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1. Introduction

To analyze and dissect the importance of Health and Safety in regards in applications of Engineering, grasping the concept of different regulations and why they were established.

2. Health & Safety with Risk Assessments

Within Engineering there are various of different regulations that are implemented when undertaking activities in a workplace, this is to ensure that the employees are following the right procedures to carry out the task, minimizing any form of hazards. Initially, when undertaking any tasks or before entering any workshops the individual must be equipped with the appropriate safety gear, this practice is covered by the Health and Safety at work act 1974 (HASAWA) this is to protect the individual from machinery, loose tools and flying pieces of debris. Under the health and safety at work act (HASAWA), employers have the responsibility to protect the health and safety, and wellbeing of their employees. To aid this duty, the Personal Protective Equipment at Work Regulation requires the employers to provide suitable PPE whenever risks cannot be controlled. This regulation makes the use of PPE mandatory and entails the use of safety glasses, ear defenders, laboratory coat and steel capped boots etc. (Simpson, 2020).

Furthermore, to further decrease the risk of hazards in a workplace the management of health and safety at work regulations (MHSWR) 1999 was established, this legislation required employers to neutralize and assess any risks that may have an impact to the health and safety of their employees or other individuals that enter the vicinity, within this legislation the employer is required to provide employees details about the potential risks in the workplace and how they've mitigated the hazard to protect the employee (TUC, 2022). Another legislation to consider is provision and use of work equipment regulations 1998 (PUWER) to relate this to an activity, Lathe machines. PUWER requires the lathe to be suitable for its intended use. Under this regulation the employer must ensure that they've provided the employee with an adequate amount of training to operate the machine (TUC, 2022), the employer has the responsibility to mention the risk of dangers and hazards that could occur.

Serious life altering incidents can happen within the workplace, when an incident has occurred it must be reported immediately varying in the severity of the injury. A Regulation covers this referred to as Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR). This allows the relevant local authority to monitor incidents that have occurred which then enables them to implement safety measures to reduce the risk of the incidents occurring again. Reports may only be issued by individuals with higher status such as the employer or managers supervising at the time of the incident.

(Legislation.gov.uk, 2013)

Lathe machine		Severity			
		Low	Medium	High	PPE needed
Likelihood	Likely	Excessive noise level			Ear Defenders
	Possible		Flying debris/swarfs	Entanglement of long hair/loose clothing	Eye protection glasses
	Unlikely			Rotating work piece ejection	Labratory safety coat

Figure 1 Risk assessment table for lathe.

3. Security with Risk Matrix

As modern vehicles evolve, they are heavily implementing the use of advanced technology and incorporating internet connectivity. These systems are prone to be breached leading to unauthorized access allowing hackers to tamper with the vehicles infotainment center console (Davies, 2023). Intruders are able to access sensitive personal information, they're able to track the current location of the vehicle, access card information and emergency contacts. (Vakulov, 2025)

Another method that has a security threat to today's modern vehicle is key fob exploiting, the vehicle is constantly sending short radio signals at a specific frequency enabling hackers to intervene with the communication between the key fob and the car. By tricking the vehicles authentication system, amplifying the same frequency the fob emits, this enables the hackers to have access to the vehicle without setting off the alarm. (History of Simple things, 2025)

Thirdly, another form of security threat is phishing. Renowned threats to numerous other industries. Cyber intruders target individuals within an automotive company via through emails imitating well known dealership, within those emails deceptive malicious links have been planted requesting personal information such as username and password, hackers are able to access the employee's account leading to a breach in customer details, scheduling and billing systems etc. (Infoshare Systems, Inc., 2023)

Lastly, access to the On-Board Diagnostics (OBD) port, this is an alternative security threat to the modern vehicles today heavily relying on a physical approach. The intruder accesses the vehicle through methods such as signal jamming, rolled down windows left unattended and weak lock systems. Intruders are able to connect the reader into the OBD port allowing them to inject malicious software and enabling them to communicate with the vehicle (Sustainability Directory, 2025).

