**Engineering forming and processes**

***What the exam board say:***

***This means you need to be able to:***

* Identify different processes in Engineering
* Describe how these processes are used to produce different products
* Explain health and safety considerations
* Analyse how successful outcomes are made or corrections are made

***Learning intent:***

Understand how engineered products are made successfully and safely using different materials and tools/ machines appropriately.

***Success criteria:***

L2 Distinction: (**bold below**) Explain stages of making products in engineering including the health and safety and how to make an excellent outcome.

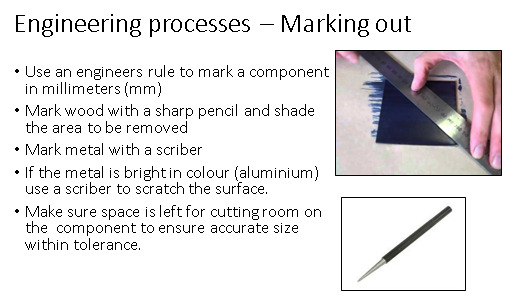
L2 Merit: (underlined below) Describe stages of making products in engineering including the health and safety and how to make a good outcome.

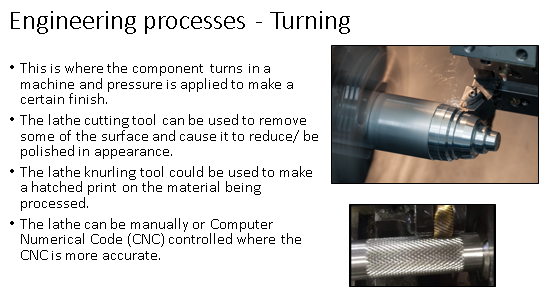
[](https://www.google.co.uk/url?sa=i&url=https%3A%2F%2Fknowledge.axminster.co.uk%2Fpillar-drill-accessories-make-perform%2F&psig=AOvVaw1Jfm8DLdI-a1IMe_K-N94W&ust=1577264009144000&source=images&cd=vfe&ved=0CAIQjRxqFwoTCIjIv7z0zeYCFQAAAAAdAAAAABAD)L2 Pass: (*italics below*) Identify stages of making products in engineering including how to make an outcome.

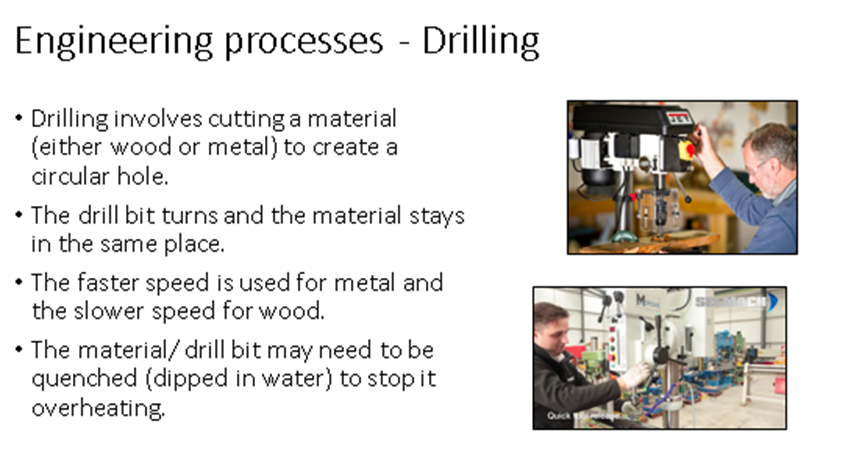
***WAGOLL:***

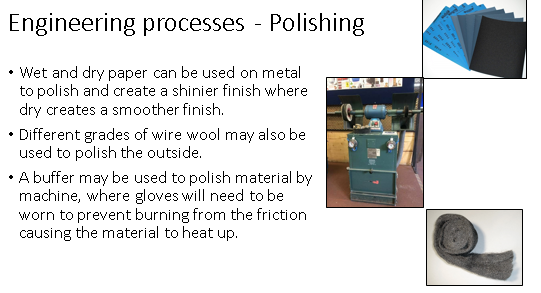
A pillar drill is a piece of engineering machinery which works by the *process of turning, creating friction and abrasion which will make a circular hole in a material.* *It is used for both wooden and metallic materials, however a faster speed (higher gear) will be used on metallic materials to ensure it can drill.* **If the faster speed is used on softer wooden material it can negatively impact the outcome as it can cause burn marks or ignite the material.** **Should especially hard materials e.g. mild steel, be used then either the material or the drill bit could be quenched in either water or oil to attempt to lower the temperature or improve the quality of the finish.** *The drill bit can be varied to change the size of the hole produced, with particularly large holes being drilled by a Forstner bit. It is important that only light pressure applied with a drill to ensure that the drill bit does not break.* The safety guard should always be used and safety goggles worn to prevent injury from swarf. The user should always be trained on how to use the machine properly and be aware of where the emergency stop is located. Finally, the user should not have long hair or loose clothing which will prevent injury from entanglement.

