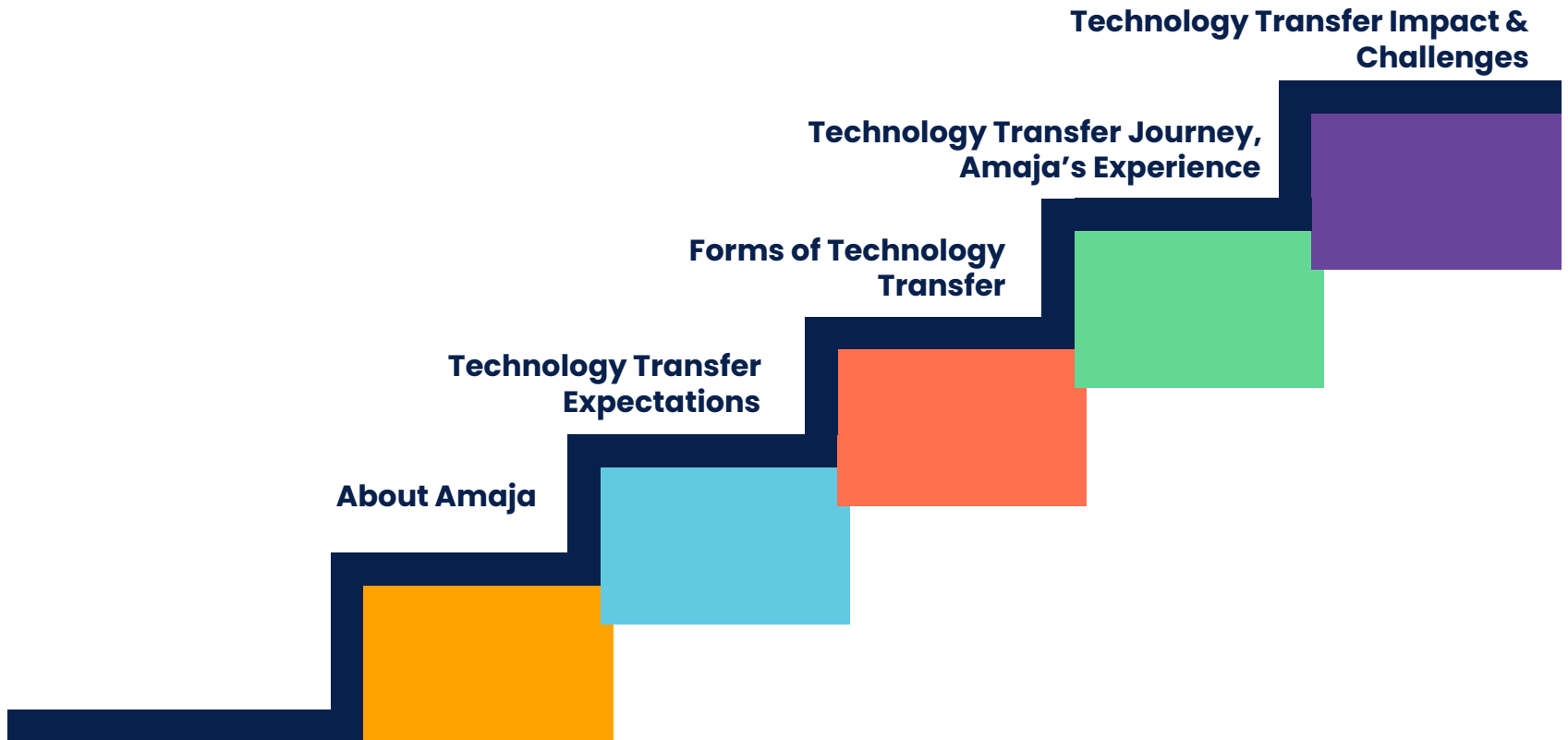




Diagnosing Technology Transfer Processes In Ghana's Upstream Oil & Gas Industry: Practical Experience

Content



About Amaja

- AMAJA Oilfield Limited ("Amaja") is a 100% indigenous oilfield service company. Our services include:
Threading & Repairs, Welding and Fabrication, Tubular services, Subsea, Stabilizer rentals, Engineering and Logistical Support.
- We operate 'Oilfield Training Centre' (OTC), and a state-of-the-art API and ISO accredited 'Oilfield Machine Shop' (OMS), providing a range of integrated solutions to our clients.
- Our business model is to form strategic partnership through joint venture where we can have our partners develop local capacity, invest in Ghana and transfer skill and technology over time to the local company. This is in line with the Petroleum Commission's mandate enshrined in the L.I 2204.

