

Alex Hook's EEEGR Report

Planning my Project

My name is Alex and I have started a 4-week internship with North Star to tackle my project, 'The Journey of the Box'. My aim for this project is to find innovative ways to improve the efficiency of the transportation of cargo from the manufacturing facility to finally being installed at an offshore wind farm. In order to solve this problem, I broke the project down into three different steps. Understanding the process, identifying problems, and finding innovative ways to improve the efficiency.

The purpose of this project is for me to understand the logistics surrounding cargo handling, warehouse facilities on a service operation vessel (SOV), and the wider offshore wind industry. I have also explored the lesser-known jobs that are available for young people in the offshore energy sector. For example, the mechanical engineer which is commonly used as a pathway into the more known jobs such as the second engineer and the chief engineer.

This project can be managed several ways. For example, I could have skipped the part of understanding the process and just went straight to identifying the problems and ways to innovate. However, this approach is unbeneficial because it is difficult to find a way to innovate a process in which you don't fully understand. Another approach could have been to focus on one specific stage, such as road transportation or the marshalling port, which could have allowed me to investigate one area in much greater depth. However, this means that I may miss a problem between different stages.

However beneficial these approaches seem, I chose to use my first 2 weeks to familiarise myself with the process that North Star uses and identify the potential problems that arise from it. I then spent my last 2 weeks comparing it to other rival companies to find innovative ways to improve the efficiency and minimise problems. I chose this approach as I thought it would help benefit me the most, allowing me the time I needed to properly understand the project and get the most out of it as I could.

During my project I was able to balance my desk-based work with going out on field trips to different vessels, Alicat, and a visit to the Bacton gas terminal. I planned to spend 4-5 hours a day contributing to my project, while using the other 1-2 hours researching other helpful information, such as different jobs and roles related to offshore wind. This schedule would work around my trips out of the office, and any time missed would be made up on Fridays when I was off work. Below is the gantry chart I

made for myself to follow, this made my plan clear and helped me focus on the task at hand.

	Week 1	Week 2	Week 3	Week 4
Monday	Project research	Project research	Project research	EEEGR report
Tuesday	Project research	Trip on the Alisson Mantripp, assessed the gyro stabiliser	Meeting with John Best from EEEGR – helped me start my report	EEEGR report
Wednesday	First vessel visit – the Putford Achiever	QPR meeting and Bacton gas terminal visit	EEEGR report	Vessel visit – the Putford Pride
Thursday	Project research	Project research	EEEGR report	Finalising my project and report

Throughout my Project

As previously stated, I had many trips to different vessels, such as the Putford Achiever, the Grampian Explorer, and the Alisson Mantripp. I made the most of these rare opportunities by speaking with the crew and documented it by taking photos. This can be seen in the image below. This image was taken on the Alisson Mantripp, a daughter craft, which had just been fitted with new carbon fibre motor propeller guards. This enhances the performance of the daughter craft due to it being lightweight, thus improving its manoeuvrability. I also made use of the people around me in the office. I was travelling between different departments, from operations to crewing, to health and safety, showing my enthusiasm by asking questions and completing tasks.



During the last week of my internship, I was lucky enough to visit the Putford Pride, a multi-role vessel (MRV), with Kevin Twose, the operations manager. This trip enlightened me on how cargo is loaded onto the deck of a vessel and the roles that are involved to help the process. The chief mate on the ship informed me of the whole process, from designing a plan, to actually being on the deck while the process was underway. This experience was super beneficial for me as it helped for me to understand how the operation is coordinated between the chief mate, the deckhands, and the quayside personnel. The photo below is a snippet of a video I took while on board the vessel. I learned that the process of loading cargo is much more complicated than I originally thought. It does not just involve lifting a box with a crane rather it is a very in-depth process with a lot of thinking and work involved behind the scenes.



I researched the background of the project using various sources in order to gain a deeper understanding of offshore logistics. I used information from North Star's website, photos provided to me by colleagues, as well as conversations with the crew on board vessels and in the office. I also researched the wider offshore wind industry to find out how other companies, such as Sentinel Marine and Atlantic Offshore, made their processes more efficient to gain a much more in depth and accurate understanding of how cargo is moved from A to B.

