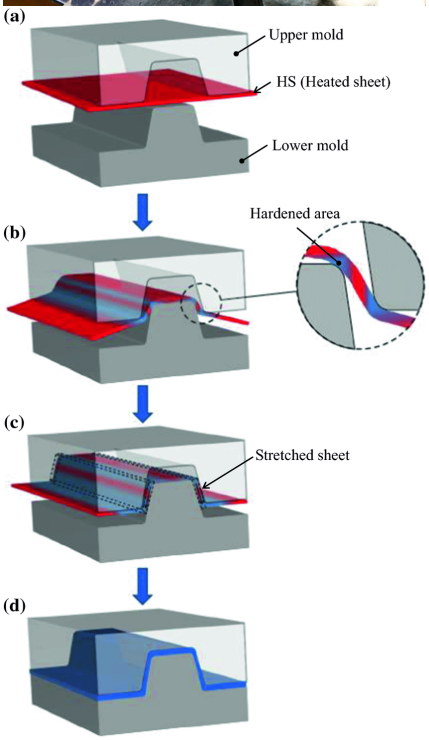
4 Processes used to make the car stand

Stamping:



Stamping is when metal is heated (usually but you can stamp some materials without heating it) and stamped using rams to force it into shape. The metal is then cooled and removed from the machine ready for the next piece.
The stamping tool can only do one mould at a time and a new stamp head an base will need to be created to make a different product which takes time and money, making this process only useful for large batch production.

Health and safety:

- Safety goggles must be worn as they will stop potential injury from parts being flung when under pressure.
- Gloves are to be worn to reduce the chance of being burnt by the machine, products created and the residue which all could be over 800°C.

Legislation/ regulations:
The Health and Safety at work act 1974 requires employers to train employees properly to reduce the risk of injury. There would also have to be signage saying do not trap or burn your hand in the mechanism.

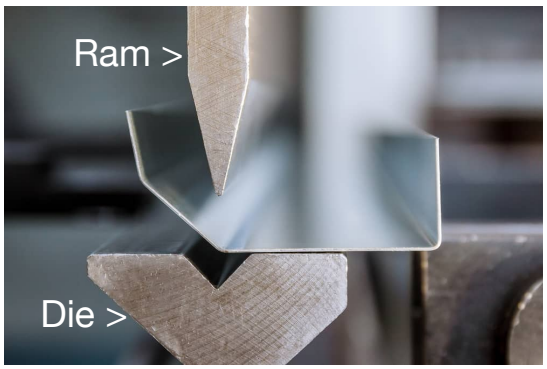
Effectiveness:
Stamping is a mass manufacturing technic which produces a large amount of product in a short space of time. Standing can't have issues. For example, if the timing of the machine sped up creating unusable parts it will keep crating those usable parts until the machine is adjusted therefore, regular quality checks are essential.

Would it be useful?
Yes as stamping can be used to create simple products like washers which are easy to manufacture with stamping however it would only be useful in large batch production.

Human Factors:
If someone sets up the machine wrong or gives too much of a gap between the stamps lots of material can be wasted before the error is noticed as most stamping machines create product very quickly.

Thomas Charnock

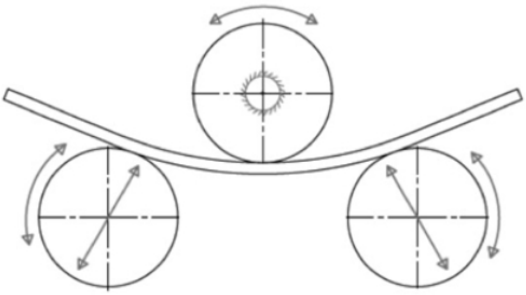
Metal bending:



Metal sheet bending is when a sheet of metal is bent using force. There are multiple different types of metal benders but most have a single ram and die like in this image. ———————>

The ram and die fit together like as pair, if you change the ram you must change the die (they may me changed for different products to be made using the same machines).

There are metal benders for curved edges > They use three rollers to crate a more natural curve.



Health and safety:

- Safety goggles must be worn as they will stop potential injury from fragments that may be propelled at the user.
- Gloves are to be worn in some sernorios such as with normal metal benders (the first image) however if you are feeding the metal in or out of the machine it can increase
- The machine should be warmed up before use in cold weather.

Legislation/ regulations:

The Health and Safety at work act 1974 requires employers to train employees properly to reduce the risk of injury. There would also have to be signage saying do not crush your hand or catch a pice of clothing in the Machine.

