



Building world-class capability
for Nigeria and beyond

TECHNICAL PRESENTATION ANALYSIS OF METAL FABRICATION and GALVANIZING PROCESSES.

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About Us

Our Mission

- For Dorman Long Engineering Limited to be the leading Engineering, Fabrication, Asset Management and Galvanizing Company; offering high value engineering products and services to the Nigerian and the Sub-Saharan African market.



Our Vision

- To continually build a world-class Engineering, Fabrication, Procurement and Asset Management Company; offering competitive services to the oil and gas sector and other industries, within Nigeria and Sub-Saharan Africa.



The construction of the MADU Conductor Supported Platform (CSP) for the development of MADU field of OML 85.

About Us

- Dorman Long is an **EPC, infrastructure and supply chain service company** providing top-end services to the oil and gas, power, telecommunication and manufacturing industries.
- Operating in Nigeria for **75 years today**, it has over 450 direct staff (local and expatriates) operating across three core bases.
- Possesses **state-of-the-art facilities** with internationally recognised quality and product certifications.
- **Enviably track record** having executed a range of contracts for almost all oil majors, Telecommunication and energy services companies operating in Nigeria.



DORMAN LONG CORE BASE LOCATIONS

We operate our facilities seamlessly across three key locations in Nigeria:

Location	Idi-Oro	Agege	Nigerian Naval Dockyard
Description of Activities	Pressure Vessels, Structural Steel , Storage Tanks, Pipe Spools	Structural Steel, Pipe Spools, Hot dip Galvanizing.	Process equipment packages/module integration and marine structures fabrication, Pressure Vessels, Structural steel, Pipe Spools
Covered area (Sqm)	7,500	8,500	2,500
Open area (Sqm)	15,000	15,000	10,000

Business Scope

01

EPCI & Fabrication

02

Asset
Management/Field
Service

03

Galvanising and Protective
Coating

04

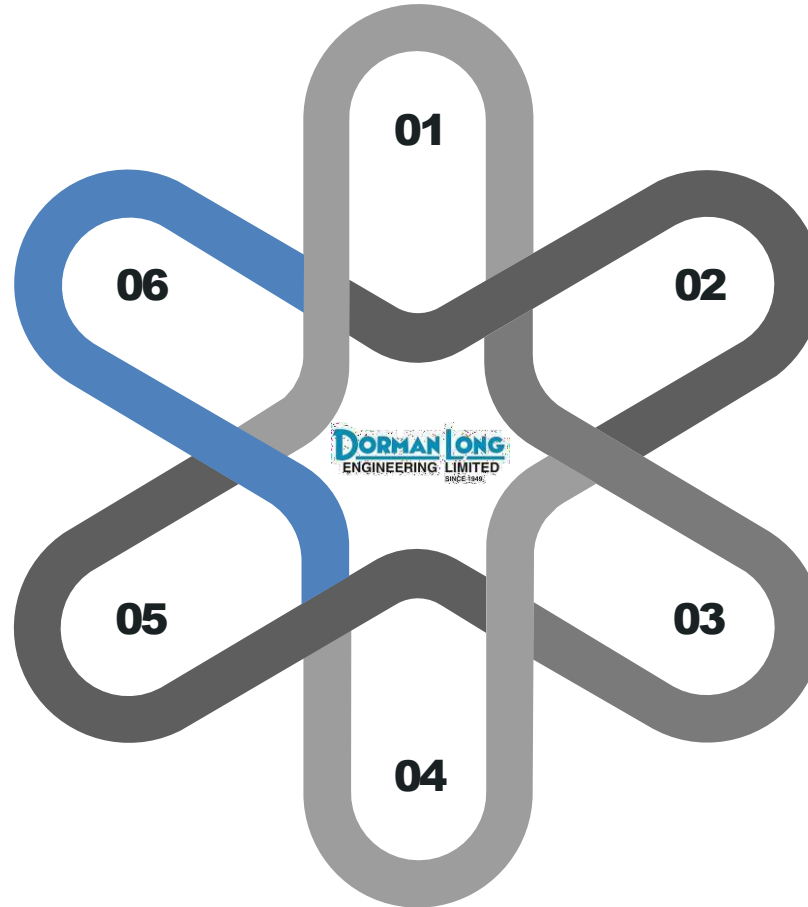
Engineering Services

05

Procurement and Logistics

06

Project Management



HISTORY OF METAL FABRICATION

What is Metal Fabrication?