Finalising my Project

Overall, I found that there are a few opportunities for improvements in the process of delivering cargo from the manufacturers to the wind farm. I found this by looking at the process as a whole rather than just looking at one stage. For example, at the moment the delivery process from the manufacturing facility is limited to just by road or train. In order to minimise delays and reduce road usage, the companies can use cargo ships. This could potentially reduce costs because ships can take more cargo in one trip than lorries, which means less modes of transport are required. This impacts the wider world because wind farms are becoming more and more popular for renewable energy sources. This means the projects will require more resources and materials for installation. This can be solved by using cargo ships to be able to transport these large volumes of materials.

The decisions and my approach had a significant impact on my project's outcome. At the beginning of my project, I chose to develop an understanding of the existing transportation process. I did this by taking time to visit vessels to have a hands-on experience which helped me by providing a visual aspect. I also conducted desk-based research to gain a clearer understanding of each stage and where potential problems and inefficiencies could occur. I believe this made my final recommendations more realistic because they were based on an understanding of the process rather than just assumptions.

Throughout this project, I have gained a deeper level of knowledge in relation to the offshore energy sector, specifically renewable energy. I now realise the numerous roles and responsibilities go into the process and how they assist in the operation. The vessel visits have helped me find out the in-depth methods used to load cargo, launch rescue operations, and how the crew onboard get on in their day-to-day lives. This internship has been completely beneficial for me; however, I should have asked for feedback earlier in my project to identify weaknesses before my final version.

Project-wide Criteria

I demonstrated my understanding of the science behind offshore transportation and installation by researching how weight and technology affect the project. I learned that the lifting equipment, such as cranes and slings are specifically selected due to the weight of the cargo behind handled. This is a vital aspect of the operation because if cargo exceeds the maximum weight capacity of a crane, mechanical failures can occur which can lead to the crane toppling over. I also learned how vessels use thrusters and computer-controlled systems to maintain their position; this is called dynamic positioning. The thrusters continuously work according to the data being provided by the central computer and position reference system.

Throughout this project I learned how important it is, when conducting an operation, to think about the safety and ethical issues that come along with it. For example, when lifting heavy cargo, you must use the appropriate specialist equipment such as heavy-duty cranes. This is to prevent mechanical failures and ensure the safety of everybody onboard. It is also important to consider the weather and sea conditions before making the journey. This is because if the conditions are too dangerous, such as rough seas and high winds, the risks of the job are exacerbated; this could cause mechanical problems or confuse the workers which can results in human errors. Ethical problems are also a big thing to consider. Maintaining the biodiversity of the sea below you is an especially important factor to consider when operating offshore. In order to minimise

the disturbance of the marine wildlife, offshore wind companies have noise mitigation procedures. One example of this is sound attenuation technology. This dampens the heavy sound produced by the harmful construction noises.

I showed creative thinking by developing a clear and structured way of presenting the offshore transportation to installation process. I constructed a clear step by step process into the logistical operation by using pictures and diagrams in order to make a complex process easier to understand for a reader. I also provided alternative approaches to improve efficiency and safety while explaining clearly how each stage moves to the next, from the manufacturers and marshalling to the installation of the turbine.

The following photos are taken from my presentation for my project. I used creative thinking to make my slides clear and easy to read, while also making the process simple to understand.

Vessel Loading

North Star's side cargo door provides a safer and more efficient loading solution by allowing oversized cargo to be transferred directly into the cargo hold, which reduces deck congestion and cargo handling time.



Loading the Cargo
When the vessel arrives in port, the dockworkers and port operatives will use vehicles as shown in the picture to load cargo onto the vessel. Newer North Star vessels have a side door for cargo. However, others can just be loaded onto the deck.



Onboard the Vessel
When the cargo has been loaded, it will either be organised in a warehouse below deck, if it has a side door. Or it will be arranged on the deck to ensure the most cargo can fit.

Key Roles:
Deck Crew – Secures and prepares the cargo for voyage.
Crane/Plant Operator – Moves heavy components onto the vessel.



Cargo being loaded onto vessel by side cargo door. Internal cargo hold-via the side cargo door

Manufacturing → Port Operations →

Vessel Loading → Offshore Transport →

Installation

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Offshore Transport

This process is between leaving the port and preparing the installation at the turbine.



Transit to Site

The vessel will maintain a safe and efficient transport from the marshalling port to the offshore wind farm. The weather and route will be continuously monitored to avoid unfortunate surprises.