Effectiveness:

Metal bending would be very affective to get the exact angle required as unlike a line bender it is done in seconds. Metal bending is very reliable and manufacturing can continue almost infinitely as long as there is still materials to put in and the machine continues to work however, some sort of cutting tool is required to create a usable product.

Would it be useful?

Yes as metal bending can be used for unique products with low quantities like on off products as the machine is easily adapted to different angles and for different sized materials.

Human Factors:

If there is and error in the angle when bending the material can be fed back to the machine bending to the intended angle reducing waist however if this is done multiple times it can stress the material.

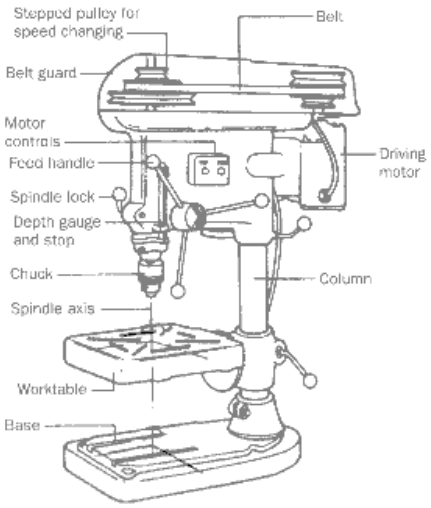
Thomas Charnock

Drilling:

Drilling is using a spinning sharp edge to cut through layers or a material, different length and diameter drill bits can be used for different products.

Health and safety:

- Gloves should be worn to avoid cutting your hands.
- Goggles should be worn to protect against particles flung by the drill bit
- A Safety guard is used to protect agains the material particles being flung when the drill is active.
- An apron should be worn to stop clothing from getting stuck in the drill.
- Any watches or jumpers that could get caught when the apron is on should be removed.



Legislation/ regulations:

The Health and Safety at work act 1974 requires employers to train employees properly to reduce the risk of injury. There would also have to be signage saying do not cut your hand or catch a pice of clothing in the Machine.
COSHH would need to be considered if coolant is used on the drill.

Effectiveness:

The drill bit is the bottleneck of the system as if it is damaged or worn then the drilling will take longer and could be inconsistent. The worktable must be carefully positioned every time with the material unless there is a jig made specifically for the product which would have to be product specific.

Would it be useful?

Yes the dill is very useful as it requires little training to operate and it can be operated by one person. The drill bit can be easily changed with a chuck allowing the operator to change the diameter of the drill for different products easily.

Human Factors:

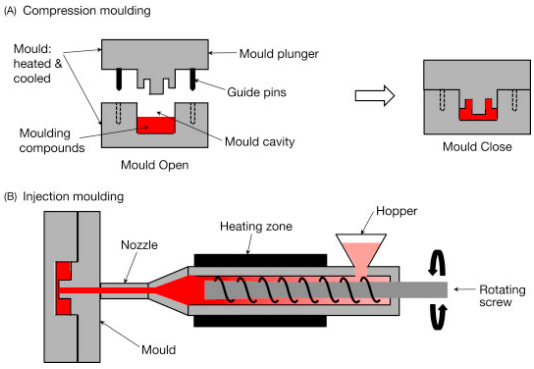
The drill heavily relies on the operators competence to line every thing up properly or the worktable, clamping the item in place for drilling so the product doesn't move out of place or damage the product splitting it or making a wonky hole.

Thomas Charnock

Compression moulding:

Compression moulding is when plastic is liquified and rammed into a mould where it will cooled down and the mould will be opened and the moulded product would then be ejected.

The mould would be left with witness marks and residue which will need to be trimmed slightly.



Health and safety:

- Gloves are to be worn to reduce the chance of being burnt by the mould or moulded product which could be over 180°C.
- Safety goggles must be worn as they will stop potential injury from the machine exploding which is possible under over 100psi.

Legislation/ regulations:

The Health and Safety at work act 1974 requires employers to train employees properly to reduce the risk of injury. There would also have to be signage saying do not burn your hand or catch a pice of clothing in the Machine.

Effectiveness:

Compression moulding is very effective creating a large amount of products very quickly and with good accuracy.

Would it be useful?

It would be very useful as you could compression mould the the car stand chassis which speed up the manufacturing process and create more, stronger and faster than traditional methods.

Human Factors:

As long as the machine is fitted properly there will be little maintenance required and the machine will just need to be filed with plastic pellets reducing user errors.
The die may require lubricant to be applied to reduce the chance of the plastic sticking to the die when it should be ejected, if the lubricant is not applied properly then there may be inefficiencies and possibly broken products or parts.

Thomas Charnock