

Engineering Technical Report and Logbook

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Engineering Applications and Study Skills ACMA4007

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Introduction:

The following report is an assignment for module 'Engineering Applications and Study Skills'. The following sections will be covered in the report: health and safety legislation regarding PPE linked to a workshop operation at the University with a risk assessment matrix; brief discussion on engineers role in society in regards to environmental impact and sustainability; a review of a time I've been involved in a team and the nature of the structure we used; personal development plan for my career.

Chapter 1 – Health and Safety with Risk Assessments:

I will be covering the operation of correctly using a milling machine in accordance with British health and safety legislation. The milling machine safety standard in the UK is 'BS EN 13128', it is the British equivalent of European safety standard 'EN 12128'. All milling machines operated and/or produced to be used in the UK must abide to this legislation, when creating new models or updating older ones for use. In clause 4 it lists potential hazards to individuals operating and near the machinery, following this in clause 5 it then lists safety requirements and protective measures for said machinery.

[1.1] Personal Protective Equipment Required:

It lists standard PPE required for use in section 5, their summary are as follows, followed by a brief explanation:

Full body covering/protective clothing: used to protect the operator and nearby people from debris from the machine causing injury such as cuts to skin.

Eye protection: used to shield eyes from major injury from machine debris, injury in this manner can cause serious long-term issues such as blindness.

Ear guards: some much larger machines can be extremely loud and cause injury from prolonged close exposure to it.

Feet protection: these are not mandatory, usually varies per workshop area, but it is a good safety precaution and recommended by the legislation.

[1.2] Risk Assessment Matrix:

Hazard	At risk	Risk	Likelihood	Control Measure	Risk Level
Drill bit becoming loose	Operator, nearby people		Moderate	Instruct people on how to properly tighten a chuck securely	L
Clothing entangled in machinery	Operator		Moderate	Instruct people to remove or secure any loose clothing	L
Hair entangled in machinery	Operator		Moderate	Instruct people to tie long hair back securely	M
Debris flying off machinery	Operator, nearby people		High	Safety guards, eye protection and full body protection such as dust coats	L
Spillages on the floor	Operator, nearby people		Moderate	Make others aware, report them immediately	H
Objects and tools falling	Operator, nearby people		Moderate	Enforce the use of steel toe cap boots	M
Electricity fault	Operator		Low	Regular Machinery inspections, reporting any visible faults, pressing emergency stop	L
Hand getting caught by the drill or vice	Operator		Low	Instruct people to keep hands away from drill bits when in use and how to safely place items in a vice	L
Hand or clothing getting caught in the machine bed	Operator		Low	Instruct people to be vigilante and aware of items attached to their person	L
Exposure to dust	Operator, nearby people		High	Limit time in the workshop, use dust masks	L
Touching hot drill bits or worked pieces	Operator		Low	Instruct people to allow the piece to cool a little before immediately grabbing it after use	L
Emergency stop failing	Operator, nearby people		Low	Regular Machinery inspections, reporting any visible faults, pressing full room emergency stop	L
Machine failing to turn off	Operator, nearby people		Low	Regular Machinery inspections, reporting any visible faults, pressing emergency stop	L
Safety guard failing	Operator, nearby people		Low	Regular Machinery inspections, reporting any visible faults, pressing emergency stop	L

Chapter 2 – Engineering Role in Society:

[2.1] Code of Conduct Quotes:

The following are corporate standpoints expected to be followed by all their employees regarding environmental impact and sustainability:

“It shall prevent the wasteful use of natural resources and be committed to improving the environment, particularly with regard to the emission of greenhouse gases, and shall endeavour to offset the effect of climate change in all spheres of its activities.” – TATA Steel Code of Conduct 2013 Clause: 8

“Universal Robots, as a part of the Teradyne Group, is complying with all applicable environmental regulations and standards. We support pollution prevention and minimization programs, use materials and energy efficiently to conserve natural resources and continue to review our environmental objectives and monitor performance in the environmental key areas.” – Universal Robots 2021 Corporate Social Responsibility Report

[2.2] Engineers Responsibility Discussion:

Engineers’ role in society is important, especially in terms of attempting solve environmental issues and sustainability. Most companies are expected to make their engineers follow a code of conduct to properly instruct them of their goals and limits with how they work. For example, in terms of environmental impact, TATA Steel are enforcing their engineers to make suitable adjustments to properly lower their emissions and reduce their impact on climate change. Universal Robots also have a similar goal for the engineers, but with a focus on their energy consumption and waste.

With the influence on the world that engineers have, ultimately being responsible nearly all man-made things, they can greatly help decline climate change and in some fields potentially focus on reversing its effects. In the modern engineering world, it is considered bad practice for engineers to ignore environmental impact from their work , often companies without a strong code of conduct towards preventing environmental and sustainability issues often run the risk of losing partnered companies, contracts, and funding.