Cargo Monitoring

During the transit to the wind farm, there are regular stability checks being carried out to keep the cargo securely fastened throughout the voyage.



Arrival and Installation readiness

The vessel positions safely at the wind farm, either by dynamic positioning or anchoring depending on the vessel model. The cargo is then prepared for efficient transfer to the installation operation.

Key Roles:

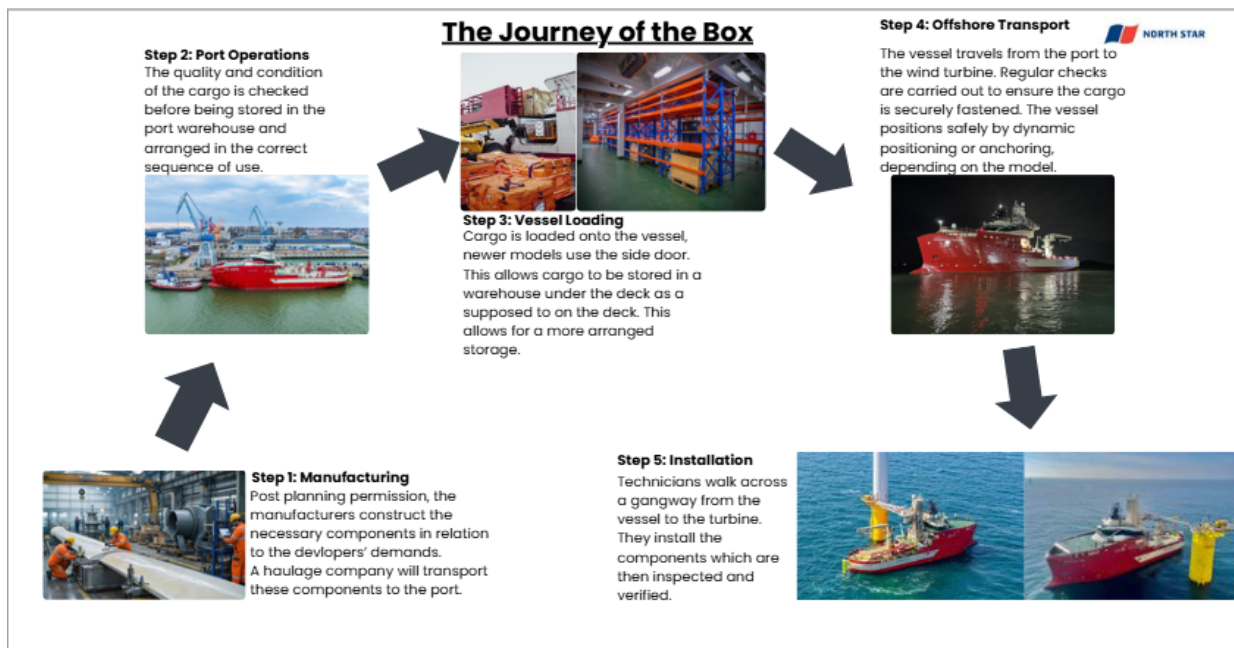
Dynamic Positioning Operator – Maintains the vessel's position when required.

Captain – Responsible for the vessel and overall voyage.



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I also simplified the process even further by creating a roadmap:



This roadmap can be used to help beginners, such as school pupils, understand the basic process of how the 'box' moves from place to place, and the potential job roles involved for them.

I encountered a range of problems throughout completing my project. One problem that I faced was that I noticed many delays were occurring due to transportation vehicles such as the barges or lorries were being caught in traffic. This caused a cascade of problems further on because everything else in the process had to wait for this cargo to be delivered. I solved this problem by looking at other modes of transport that minimised road travel. This led me to involve cargo ships and trains to transport the cargo from the manufacturers to the port. This would improve the efficiency of the operation because it allows more cargo to be transported by one vehicle, this gives a better cargo to vehicle ratio, which reduces the chance of delays to occur due to less vehicles being involved.

Throughout my time at North Star, many staff members, in the office and onboard vessels, asked me what my project was about to find out how to help. This was when I was able to say that my project is about following the 'box' from manufacturing to marshalling, and then eventually being transported offshore for installation. The 'box' is a simple metaphor for the cargo and equipment that support offshore operations. My project enlightened me on the many different roles, responsibilities, and complex processes that form the 'The Journey of the Box'.