Technology Transfer Expectations

Local capacity development

- System
- Process
- Procedure/Methods
- Skill & knowledge

Forms of Technology Transfer

Forms	TECHNIPFMC INT. HOLDINGS	TENARIS	FRIEDLANDER/ORSAM
System	SAP: logistics, Production, QMS, IWOCS	<ul style="list-style-type: none"> - Quality Mgt System - Tenaris Licensee Network system - Technical string design & material selection 	<ul style="list-style-type: none"> - Axis software - Sioux integrated management system
Process	<ul style="list-style-type: none"> - Deployment of Crown plugs - installation of Xtrees - installation of tubing hanger - Retrieval - Troubleshooting 	<ul style="list-style-type: none"> -Field services -Concrete coating -Threading & Repair -Buck-on - Surface treatment. 	<ul style="list-style-type: none"> - 3D laser scanning -Dimensional control - Calculation Notes - Welding & fabrication
Procedure	<ul style="list-style-type: none"> -Supply chain management - Installation procedures - Retrieval procedures 	<ul style="list-style-type: none"> -Pipe management - Concrete coating - Pipe handling & Traceability - Threading, pipe inspection, etc 	<ul style="list-style-type: none"> - Welding & fabrication procedures. - NDT coating & hydrotest procedure
Method	Project documentation	Application of Dopeless Technology.	Total Station for setting out of hub and jig positions including pitch & roll.