|  |  |  |  |
| --- | --- | --- | --- |
| ***Name (identify)*** | ***Picture*** | ***Describe what used for***  ***(L2 Merit)*** | ***Explain how used to produce good outcome***  ***(L2 Distinction)*** |
| Tennon saw | [Image result for tennon saw"](https://www.google.co.uk/url?sa=i&url=https%3A%2F%2Fwww.axminster.co.uk%2Fvictor-tenon-saw-910306&psig=AOvVaw0RTJQePsR79jn6dIcxmdv-&ust=1577264308578000&source=images&cd=vfe&ved=0CAIQjRxqFwoTCLCRj8n1zeYCFQAAAAAdAAAAABAD) | A Tennon saw is used for cutting straight lines in wooden material. It remains straight due to a rigid brass bar at the top of the blade. | It is used correctly by applying pressure with a bench hook holding material in a vice. When using your finger should align with the blade to ensure a straight cut. |
| Hack saw |  |  |  |
| Coping saw |  |  |  |
| Vernier Callipers |  |  |  |
| Odd leg  Callipers |  |  |  |
| File |  |  |  |
| Scriber |  |  |  |
| Centre punch |  |  |  |
| Hammer |  |  |  |
| Mallet |  |  |  |
| Engineers square |  |  |  |
| Taps |  |  |  |
| Dies |  |  |  |
| Chisel |  |  |  |
| Tri square |  |  |  |
| Centre marker |  |  |  |
| Screwdriver |  |  |  |
| Engineers rule |  |  |  |









***Research the processes below and explain these using the format of the example.***

* **WAGOLL: Sanding**
  + Identify when the process is done and different tools and machines used.

This is done with glass paper on wood where different grades of paper will be used. Wet and dry paper could be used for metal and can produce a smoother polished finish.

* + Describe what happens so the process is done safely and successfully

The material is held in a vice or clamp and the paper is moved over this until a smooth surface is created. It can be adjusted where a sanding board is held still and the material moved over this. A belt sander can be used for a mechanised process where larger amounts of material are removed.

* + Explain where the process is applied and how a high-quality finish is achieved. Explain how the process changes for different materials.

Sanding involves using gradually decreasing graded paper to create a smoother finish. The belt sander should only be used to remove large amounts of materials and can cause inaccuracies in the finish. Different paper is used for metal as opposed to wood.

* **Milling**
  + Identify when the process is done and different tools and machines used.
  + Describe what happens so the process is done safely and successfully
  + Explain where the process is applied and how a high-quality finish is achieved. Explain how the process changes for different materials.
* **Sawing**
  + Identify when the process is done and different tools and machines used.
  + Describe what happens so the process is done safely and successfully
  + Explain where the process is applied and how a high-quality finish is achieved. Explain how the process changes for different materials.
* **Annealing**
  + Identify when the process is done and different tools and machines used.
  + Describe what happens so the process is done safely and successfully
  + Explain where the process is applied and how a high-quality finish is achieved. Explain how the process changes for different materials.
* **Brazing**
  + Identify when the process is done and different tools and machines used.
  + Describe what happens so the process is done safely and successfully
  + Explain where the process is applied and how a high-quality finish is achieved. Explain how the process changes for different materials.
* **Casting**
  + Identify when the process is done and different tools and machines used.
  + Describe what happens so the process is done safely and successfully
  + Explain where the process is applied and how a high-quality finish is achieved. Explain how the process changes for different materials.
* **Joining (permanent and temporary)** 
  + Identify when the process is done and different tools and machines used.
  + Describe what happens so the process is done safely and successfully
  + Explain where the process is applied and how a high-quality finish is achieved. Explain how the process changes for different materials.
* **Preparing materials** 
  + Identify when the process is done and different tools and machines used.
  + Describe what happens so the process is done safely and successfully
  + Explain where the process is applied and how a high-quality finish is achieved. Explain how the process changes for different materials.

**Computer uses in Engineering**

***Identify the following terms:***

CNC – Computer Numerical Code

Datum Point – The point where a computer starts on a material.

