

# **MMAN1130 – Design and Manufacture**

## **Engineering Standards & Engineering Drawings Test**

**Date: 25/06/2021**

**zID: z5320158**

### **Part A: Short Answer (30 marks)**

Q1. One of your brilliant engineering friends has an amazing idea that they want to use to create a start up to make all the money. However, they are frustrated because they need to comply with various Australian Standards. They feel such stringent rules stifle innovation and make it difficult to be truly competitive. You couldn't disagree more! What are the reasons you give to convince your friend to the importance and/or benefits of complying with various Australian Standards? (12 marks)

Ans:

Hi "bestfriend",

I honestly understand where you are coming from, so many rules and standards that you need to abide by, it makes a lot of sense to be frustrated. Although allow me to open your eyes to a different perspective of all these standards. Imagine every Tom, Dick and Harry wanted to explore their creativeness, and wanted to create whatever they want. Now there's nothing wrong with creating what you want, but then imagine they started mass selling it to everyone around Australia and this product breaks down and is actually harmful to the person, because when creating what they wanted they thought "oh who cares", now extrapolate this thought process across hundreds of companies across Australia. This creates an issue with quality control, is the quality up to standards, is it safe, from quality control this leads to customer satisfaction, are the customers happy with what they have? Everyone is doing what they want and not abiding by any standards. Standards are created by experts who agree what the minimum threshold for safety should be. These standards lead to good work design by the companies and ensures that everyone buying their product will be safe. It provides a general consensus and understanding to make things much easier for generations to come. Imagine one person wanted to create his own custom bolt for his car for every single location to hold the engine together, it will cause mayhem and waste resources trying to repair this car to get it back to functioning state if it was damaged. Additionally, it aids in the aspect of the law and consistency, setting a standard so people are not cheated out of a quality product, imagine I get a car with bald tyres whilst you get a car with Bridgestone tyres, I will feel like I am getting a lesser of a product.

These are the reasons why standards are important when designing things for mass production and for a long-term effectiveness.

Q2. Your Australian company has a partner company from Europe. The European company has sent some engineers across to help with the design process of a new product. However, when they show you some engineering drawings they have made, you realise that they are in 1<sup>st</sup> angle projection. Your European colleague explains to you that this isn't a big deal. However, the products will be manufactured in Australia.

- a) What is the difference between 1<sup>st</sup> and 3<sup>rd</sup> angle projection? (2 marks)

Ans: imagine shining a light from the front of a 3d object onto a white wall. The shadow that comes out the back is the "1<sup>st</sup> angle projection" whilst third angle projection of the object would be the face "Facing you" whilst looking at the box.

- b) Given the fact the product will be made in Australia, will this cause a problem? (1 mark)

Ans: Yes, because as a manufacturer is looking at the design thinking that the front is what's facing him he will end up manufacturing it in reverse.

- c) What must be done to correct this issue? Provide justifications to help your European colleagues understand. (3 marks)

Ans: Communication between the European company and the Australian company will be paramount, whilst stating what angles of projection were used. In solid works though I would right click and go to properties of the sheet, and the option to switch third angle to first angle or vice versa is there.

Q3. A fellow engineer working on a large "portal friendly" vehicle contract with GLaDOS Industries has approached you with a plan to prove compliance to the following requirement.

66.2.5.4. A 'Seat' with no other 'Seat' behind it is required to withstand a horizontal longitudinal force of 10 times the weight of the 'Seat' together with the loads of any seat belts mounted on the 'Seat'.

He reveals that his plan is to build a prototype and then do crash testing. Celebratory cake will be eaten later. What do you think of his plan? (4 marks)

Ans:

I think cake is always a good celebrating factor, although prior to crash testing, clarification of the standard would be paramount to make sure that he understands the complete requirement of such a standard. If the standard is unclear as it is in this case, we would seek advice from the standards personnel. Then we would continue to the crash site to test the safety of the seats in the specified requirement.

Q4. Your friend is a fan of the Fast and Furious movies and is looking to do some interior modification to her 1965 Ford GT40. She has read the relevant standards and to comply is thinking of mounting a mini TV into the front dashboard, well below eye view to be safe. Read the following standard for displaying television and visual display units in vehicles.

"All television receivers or visual display units and their associated equipment must be securely mounted in a position which is unlikely to increase the risk of occupant injury."

- a) Do you think this is a well written standard? Why or why not? (2 marks)

Ans: I think this is not entirely well written as it is a very subjective standard. Someone may understand certain positions to be entirely safe whilst others may disagree. Although the fact that it must be securely mounted in a way out of harm's way does need to be discussed further.

- b) If you have concerns with this standard, explain what you think the issue is? Give an example of how it may cause a problem. (4 marks)

Ans:

I believe the part “unlikely to increase the risk of occupant injury” needs to be clarified as the most optimal position for a tv set would be fastened in the boot, although this disregards the purpose of functionality. To further expand on this standard certain boundaries, need to be set for optimal placement as well as consideration of functionality.

- c) In your opinion, will your friend be compliant if she proceeds as planned? Why? (2 marks)

Ans:

Yes, because a mini tv can be the size of a typical 16-inch navigator that is inbuilt into the dash of almost all modern cars. Hence proceeding with this idea can easily be applicable to the scenario.