Makers, Legislatures, Local and foreign investors, Development partners and experts from all walks of life would converge in the beautiful capital city of Nigeria, Abuja, between 27th November to 1st December, 2023 to critically deliberate on this year's conference theme titled **"Re-engineering of the Manufacturing Sector in Nigeria for Competitiveness and Enhanced Economic Growth"**. The manufacturing sector plays a pivotal role in the economic development of any nation, and Nigeria is no exception. As the largest economy in Africa, Nigeria's manufacturing sector holds tremendous potential for growth and economic transformation. However, to unlock this potential, there is a need for a comprehensive re-engineering of the sector to enhance its competitiveness and contribute significantly to the nation's economic growth. In the context of Nigeria—a nation endowed with abundant resources, a sizeable youthful population, and vibrant entrepreneurial spirit, with potential for immense robust and dynamic manufacturing sector. Realizing this potential requires concerted efforts to re-engineer our manufacturing landscape, addressing challenges, embracing modern technologies, and fostering an environment conducive to innovation and growth.

The 2023 conference aims to bring together academics, industry experts, policymakers, and stakeholders to explore strategies and solutions that will catalyze the revitalization of the Nigeria's manufacturing sector. The theme of this conference could not be more timely and significant. In the Nigeria's economic landscape, the manufacturing sector holds a unique and central role. Its vitality is not merely confined to the generation of industrial output; it extends to job creation, technology transfer, and the overall advancement of the nation's socio-economic fabric. Hence, the deliberation on strategies to enhance its competitiveness and stimulate economic growth is not just a matter of academic curiosity but an imperative for national development.

Manufacturing, as an engine of economic growth, has the potential to propel Nigeria towards the realization of its developmental goals, including poverty reduction, increased export diversification, and improved living standards for its citizens. However, achieving this potential requires a comprehensive and multidimensional approach that encompasses policy reforms, technological advancements, human capital development, and sustainable practices.

EFFECT OF STEEL FIBRE REINFORCEMENT ON THE COMPRESSIVE STRENGTH OF NATURAL AGGREGATE CONCRETE

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ABSTRACT

The goal of this research is to investigate whether steel fibre (extracted from waste tyre) has a significant influence on compressive strength of concrete produced using Natural Aggregate (NA). Iron molds measuring 150 x 150 x 150mm were used for concrete casting, they were demolded after 24 hours and cured in a curing tank for seven (7) and twenty-eight (28) days. The cubes were tested for compressive strength using a Universal testing machine. The results showed that concrete reinforcement using steel fibres improves the compressive strength of the concrete, allowing it to withstand fracture. The steel fibres were added in three different lengths (2, 4 and 6cm) incorporating three percentage (%) volumes (0.5%, 1% and 1.5%). The average compressive strengths of the fibre reinforced NA concrete with 0% volume of steel fibres (control mix) at curing ages of 7 and 28 days were determined to be 16.39 N/mm² and 19.64 N/mm² respectively. The highest 28 days compressive strength of 27.19 N/mm² was recorded with 4 cm fibre length at 0.5% fibre content which signified a 36.36% percentage gain in the 28 days compressive strength of the concrete.

Keywords: Natural aggregate, Steel Fibres, Compressive Strength, Reinforced Concrete