G-Codes -

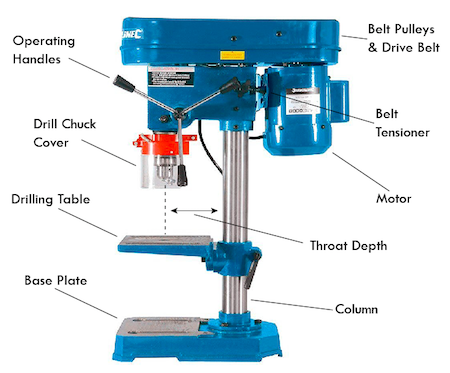
CAD -

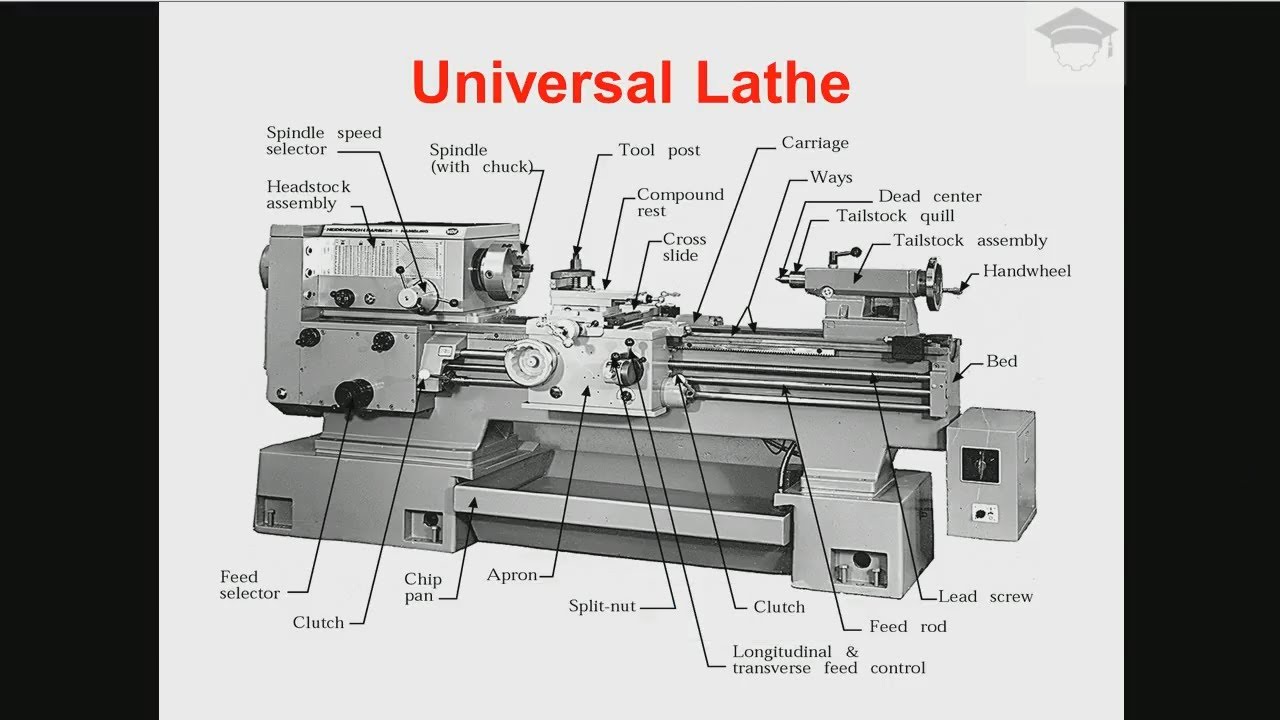
CAM -

***Describe applications where CAM is used in Engineering.***

***Explain the advantages and disadvantages of computer aided manufacture over manually producing an engineered component.***

**Parts of machines**

[](https://www.google.co.uk/url?sa=i&url=http%3A%2F%2Fwww.diyfidelity.com%2Fpower-tools-uk-reviews%2Fpillar-drills-drill-press-in-the-uk%2F&psig=AOvVaw2Cx3MHFGbTnfj6PlxHt86u&ust=1577262952941000&source=images&cd=vfe&ved=0CAIQjRxqFwoTCNjBgsPwzeYCFQAAAAAdAAAAABAD)

[](https://www.google.co.uk/url?sa=i&url=https%3A%2F%2Fwww.youtube.com%2Fwatch%3Fv%3D1e6L6Gk0RbI&psig=AOvVaw1pZDtsA4r55P0lHAO1ZdqQ&ust=1577262839887000&source=images&cd=vfe&ved=0CAIQjRxqFwoTCLjwh4_wzeYCFQAAAAAdAAAAABAs)