

Workshop project – technical report

Introduction:

During this report I will be looking at one of the practical sessions we undertook as part of this module. I will discuss the health and safety regulations relevant to the workshop we were working in, the processes of manufacture used, and any issues encountered during the process.

Health and Safety:

Whilst working in the workshop, health and safety is very important. Taking precautions is important to protect both yourself, and others in the workshop.

It is important that whoever is in charge of the workshop ensures the safety of everyone within the workshop (Health and Safety at Work etc. Act 1974). This includes ensuring that precautions are taken to minimise the risk of injury and that where necessary the appropriate PPE is worn. It is also their responsibility to ensure that the people in the workshop are proficient in using the equipment they are working with [CITATION UEd15 \l 2057]. It is also their responsibility to ensure that the equipment is maintained and safe to use [CITATION Wor18 \l 2057].

In areas such as the workshop where there is a significant risk of injury, it is necessary to have at least one first-aider present, in addition to a first aid kit [CITATION Hea18 \l 2057].

Although PPE (personal protective equipment) should only be used as a last resort [CITATION Hea181 \l 2057], it is not always possible to eliminate all risk. In the case of the workshop, precautions, such as placing heavy objects on the ground, were put in place. However, there are situations, such as when heavy objects are being transported, where PPE such as steel toe capped protective shoes are required as a last resort. Another piece of PPE required is eye protection. Although the tools such as the lathes and pillar drills have guards to prevent small cut-offs from hitting you, these are not perfect and are often designed to only protect the operator of the tool. To protect ourselves we always wore eye protection when any of the machines were being operated.

Long term protection is also very important. Especially hands and hearing can often deteriorate if appropriate protection isn't used. For your hands, it's important to make sure you wash them often, use barrier cream and where necessary wear gloves. It is also important to make sure sharp edges are de-burred to prevent cuts. As for ear protection, which wasn't necessary for our sessions, when loud equipment is being used ear protection should always be used.

It is always important to take into account not only what you are doing yourself but also what others in the workshop are doing.

The procedure during this session continued on from the previous one. In the previous session the part had been prepared for the lathe and the first two diameter steps cut into the profile.

[illegible]

ENGINEERING MACHINE SHOP

TEST PIECE 1

Striped Bar Diameter

Equipment

Centre lathe and its equipment, a selection of cutting tools, marking out equipment including vernier callipers, a micrometer and a rule.

Lathe Operations

1. Locate the work with a short projection in a three jaw chuck.
2. Set a right hand lead edge tool in the tool post to the correct tool height. (use the revolving centres to set the tool height)
3. Select the correct spindle speeds and feed rate.
4. Face off both ends of the bar to create a good square finish. (If face does not clean up then turn height is incorrect)
5. Put the work on the chuck leaving approximately 35mm projection.
6. Turn the work 35mm diameter a 25mm length.
7. Place the work back into the chuck, stick on the face, zero the digital readout and take the excess off the bar. (Remember not to take more than 1mm off at a time and also ensure that the correct end is machined).
8. Locate a centre drill in the chuck (located in the tail stock) and centre drill the work.
9. Using the correct size drill (give experience) drill a hole 35mm deep.
10. Using a 6mm tap and hand tapping tool, thread the hole 15mm deep.
11. Re-adjust the work on the chuck with 55mm projection. Locate the tailstock engineering centre (if used, should be holding on the smaller diameter).
12. Turn:
25mm dia x 35mm
25mm dia x 25mm
30mm dia x 22mm
40mm dia x 22mm
13. Change the tool to a chamfering tool, set the correct height to the centre of the revolving centre.
14. Machine a 5mm x 45° chamfer on one end of the work piece and a 3mm x 45° on the other side.

Now that the tools gauges are calibrated I started cutting the radii. Since it is important to cut in small increments (0.2mm in this case) it makes sense to cut from right (the end of the part) to left (the clamp). This means that as you cut down you are passing over smaller sections of the part. Using the Y-axis to measure how far along the part to cut, I cut 60mm of the surface down to a 36mm diameter. As I got closer to 36mm, to make sure I didn't cut too much material away, I re-adjusted the gauges by re-measuring the diameter with the calipers. At this point I also started cutting in smaller increments.

Following this I repeated the steps for the 36mm diameter to cut the 28mm and then 25mm diameters.

Discussion and Conclusions:

At the end of this session the part had the rough overall shape of the final part, leaving only a few holes to be drilled and chamfers to be cut.

This session helped me to practice cutting and measuring techniques on the lathe that I had learned in the previous session. This allowed the processes to become more natural for a quicker overall manufacturing process.

This session also helped me practice precise working on the lathe.

Bibliography

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