Likelihood/Impacts	Severity		
	Low impact	Medium impact	High impact
Very likely		Phishing attacks	Key fob signal exploit
Possible		Infotainment/ hacking center console	OBD port tampering
Very unlikely			

Figure 2 Risk matrix table

The highest rated risk within this risk matrix is the key fob signal exploitation, a prevention method to avoid this is a signal blocking pouch, the pouch prohibits the key from communicating to the vehicle acting as a signal jammer. In addition to this, another prevention method that could be utilized is to keep the vehicle in a secure perimeter such as keeping it in a garage or anywhere with CCTV deterring intruders.

4. Engineers Role in Society

In the world of engineering, individuals are held to a high standard, and a code of conduct is established to abide by. Although the code of conduct may vary in each company, the general goal is to maintain safety practices and consider the significance of sustainability and environmental issues when innovating new projects. The chartered institution of building services engineers (CIBSE) is an organization that provides a code of conduct to engineers. Initially they must uphold professionalism, engineers must not portray themselves more qualified beyond their capability this may deceive other individuals believing false information. Engineers must assess and anticipate how their actions may affect the environment and produce a solution to mitigating the impacts (CIBSE, 2025).

Another organization that publishes codes of conduct to engineers is the Institution of Mechanical Engineers (IMechE) many engineering companies share the same core objective. Engineers must act with integrity therefore decline any form of bribery, bribery within a company can lead to corruption, compromising ethical standards. In addition to this another rule that engineers must abide by is to portray leadership in a professional manner, they must be able to minimize risk in the spur of the moment and analyze how they can mitigate and control the hazards especially when supervising an apprentice. They must be open minded and support diversity providing equal opportunities for growth within the industry. (IMechE, n.d.)

Within Motorsports engineering, Federation Internationale de l'Automobile (FIA), a governing body for Motorsports engineering. Overseeing major events such as Formula 1, world endurance championship and world rally championship. Beyond racing, the FIA also promotes sustainability and environmental awareness within the organization (FEDERATION INTERNATIONALE DE L'AUTOMOBILE, 2025). A notable goal that F1 is trying to achieve with the encouragement of FIA is to have net zero carbon emissions by 2030 (Mittal, 2024)

5. Problem Solving

In the engineering industry, engineers encounter dozens of problems frequently. There are various of different problem-solving options to find a solution for those issues.

Firstly, a starting point for a team of engineers is to use the root cause analysis (RCA) procedure. The RCA is a constructed step by step method that pinpoints the underlying issue preventing recurrences, to have an effective outcome all underlying issues must be considered and placed within the three categories:

- Root cause
- Causal factors
- Non-causal factors

When using RCA engineers must indulge deeper than the initial portrayed symptom, they must inquire, and utilize the general principle of RCA, to ask why 5 times. For example, a scenario about a depleted car battery. (Roseke, 2025)

1. Why has the battery died?
Alternator not charging properly.
2. Why is the alternator not functioning properly?
The belt may be stretched causing it to break.
3. Why has the belt snapped?
Possibly not been replaced and worn-out overtime.
4. Why has the belt not been replaced?
Causing factors may be that the vehicle has not been serviced.
5. Why has the vehicle not been serviced
Vehicle owner skipped designated maintenance. (Maxthecarguy, 2024)

