

Introduction

Barton marine is an 80 year old world class manufacturer of marine blocks. We were commissioned to conceive, design, implement and operate two experimental rig to test;

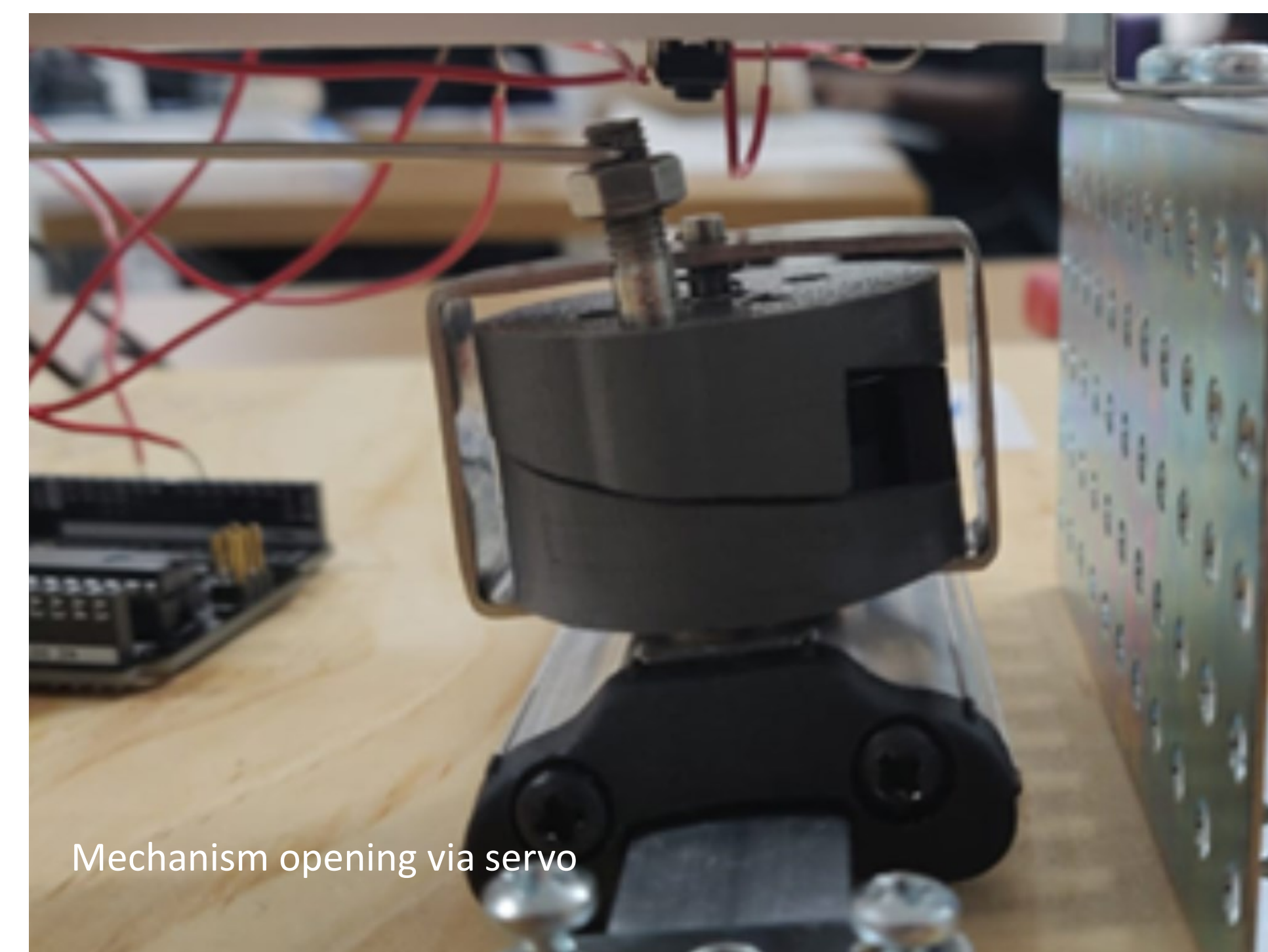
- their prototype roof traveler locking mechanism
- recycled Kevlar composite K-cam-cleat comparing to the original unrecycled material.



