

# RÉSUMÉ AND CURRICULUM VITAE



## PERSONAL DETAILS & QUALIFICATIONS

**Name:** Ellen Main  
**Position:** Design Engineer  
**Nationality:** British  
**Education:** BEng (Hons) Mechanical Engineering

---

## EMPLOYMENT RECORD

**2022- Present** *Argo Engineering Solutions Ltd*, Design Engineer  
**2021** *DFS Composites Ltd*, Summer Placement

---

## RÉSUMÉ

I joined Argo Engineering in Summer 2022 having just graduated from the University of Southampton with a BEng in Mechanical Engineering. Between studies I spent a summer working with a small wind turbine tooling design company (DFS Composites). During this placement, I developed my CAD and concept design skills through the process of designing a new quality control device.

My degree covered a broad range of modules including Materials and Structures, Finite Element Analysis (FEA), Heat Transfer and Thermo-fluids. During the FEA module, I completed an FEA analysis of a representative ship hull to assess its static and dynamic response to the sea pressures.

My final year project used X-ray CT and image analysis methods to detect and quantify the levels of manufacturing variability within the mast of the IQ Foil – the Olympic foiling windsurfer. This has given me an appreciation of the strengths of composites and key design considerations.

---

## EXPERIENCE

### **Wind Assisted Ship Propulsion Projects x 2**

My first project at Argo was designing the composite components of a rig for wind assisted shipping. A large part of the work I did for this project was using Strand 7 software to conduct FEA analysis on different parts of the rig. I used various models from simple beam element models to detailed ply-by-ply analysis to specify laminates for each part of the rig.

On a different wind assisted shipping project I used Lloyds Register Rules to calculate accelerations of the ship hull to be used as an input for the design of the rig structure.

### **12m Autonomous Fast Craft**

At Argo I have also worked on the structural design of a 12m autonomous Aluminum vessel. Initially, I adapted and verified the scantlings to meet DNV rules. As the project progressed, I used first principle calculations to verify other structural components such as lifting points and heavy equipment foundations.

### **ACB Studies**

I have also contributed to the design of a series of Air Cushioned Barges (ACBs) to Approval in Principle stage with Lloyds Register. This included FEA of different hull forms to check the feasibility of a new hull shape. I also used alternative first principle methods to perform an on-hover stability assessment of the ACBs as conventional methods cannot be used.

### **Finite Element Analysis**

Whilst working on projects at Argo I regularly use Strand 7 FEA software to analyse models. So far, these have ranged from simple block models to extract loads, to advanced ply-by-ply analysis on larger, more detailed geometry. I have also performed a range of first principle calculations to verify the FEA results.

### **Hull Structural Analysis**

Since joining Argo, I have calculated and optimized scantlings for a variety of high speed craft and light craft. I have designed using DNV, BV, ISO and Lloyds rules. This has provided an opportunity to use software such as HullScant, Composelt and SSC.

---

## **OUT OF WORK INTERESTS**

My main interest has always been sailing. Since I was very young I have been competing at international level in dinghies and I continued this throughout university by joining the team racing team.

---

I have more recently taken up road cycling and long distance running – where I am proud to have completed the Southampton marathon. I am always looking for something to do to get outside and keep active.