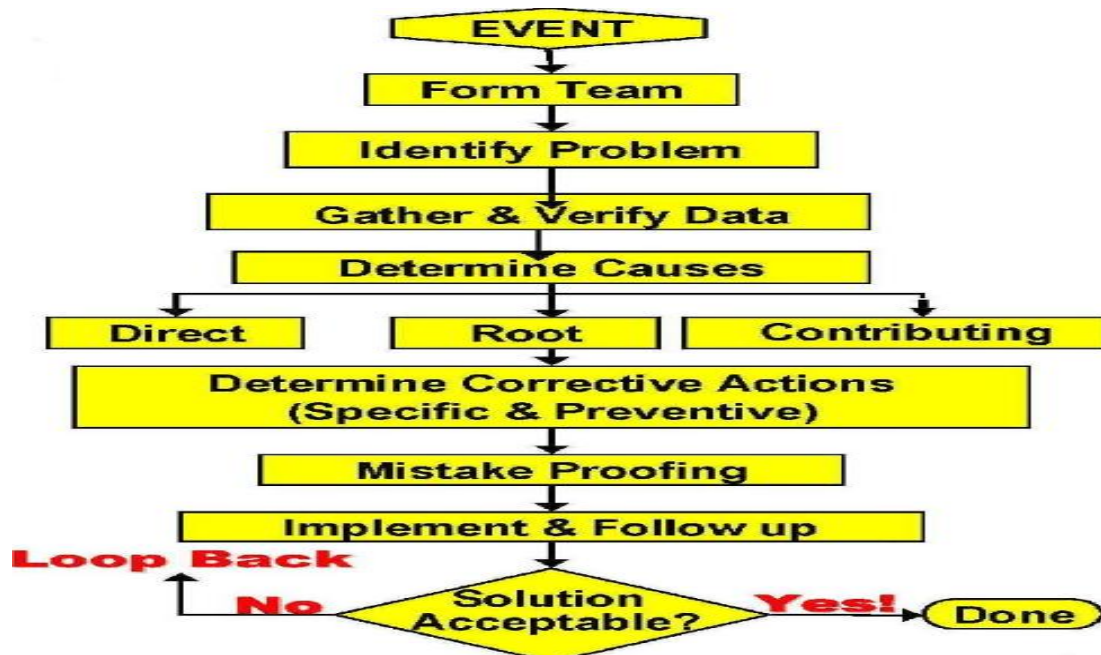


Figure 3 cited from (Spasojević-Brkić, 2011)

Furthermore, an alternative problem-solving option that engineers can undertake is using Computer Aided Design (CAD) programs. With CAD programs, engineers can have a proper visual representation of the product meaning they are able to promptly aid the issue, with the support of many tools such as the simulation tool, this enables engineers to analyze how their product interacts with real world conditions. With CAD they're able to dictate the specific area where interferences occur within the 3D model therefore, they can implement real time improvements. (ARUSI, 2024)

6. Team Structure

Within the engineering field, engineers must coherently work together to have the best possible outcome when working on a project. My personal experience working within a team of more than 3 people would have to be foundation year of this degree, my team were set a task to plan and design an entry for the Richard's Castle Soapbox Derby.

Initially we had to communicate with one another stating our strong suits and the topic that had our most interest in within this project. This is a solid foundation to start distributing key roles as we've shared our strong topics relating to the project, within this project we had roles:

- Designer
- Drivability research
- Dynamics research
- Administrator/minute taking/organizer
- Costing research
- Materials research

Our group had individuals that came from the automotive and the motorcycle sector, therefore leading to better brainstorming of solutions and increased innovation as each member would contribute their own special knowledge within their fields when designing our soapbox. My team then decided to have a weekly designated meeting to ensure everyone was up to date in terms of research and weekly progress checkup, needed to ensure efficiency for the deadline. In terms of how we communicated our research to one another, a member of our group created a shared word document allowing us to proofread each other's research and keep everything up to standards.

Time management was essential as it ensured everyone stayed on task, my team utilized a GANTT chart to keep track of time meetings, attendance and how much time we spent on each task. Unfortunately, two members of our group were no longer with us, but that

misfortune did not lead our team astray, we maintained composure and continued with the task.

After a prolonged amount of research, the type of team structure that mostly resonated with ours is the flat structure. This type of team structure promotes a huge amount of individual research as there are no supervisors for each section hence meetings were implemented to keep in check of progress. (Team Asana, 2025)

In addition to this, an alternative type of team structure that could have been appropriate to utilize is matrix structure, this would be an excellent structure to use in the future as it would have supervisors on each section promoting increase in efficiency and there would be no need to time management tools. Unfortunately, all team structures have negative points, this team structure can cause confusion as managers and supervisors could have conflicting instructions/priorities. (Team Asana, 2025)

7. Conclusion

In conclusion, the purpose of this report is to have an overview within the engineering safety section. Understanding how health and safety is crucial within a workplace. Comprehending various roles within the engineering industry.

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