Metal fabrication is the art and science of building metal structures by cutting, bending, and assembling processes. This intricate craft involves transforming raw metal materials into pre-designed shapes and products, showcasing a blend of technical skills and creativity. The process ranges from hand-wrought designs to high-tech, computer-aided creations.

How Did Metal Fabrication Evolve Historically?

Metal fabrication, a craft as old as civilization itself, has played a pivotal role in shaping the world we have today.

From ancient blacksmiths forging tools to modern industries shaping skyscrapers, the journey of metal fabrication is a testament to human ingenuity and technological advancement.

The story of metal fabrication begins in the ancient times when humans first discovered metals. Those period, simple techniques like hammering were used to shape metals into rudimentary tools and weapons.

HISTORY OF METAL FABRICATION

The Turning Point Revolution led to dramatic shift in metal fabrication.

The introduction of steam power and mechanization transformed the ancient way metal was processed. Technologies like the steam hammer and the rolling mill greatly transformed metalworking processes, making it possible to mass-produce metal products with unprecedented efficiency.

20th Century marked the Era of Automation and Innovation.

As the 20th century unfolded, metal fabrication saw a surge in technological innovations such as electric welding, such as metal inert gas (MIG), welding and tungsten inert gas (TIG) welding. Thereafter, technology evolved to Techniques like shielded metal, arc welding, and flux-cored arc welding. These are good precision and strength of metal fabrications.

The 21st Century: Advanced Technologies and Customization welding processes evolved making metal fabrication to take the forefront of technological innovation. Some of which are Computer-aided design (CAD) and computer numerical control (CNC) machining which allowed for precise and intricate designs that were once impossible. Processes like laser cutting and plasma cutting have brought about a new era of efficiency and accuracy. The industry now caters to a wide range of needs, from structural steel fabrication for construction to customized fabricated metal products for various industries.

HISTORY OF METAL FABRICATION

Over the years metal fabrication has remained a vital part of human development, constantly adapting and advancing to meet the needs of each era. From shaping simple tools to constructing modern marvels.

Conclusion:

Metal fabrication is a complex but innovative process for transforming raw metal into functional and aesthetic products.

Metal fabrication is an indispensable part of modern industry, offering versatility, durability, and precision. It enables the creation of a wide range of products, from everyday items to complex industrial machinery. The art of metal fabrication continues to play a crucial role in driving progress and innovation.

The advancement in technology, such as CNC machinery and various welding techniques, has significantly improved the efficiency and quality of metal fabrication. Despite facing challenges like material warping, corrosion, and precision errors, the industry continues to evolve with innovative solutions, maintaining its crucial role in the global manufacturing landscape.

STAGES OF METAL FABRICATION

What are the different stages of Metal Fabrication?

Metal fabrication isn't a single action but a combination of processes, each harmonizing to create a final product that meets your specific needs. Let's break down these stages:

- ❖ **Material Selection:** The journey begins with selecting the appropriate raw materials. Metals like stainless steel, aluminum, and brass, each with unique properties, are chosen based on the project requirements.
- ❖ **Designing:** Here, collaboration between the customer and the design team is key. Using CAD software, engineers draft the initial design, ensuring that every detail aligns with your vision and practical applications.
- ❖ **Process and Machine Selection:** Depending on the design, specific fabrication processes such as laser cutting, MIG welding, or CNC machining are chosen. The selection of machinery, whether it's a plasma cutter or a press brake, is crucial to achieve precision.
- ❖ **Fabricating:** This stage is where the actual shaping of metal occurs. Techniques like cutting, bending, welding, and assembling are used to bring the design to life. Each method, from shielded metal arc welding for joining to laser technology for cutting, plays a pivotal role.
- ❖ **Finishing and Quality Check:** The final touches involve finishing processes like powder coating or gritblasting, paint coating etc to enhance durability and appearance. A comprehensive quality check follows, ensuring the fabricated product adheres to the highest standards.

MAIN PROCESSES IN METAL FABRICATION

❖ **Cutting:**

Cutting is the foundational step in metal fabrication, shaping the raw material into manageable pieces, Two types are: Traditional and Modern Methods.

❖ **Bending:**

Bending is crucial for shaping metal without removing any material, essential for creating angles and complex forms.

❖ **Welding:**

Welding, a process fundamental to metal fabrication, involves the fusion of metal parts. This transformative method is vital in creating structures and components that are both strong and durable.