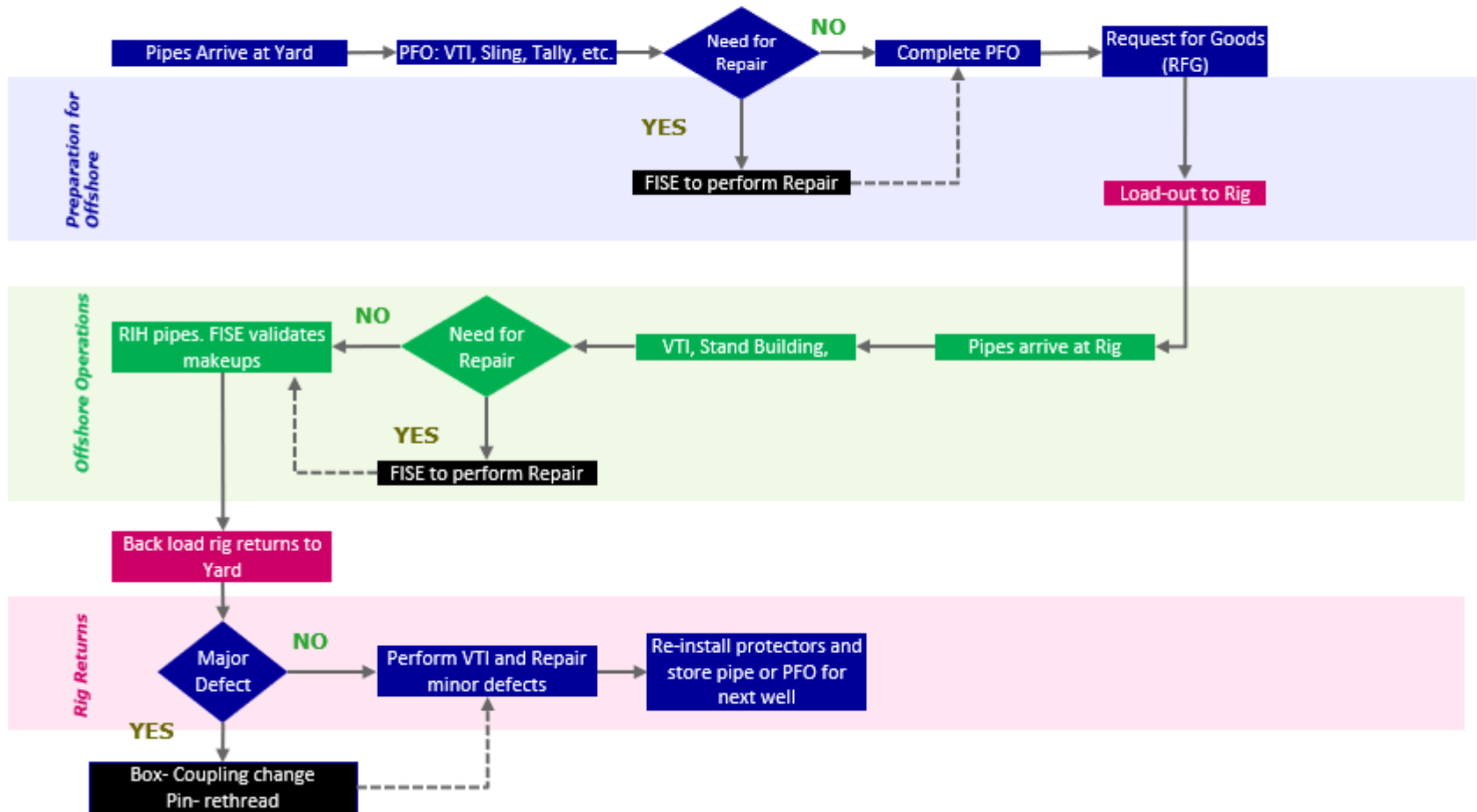
TECHNOLOGY TRANSFER JOURNEY AMAJA'S EXPERIENCE

Amaja's Pipe Yard (2016 YTD)

Pipe Mgt



Pipe Mgt - Operations Workflow



Amaja's Machine Shop (2012 YTD)



Machine Shop Operations (2012 YTD)