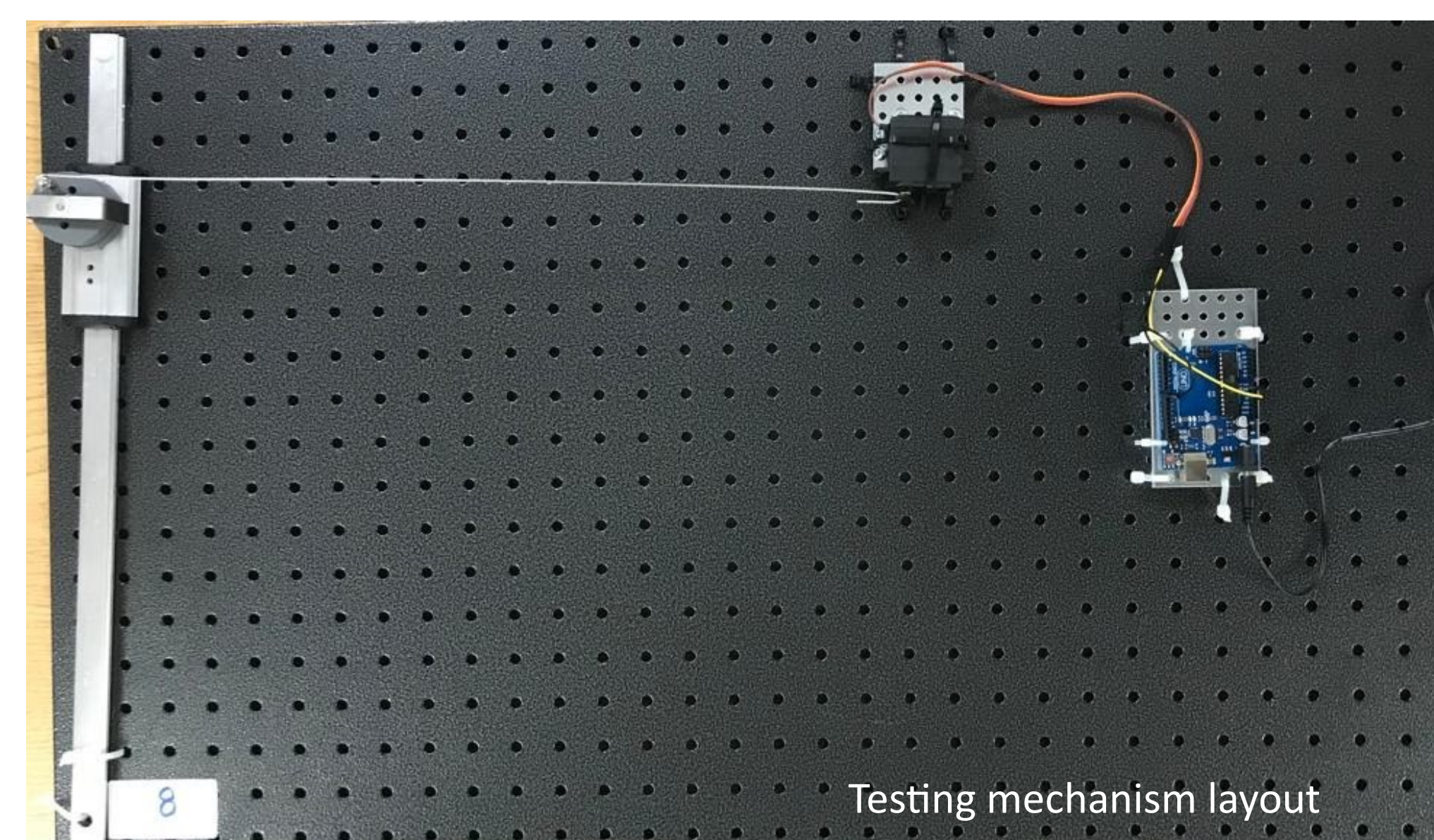
Methodologies

Tracked lock: Problem produce a linear motion to determine breaking point. Solution;

- a servo motor arm was attached to the lock mechanism,
- coded 4 interlocking segments: Servo, counter, LCD, and Sensor, programming the rotation at 180 degrees so that the cable is taut at the furthest point.
- Counting was determined, LCD activated by the a centre pin raising and allowing the lock to travel, if this was not met the cycle was incomplete and the lower count will be taken.