- **MIG Welding (Metal Inert Gas Welding):** A versatile and common method, MIG welding is used extensively in fabricating both thick and thin materials, suitable for a wide range of metals.
- **TIG Welding (Tungsten Inert Gas Welding):** Known for its precision, TIG welding is used for welding thinner materials and intricate shapes, requiring skilled welders.
- **Arc Welding:** This traditional form of welding uses an electric arc to melt metals at the welding point, suitable for heavy-duty metal fabrication jobs.

❖ **Punching:**

Punching, an efficient method in metal fabrication, involves creating holes or indents in metal using a punch and die. It's often utilized in high-volume production environments.

MAIN PROCESSES IN METAL FABRICATION

- ❖ **Forming:** Forming is another key process in metal fabrication, involving the shaping of metal under tension.
- ❖ **Machining:** Machining is the process of removing parts of metal to achieve a specific shape or design, crucial for creating components with high precision.
- ❖ **Finishing:** The finishing phase in metal fabrication is crucial for enhancing both the appearance and functionality of metal products.
- ❖ **Surface Treatments:** Common treatments include grit blasting, painting, and powder coating. Each method serves to not only improve the aesthetic appeal but also to provide a protective layer against corrosion, wear, and tear.
- ❖ **Importance:** A well-applied finish extends the lifespan of the metal product and can significantly enhance its resistance to environmental factors.

METAL FAB CHALLENGES & SOLUTIONS

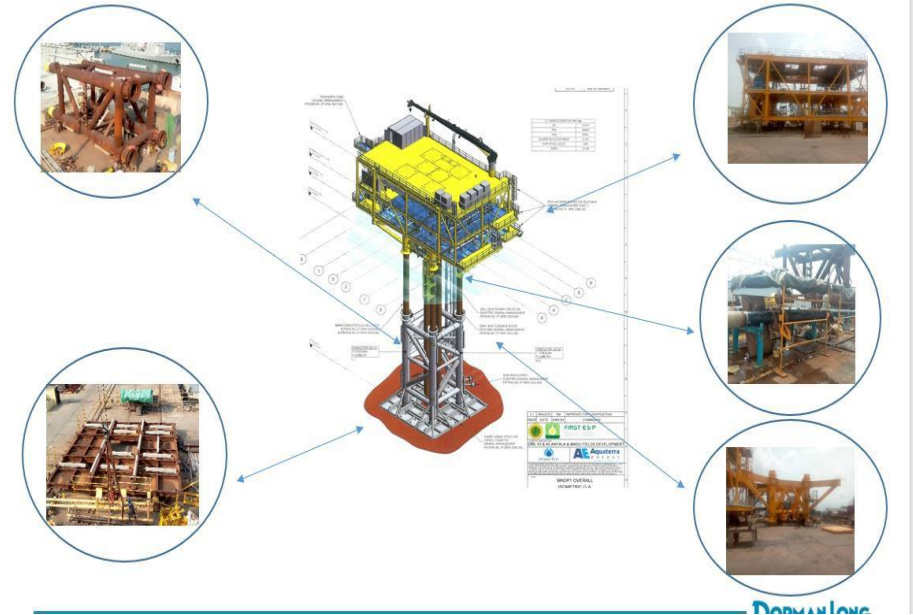
Challenges and Solutions:

- ❖ **Warping:** Caused by uneven heating and cooling. Solution: Controlled heating and gradual cooling processes.
- ❖ **Corrosion:** Exposure to elements leads to rust and deterioration. Solution: Use corrosion-resistant metals or apply protective coatings.
- ❖ **Material Fatigue:** Repeated stress causes weakening. Solution: Accurate stress analysis and using materials with high fatigue strength.
- ❖ **Precision Errors:** Inaccuracies in cutting or shaping. Solution: Utilize advanced precision tools like CNC machinery and ensure proper calibration.
- ❖ **Weld Defects:** Issues like porosity or cracks in welding. Solution: Implement proper welding techniques and use high-quality welding equipment.
- ❖ **Dimensional Inaccuracy:** Deviation from design specifications. Solution: Regular calibration of tools and rigorous quality checks.
- ❖ **Tool Wear:** Frequent use leading to tool degradation. Solution: Regular maintenance of tools and using high-grade, durable tool materials.
- ❖ **Surface Imperfections:** Scratches or dents during handling. Solution: Gentle handling and using surface protection methods during fabrication.
- ❖ **Assembly Difficulties:** Misalignment or fit issues. Solution: Precision fabrication and thorough testing of components before assembly.