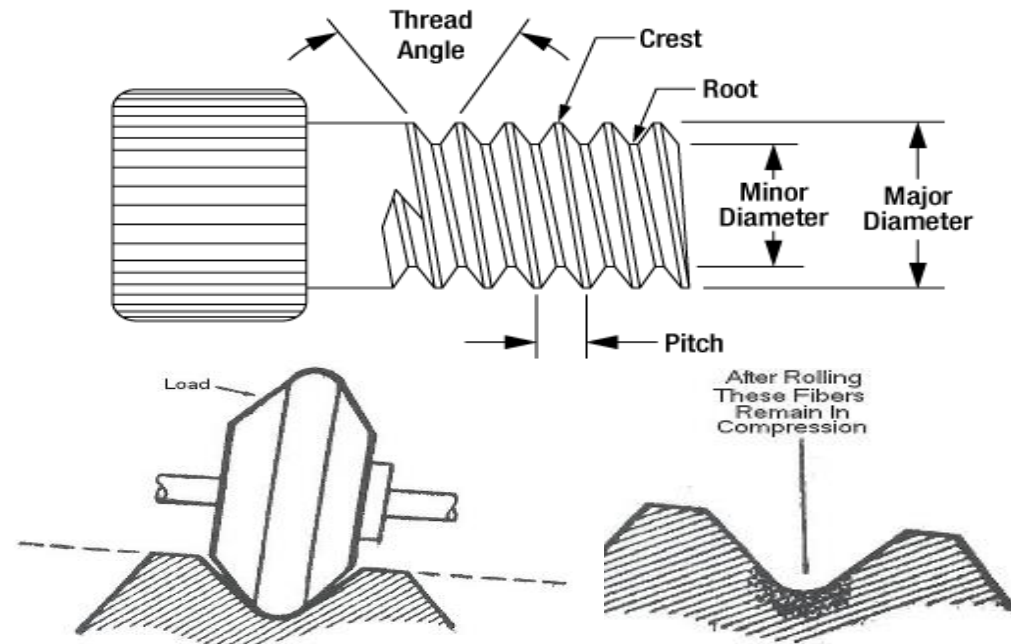
Machine Shop Operations

Threading



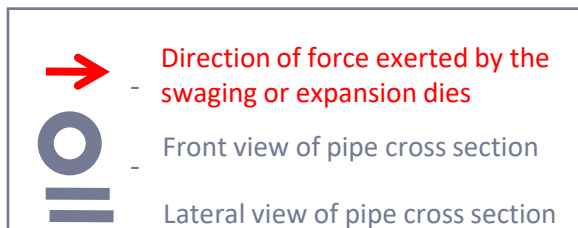
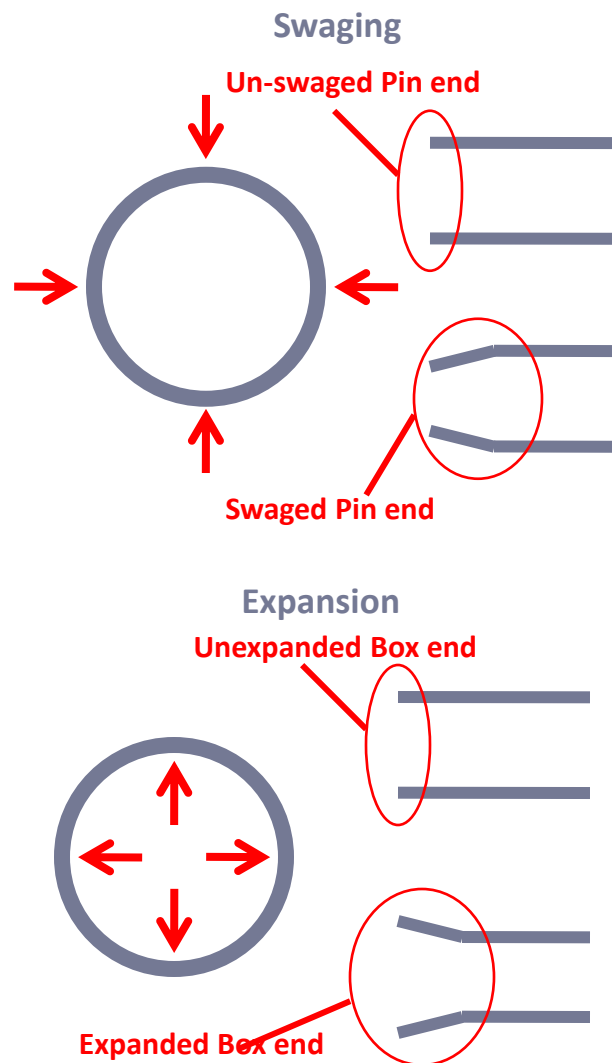
Machine Shop Operations