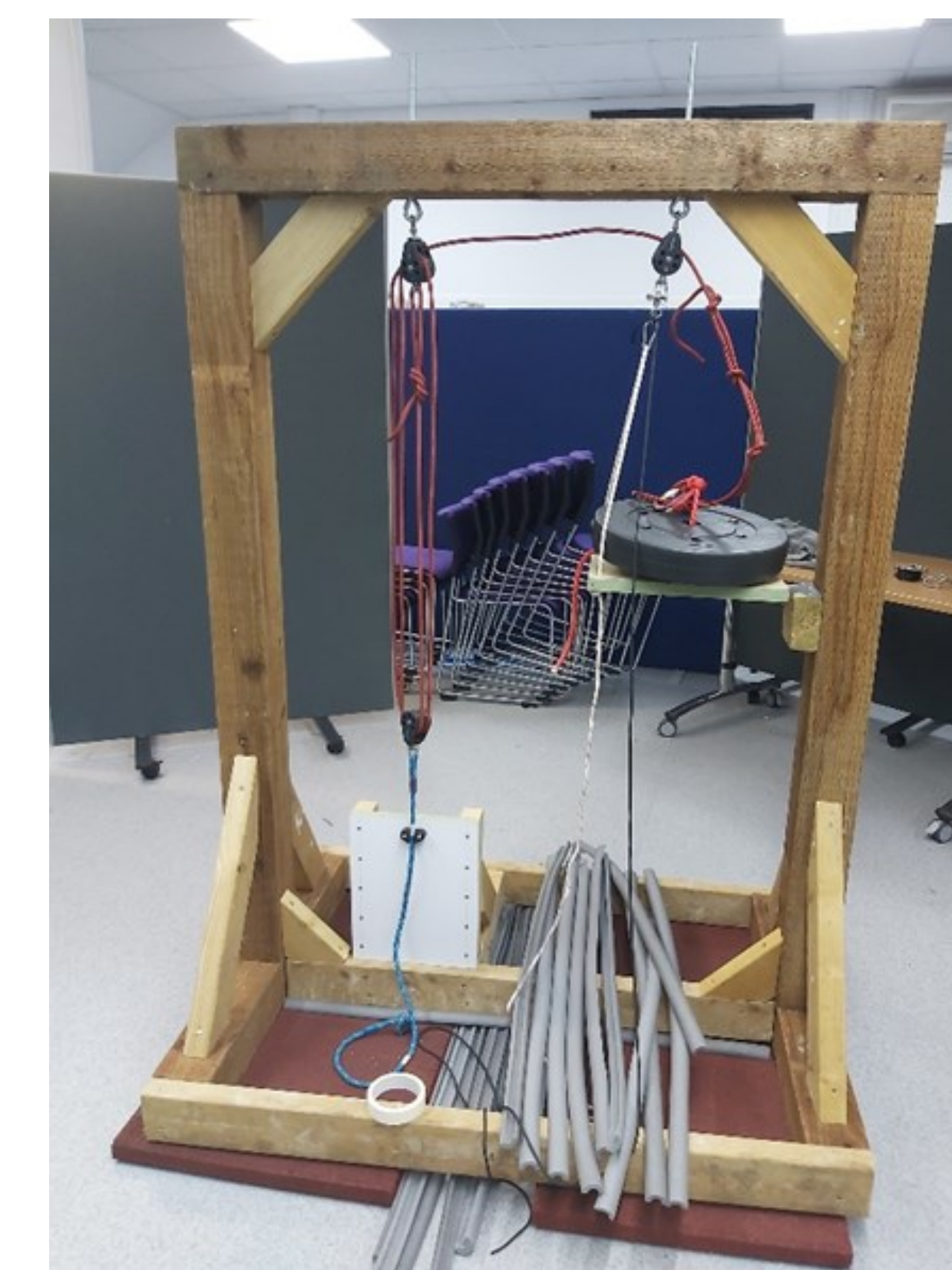
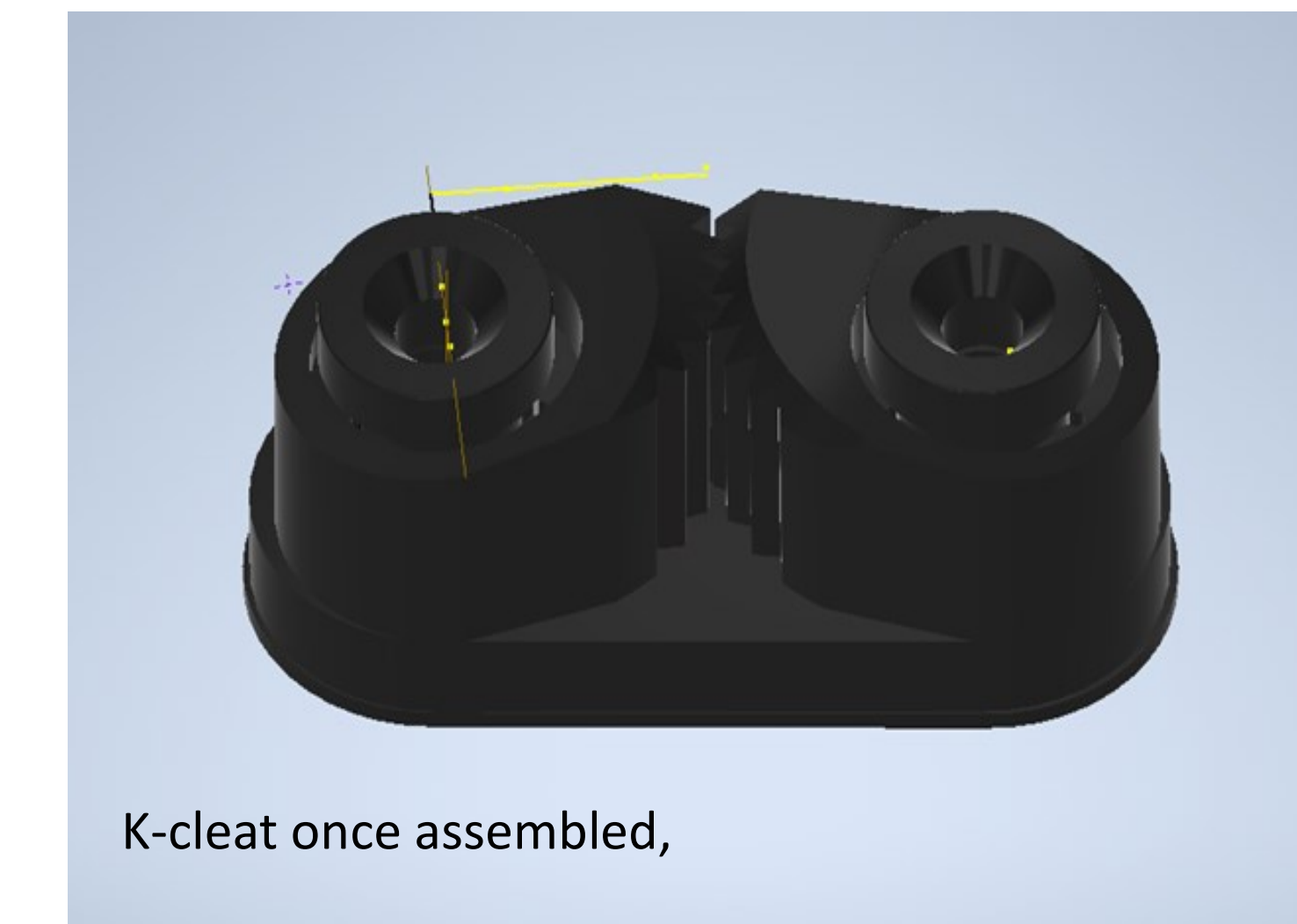
K-cam-cleat: Static test was carried out upon the rig within the factory, the simulation was completed on Autodesk and the dynamic group built a frame with a snap shackle and pulleys to simulate rapid torque from strong winds.