CLASSICAL METAL FAB WORK PROJECT

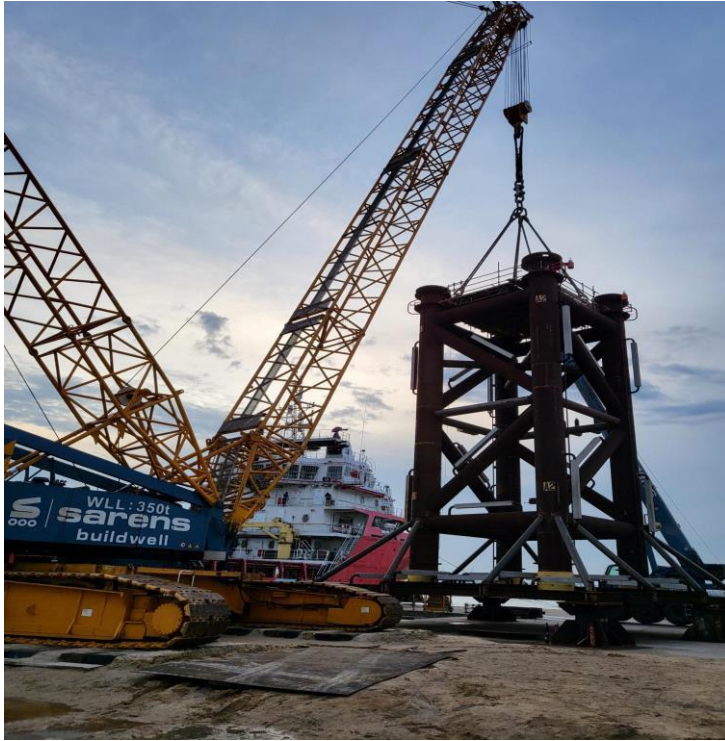


MADU CSP Overall Isometric G.A.



Conductor Supported Platform, is an unmanned wellhead production platform designed for oil and gas production with crude production capacity of about 40,000 to 60,000 bpd to boost Nigeria oil and gas economy. the project comprising three Main Modules (PDM, Production Deck Module, DDM, Drill Deck Module, & SSS, Sub-Sea Structure), and in addition the Conductor Piles, Rigid Riser Assembly and other Ancillary structures.

MADU Subsea Structure



Fabricated Wellhead Conductor Supported Platform Subsea Structures.
All leg cans rolled and welded by Dorman Long Engineering

Pressure Vessel Shell Plate Rolling



The principle of the rounding of the barrel section: The rounding of the barrel section is also called bending of plates (plate bending) or plate rolling, which is the basic manufacturing method of the barrel section. Plate bending machine is used to apply continuous and uniform plastic bending to the steel plate to obtain a cylindrical surface.

Pressure Vessel Picture Cont'd



Welding of Flanges to Boot Shell



Fit-up of Nozzle to Vessel Shell



**PROJECT: ABITEYE NAG DEVELOPMENT PROJECT.
CLIENT: CHEVRON NIGERIA LTD**

Pressure Vessel Picture Cont'd



Completely Fabricated Vessel

Overview of Facilities

DLE Agege Yard Facility equipped with CNC Machines, Galvanizing Plant, Heavy Fab Shop