Chapter 3 – Team Structure:

[3.1] Overview:

During my studies at Swansea University, I was given a group project assignment to complete where we were tasked with designing a structural layout for supports for a leisure centre that would work with an architecture design given to us. difficult to keep up with compared to other groups. The workload consisted of creating a layout, creating spreadsheets for calculating ideal beams and columns for each section, creating a 3d digital render of the structure, creating the layout with the chosen beams on a software and creating shear force, bending moment and deflection diagrams for the whole structure.

The project was intended to be tackled by three people per group but unfortunately my group was only able to have two including myself, this made the workload exceedingly difficult to keep up with and allocate compared to other groups in our class. My group and others faced a very short deadline that was eventually delayed multiple times last minute, so it caused lots of sleepless nights prior to them deciding to delay it.

A few weeks into the project, another group that we knew quite well semi merged with ours, only sharing insight and information with each other on how to get through the project. With the newly formed group I functioned as leader as I was the most knowledgeable on the topic, guiding members of both groups through each section. Both groups over reliance on me caused me to micromanage the two groups. In my group I was primarily doing all the work, having all the challenging work fall to me as I was more competent.

[3.2] Review and team improvements:

My personal critique of myself in my team: I was very hands on with every aspect of the project, my team mate never had to make a decision alone and always had me to rely on for guidance. At the beginning of the project, I was not keen on acting as a leader, but as my understanding of the project grew, it was necessary for me to take charge. At times I resented my teammates, feeling as though they were incompetent and having all the workload fall on me because they could not grasp what to do alone but I handled myself professionally and never showed any sign of resentment.

My team structure was similar to a 'flat structure', having everyone working together on the same areas. This was needed as people constantly needed assistance on their current goal, often relying on me or the leader of the other group for guidance on their current goal. This as mentioned, made me micromanage most of the group work, a better structure would be to have a more dedicated hierarchy system, separating work areas and only coming together to have meetings to make major decisions. This would separate me from a lot of the work load I was taking on and allow others to have the freedom to learn and understand the process and the work better.

Chapter 4 – Personal Development Plan:

Name		Tyler (TJ) Powell		
Degree		BEng Mechanical Engineering Degree		
Previous Qualifications		BTEC Level 3 Engineering Diploma		
Previous Experience		BEng Civil Engineering Degree (2 years)		
Long Term Goals (5 – 10 years)		[1] If possible due to potential work constrains and/or timing I would like to commit time to getting a doctorate in an engineering-based field. [2] I would like to have enough qualifications and experience to be able to work as a design lead of a project. [3] I would like to be secure enough financially to have the freedom to start a family.		
Short Term Goals (0 – 5 years)		[4] Acquire a Mechanical Engineering Degree [5] Acquire a Masters in Engineering (not confident on subject yet) [6] Work on multiple projects that are impactful to my CV to stand out to employers (at university or summer placement etc.) [7] I would like to be hired for my first paid engineering project. [8] I would like any job to try and get out of my debt.		
Goal	Objective	Resources Required	Measurement	Target Date
[1]	Acquire a prestigious title and understanding of a particular field	Doctorate course and available time	Have a doctorate degree	2029
[2]	Become a lead designer of a project	Experience and knowledge	Have a design lead position of a project	2033
[3]	Be financially secure in a position	High paying position	Yealy income of £60,000+ (ideally)	2033
[4]	Pass my course	Commitment	Have a bachelor's degree in engineering mechanics	2026
[5]	Pass a postgraduate degree	Commitment and availability	Have a master's degree in a suitable field	2027
[6]	Work on interesting projects that can develop my skills stand out on my resume	Opportunities available to me at the university or potential junior hire	Worked on 3 extracurricular projects (currently working on one)	2026
[7]	Acquire an engineering job	Degree and personal knowledge and experience	Have an engineering related job	2026
[8]	Acquire any job during my studies	Luck	Have a for small commitment part time job and be out of debt	2024

Conclusion:

To conclude I believe I have shown knowledge and understanding of technical concepts and how they are applied to a physical application. I have applied practical technical skills and understand safety standards in workshops and laboratories, developing key transferable skills. I have also learned more about personal development and how creating goals can help motivate you towards a goal. I also understand an engineer's role in society, they are pivotal to any development in the world, they are responsible for so much.

References:

BS EN 13128 (latest version 2010):

TATA Steel Code of Conduct 2013:

<https://www.tatasteeleurope.com/sites/default/files/Tata%20Code%20of%20Conduct.pdf>

Universal Robots 2021 Corporate Social Responsibility Report:

<https://www.universal-robots.com/media/1823208/2021-universal-robots-corporate-social-responsibility-report.pdf>