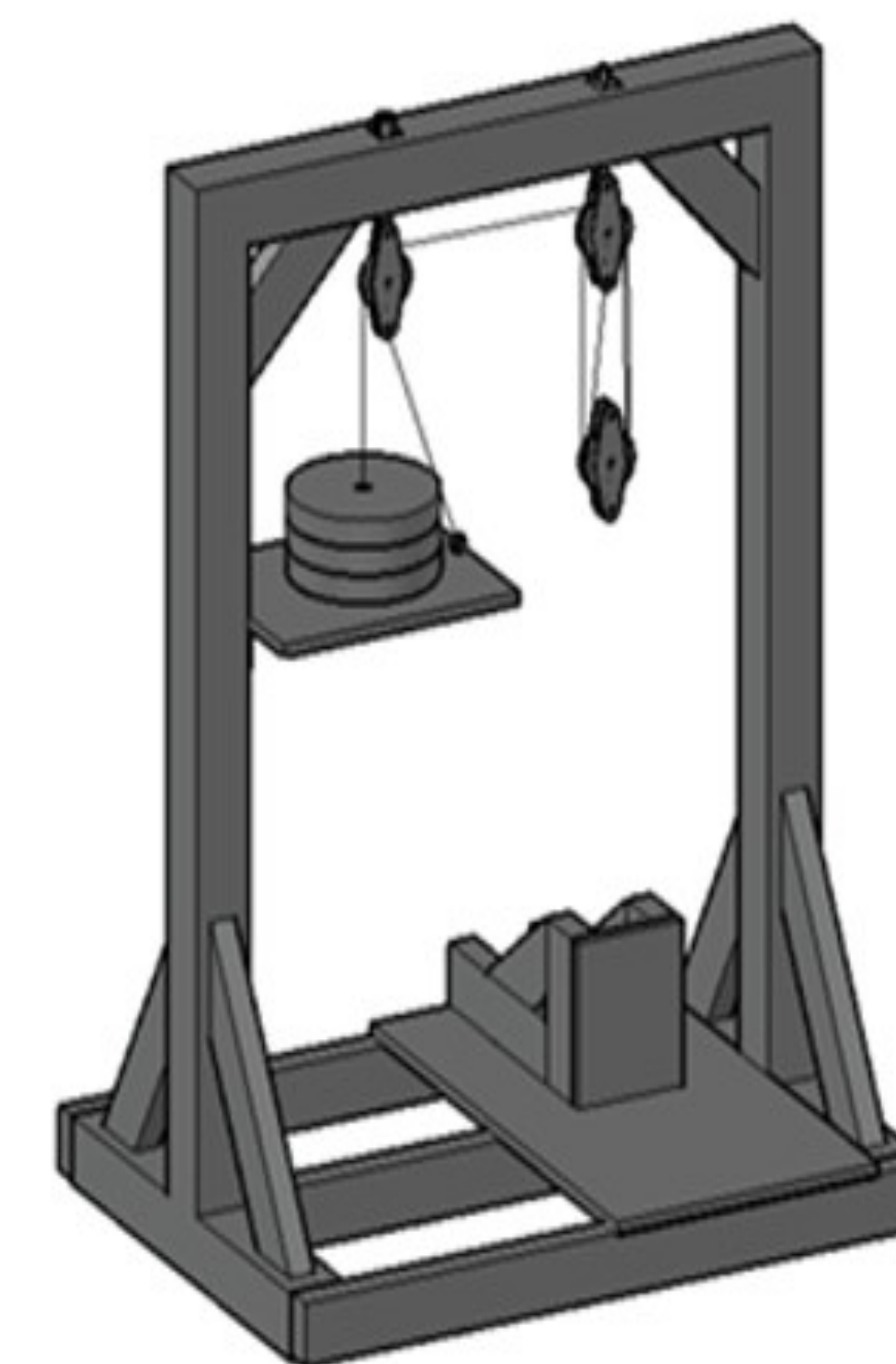
Aims/Overview

Traveling lock: This program and design was created for the purpose of testing durability of the boat roof lock and producing reliable results. This was achieved by making the entire test computer operated and monitored by sensors rather than depending on human reaction times.

K-cam-cleat: To discover if the recycled Kevlar composite would be as applicable as the non-recycled material using a static, simulation and dynamic test.



Practical implementation of dynamic test design



Dynamic testing frame for K-cam-cleats.

Conclusion

Tracked lock: The test rig is ready for use upon the mechanism, counting how many repetitions will be completed, it is believed that the pin will not be raised over 10,000 times and be broken before this target.

K-cam-cleat: Different tests produced different results. It was found that within dynamic conditions the new recycled material, was just as reliable as the original material.

Barton Marine feedback, "I was very impressed with how quickly foundation students understood the problem and producing practical 'real world' solutions. For us this was not just an academic exercise but a project that produced a practical solution enabling us to improve performance of our product."