Fabrication/Galvanizing Facility, Oko-Oba,
Agege - Lagos

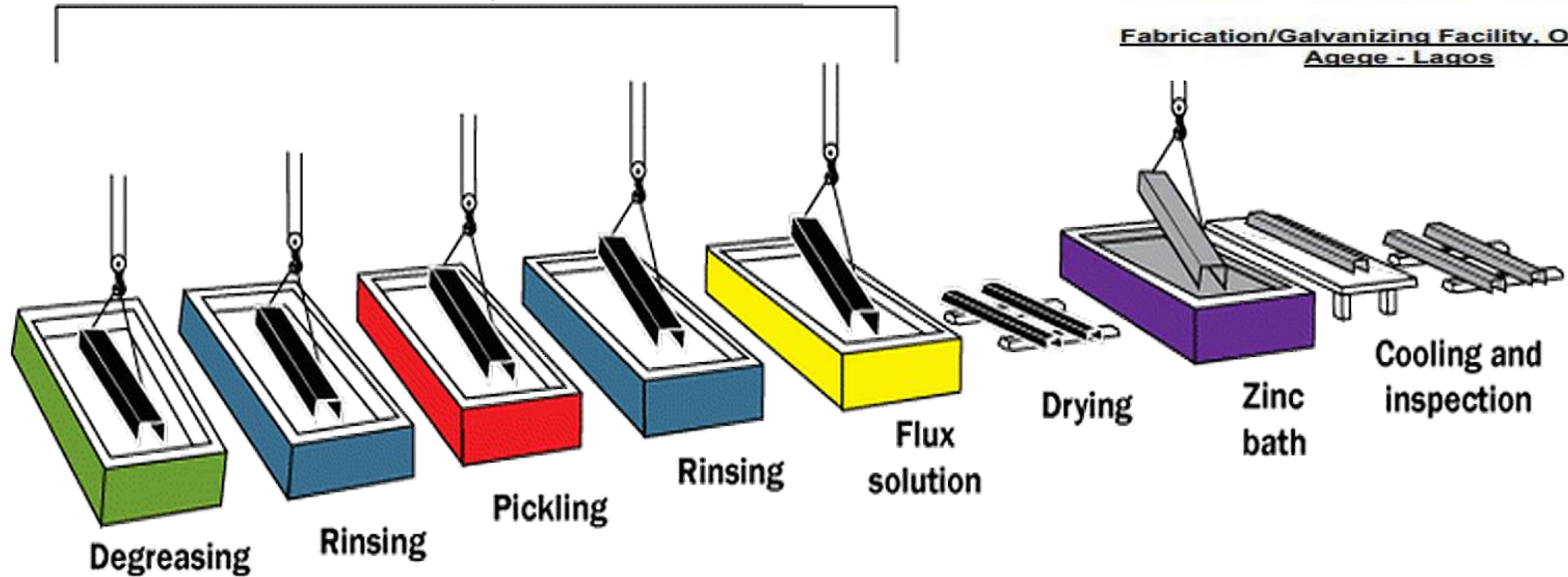


METAL

- ❖ Hot-dip galvanizing (HDG) is the process of coating fabricated steel by immersing it in a bath of molten zinc. There are three fundamental steps in the hot-dip galvanizing process: surface preparation, galvanizing, and inspection.

- ❖ HDG process Figure Below:

Surface Preparation



Fabrication/Galvanizing Facility, Oko-Oba, Agege - Lagos

METAL

- ❖ Hot-dip galvanizing provides a number of benefits to the steel it protects. The metallurgically-bonded zinc-iron alloy layers not only create a barrier between the steel and the environment, but also cathodically protect the steel. The cathodic protection offered by zinc means the galvanized coating sacrifices itself to protect the underlying base steel from corrosion.
- ❖ Other benefits include:
 - ❖ Low initial and life-cycle saving costs,
 - ❖ Durability,
 - ❖ Longevity,
 - ❖ Availability,
 - ❖ Sustainability,
 - ❖ Good Aesthetics

Asset Mgmt. Field Service Operation

A _____

Capabilities - Asset Management Services

Asset Management - Operations & Maintenance Services

- A one-stop-shop for asset support services to upstream Oil & Gas Facilities through the Gulf of Guinea from asset commission, operations and de-commissioning.
- Leveraging on our core competence in Engineering, Fabrication, Construction and Project Management
- International level training to improve national skills base in HCD
- Dorman Long has successfully completed BONGA FPSO Shutdown Maintenance for five consecutive times within budget times or often ahead of schedule, with ZERO LTI
- Successfully performed full repair and maintenance activities of the Single Buoy Mooring (SBM)

Asset Integrity Services

- Sludge Tank Cleaning Services
- Skilled Manpower provisions
- Turnaround Maintenance
- Insulation
- Well hook-ups, Installation and Welding
- Machining Services
- Torque and Bolt Tensioning
- Habitat Services
- Post Weld Heat Treatment
- Hydrostatic Pressure Testing
- Pre-commissioning & Commissioning
- Rope Access
- Scaffolding
- Blasting & Painting
- Inspection & Certification
- Post Construction/Installation activities services including reporting and lesson learned

Asset Mgt Field Service



BONGA FPSO – Nigeria

The 225kbopd capacity FPSO was shut down on October 18, 2022 to carry out statutory inspections, recertifications and other critical asset integrity restoration activities. The 2022 TAM which was originally planned for 30 days was completed in 22 days on November 9, 2022 thanks to excellent front-end planning and flawless execution.” SNEPCO, Nov 2022

Picture of Bonga FPSO, a facility Dorman Long has successfully Project Managed, and maintained over the past 10 years seamlessly without recorded safety incident.



Sea Eagle: Asset Mgt Field Service Operations



Assembly of 12-Inch S. Forcados Line on Sea Eagle



Shell's Sea Eagle Stairway (Sea Eagle Re-Entry Project)



Thank you!

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