Cold Root Rolling



Machine Shop Operations

Cold Forming & Swaging



Machine Shop Operations

Stress Relieving



Machine Shop Operations

Phosphating



Phosphating Machine Spraying Chamber

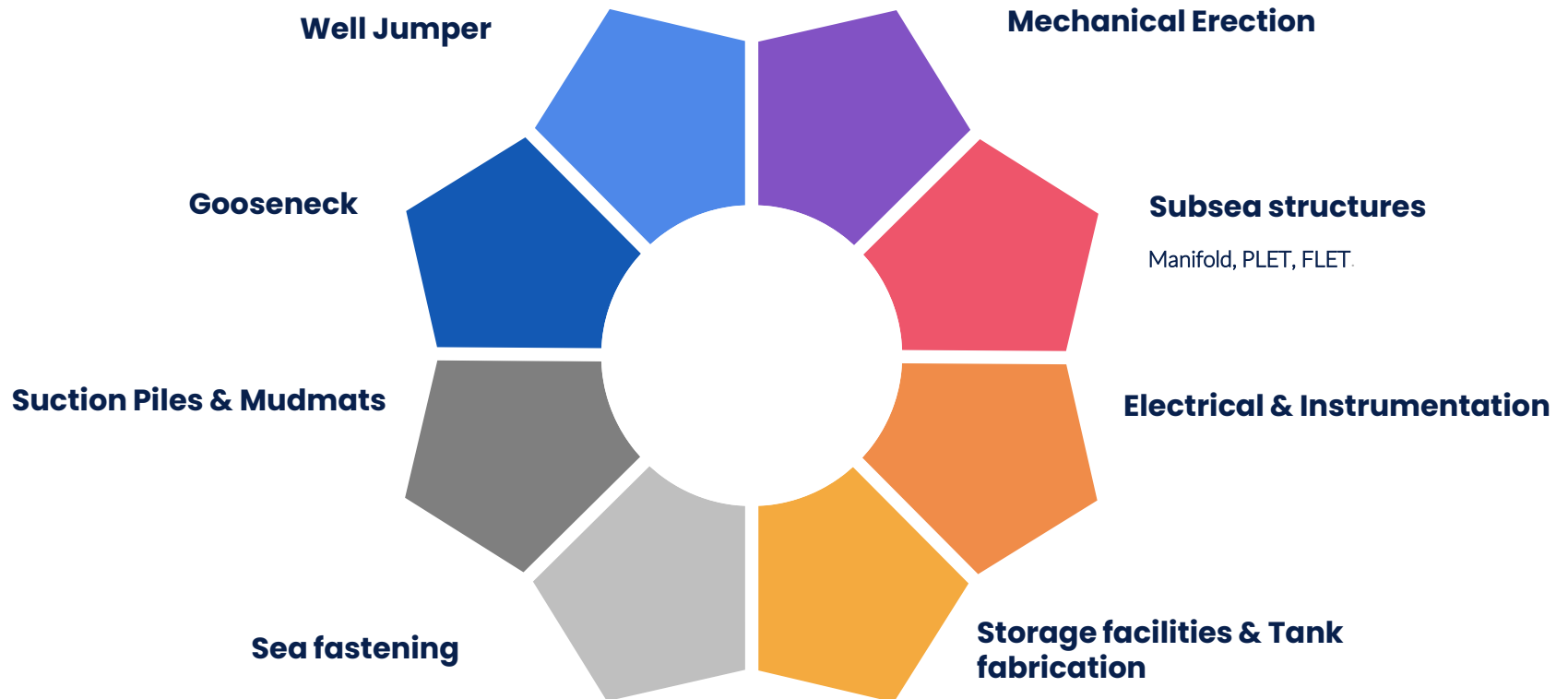


Un-phosphated Connection



Phosphated Connection

Orsam Oil & Gas Capabilities



Well Jumper

Are there Technology Transfer Gaps?

Tender

Technical, Commercial, Local Content, clarifications, etc.

100% Local Capacity

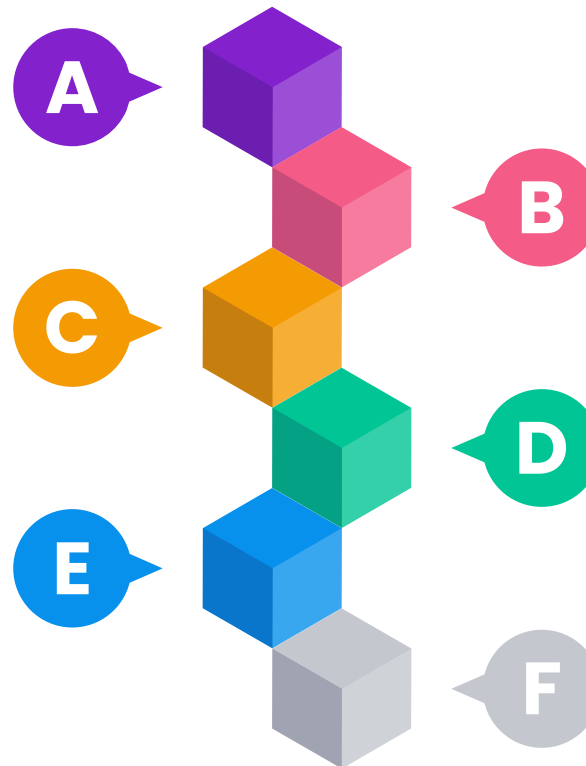
Engineering

Surveying to develop isometric drawings, meteorology readings, interpretation and integration into the isometric drawings.

40% Local capacity

QAQC

Quality Assurance & Quality Control activities. **100% local capacity.**



Procurement

Welding consumables, coating consumables n equipment, NDT services, lifting equipment, etc

95% Local Capacity .

Fabrication

Cutting of the pipes, bevelling, fitup, welding,. Performing hydrotest which requires graphical plotting.

The management of the whole construction. **70% local capacity.**

Loadout & seafastening

lifting of Jumper and placing it on the vessel. It is secured and piloted by the construction manager

70% local capacity.

Well Jumper – Engineering

Surveying



Well Jumper – Fabrication

Welding

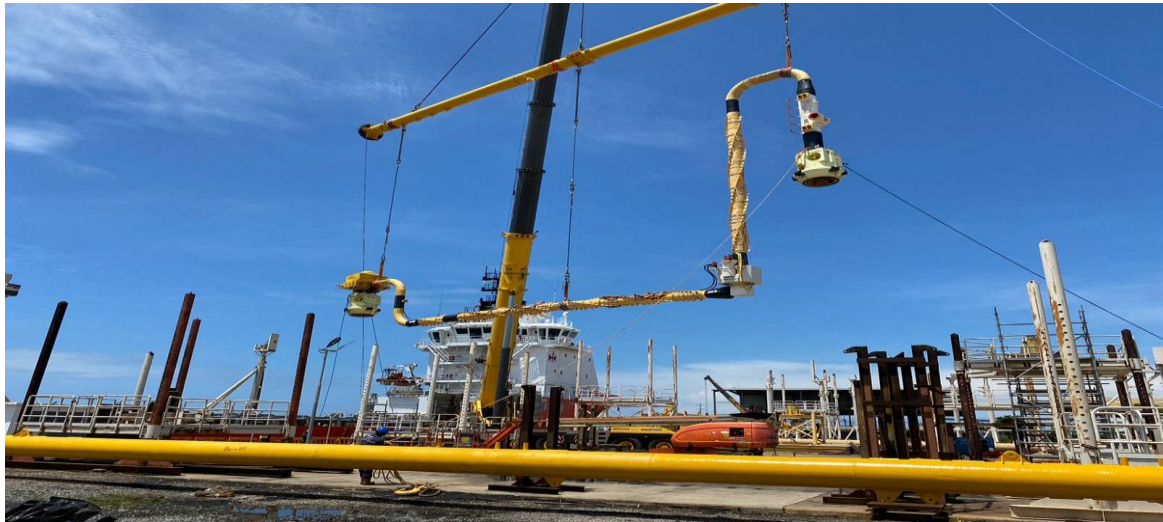


Beveling & fit-out



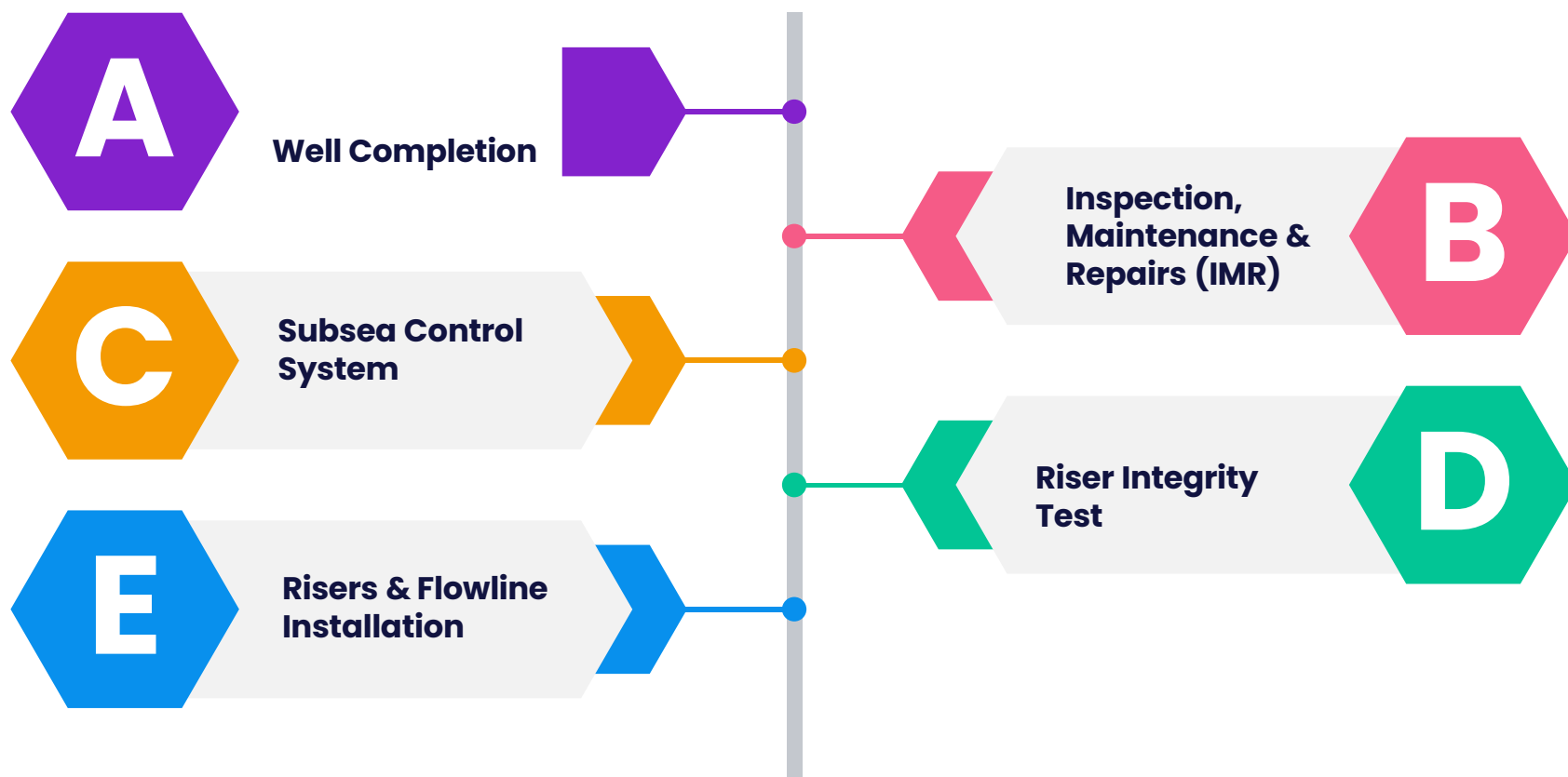
Well Jumper Load-out

Load-out
operation



TechnipFMC Ghana

Subsea Capabilities



Well Completion

Are there Technology Transfer Gaps?

Deployment of IWOCS (Intervention & work over control system)

to establish communication and control between the rig and Xtree .
Two of Amaja employees are part of the team leading this operation.
100% local capacity.

Installation of Tubing Hanger

Amaja engineers can run this operation without any expat support. Two of our guys are part of the lead operators.
100% local capacity.



Installation of Xmas Trees

100% local capacity.

Deployment of crown plugs

Amaja engineers can run this operation successfully without any expatriate support.
100% local capacity.

Retrieval Process

Amaja engineers are capable of running a successful retrieval process.
100% local capacity.

Impact of Technology Transferred and Adopted

- Improved system, processes and procedures.
- Increase in individual and organisational performance - Clients now have confidence in Amaja's ability to deliver its scope of work. Some of Amaja Engineers from time to time are exported offshore (ie. Nigeria, Angola, etc) to support TechnipFMC's operations. In the process new technology is transferred.
- Cost savings - Technical Manager position was costing our Machine Shop 238,200 USD Annually.

Challenges of Technology Transfer

- No Technology Transfer in terms of R&D - Engineering Designs from R&D departments are considered IP hence not transferable or easily transferable. They are protected.
- Unreadiness of indigenous companies for transfer of technology due to capacity constraint, both technical and investment.
- Non-availability of R&D departments in Indigenous companies. Setup cost can be very expensive though.
- Clarity issue as foreign partners argue that their responsibility in terms of TT is to the JV and not the Indigenous partner.

Conclusion

All in all, Amaja is committed to working with the Petroleum Commission, its JV partners and other stakeholders to ensure that Technology Transfer processes in the upstream petroleum industry is progressive.