The following tutorial demonstrates the process of modelling a sliding core.

This will use the side core tool

**Modelling the component**

First of all model the component shown opposite.

Working on top plane drawing a rectangle **120 x 80mm** then extrude upwards by **40mm** applying a draft of **10 degrees**. On completion, apply fillets of **10mm** and shell from below with a wall thickness of **5mm**.

Using the clipping plane the component should look as shown.

**Modelling the cut-out**

Next we will add a cutout to the right hand end as shown. This will be achieved by creating the cut of dimensions shown below, adding fillets or radius **2mm** and the applying draft of **5 degrees** and drafting outwards from the inner edge.

A sliding core will ultimately be required to form this detail.
**Modelling the mould**

Next carry out the standard steps in preparation for creating the mould base.

Finally using appropriate dimensions create the core and cavity block using the ‘Tooling split’ command.

Next hide the surfaces and activate the clipping plane to see the internal detail.

For improved clarity, modify the colours of the individual solid bodies.

As Solid Works uses **green** and **red** for the core and cavity surfaces respectively, I suggest that you might use the same colours for the core and cavity solid bodies.

[Colours may be set by expanding the feature manager, selecting the appearance icon adjacent to the solid body in question and then selecting the colour required.]

When selecting colour I recommend colours from the second row as colour below this come out very dark when printed.]
**Modelling the slide**

On examining the mould in the region of the cutout it will be clear that in order to release the component the piece of metal which forms the shutout must be retracted. This is referred to as and **undercut**. As the component remains on the core when the mould opens; if the detail which forms the shutout were to remain part of (and move with) the cavity side or fixed half then this segment would need to be fully retracted before the mould can even start to open.

The alternative is for this segment become part of the moving half or core side. By doing this it is possible the allow the segment to be retracted while the mould is opening.

This is usually achieved by using guide pins or, where movement is small, by spring loading the slide against an angled face.

It is therefore necessary to cut this segment from the cavity block to produce a slide. It will then be dovetailed into the core side or moving half.

Working on the end of the block create the sketch shown above. On completing the sketch, select the side core tool and choose ‘up to next’ option.

This will separate the segment shown from the rest of the cavity creating a new stand alone solid body.

You are now ready to construct the assembly. To do so export each of the solid bodies (core, cavity, slide and component) as stand alone parts using ‘Insert into new part’ and then insert them into an new assembly.
Creating the mould assembly
First of all create a new assembly called Slide-mould.sldasm

Next insert each part into the mould dropping each part at the origin by choosing accept.
For clarity change to cavity half to transparent. The assembled mould should now look as shown opposite.

At the moment all components are fully fixed, denoted by the letter (f).
As we ultimately want to observe the movement of the mould and slide as the mould opens we want to free up some degrees of freedom.

To do so right click on the cavity block and choose Float.
Next apply assembly relationships to the two pair of corresponding side faces. A to A and B to B. Next drag the cavity block upwards as if to open the mould.

Next ‘Float’ the slide.

To restrict lateral movement, mate the side of the slide with the side of the slot in the cavity block (C to C).
Finally mate the underside of the slide with the parting surface of the core block (D to D)

Now the cavity block is free to move vertically while the slide is free to move in and out as illustrated.

Next we will need to devise a system to move the slide as the mould opens.

In this case we will use an angled face on the slide. This will be operated by angled face in the cavity block.
**Guiding slide movement.**

In order to move the slide there are two possibilities. i.e. guide pins or angle face. In this case we will use the angled face.

In order to clear the component the slide needs to retract by 7.2mm over a mould opening distance of 18mm (this requires an angle of \( O = \tan^{-1}(7.2/18) = 21.8 \) degrees). To allow some clearance we will use an angle of 25 degrees.

To achieve slide movement the slide must be enclosed by the cavity block in order to create the angle face to operate the slide.

To achieved we will cut 10mm of the end of the slide and add a 10mm wedge to the outer end of the slide channel.

Modify both slide and cavity block as outlined.

So far the detail looks as shown.

Next we need to draft the back end of the slide and the corresponding face in the cavity block. Edit each component in turn and specify a draft angle of **25 degrees**.

The arrangement should now look as shown below.

Finally mate the angled faces of the slide and cavity. The will result in the slide moving correctly as the mould opens.
**Operating mould movement.**

Mate relationships are usually infinite. i.e. an axial relationship applied to the rod and cylinder of a hydraulic ram does not limit movement. i.e. rod is free slide indefinitely in either direction.

To limit movement a mate relationship between the piston and end of the cylinder is obviously possible. Different levels of extension can be represented by different distance values.

However, it may be required to allow the rod the slide freely but within realistic limits. While collision detection is possible this can be demanding in terms of computer processing time.

Instead a **limit mate** may be used.

To apply a limit mate select the parting faces of the mould, choose the mate command then under Advanced mates select the distance mate option. Specify:

- **0mm** as the minimum value
- **50mm** as the maximum value
- **30mm** as the current value.

This will move the block to 30mm apart but will allow you subsequently to drag the block between 0 and 50mm.

Move the cavity block and watch the slide move accordingly.

Note the CAD mate between the angled faces is maintained even when not in contact. This is because mate relationships are infinite.

In reality the movement will only operate while slides are in contact, therefore slide movement will need to be limited so that angle faces will come in contact when mould closes.

Finally we need to add the engineering detail necessary for the slide to function i.e. a T-slot. Working on the core, create the sketch shown and cut to an appropriate depth. Add the appropriate detail to the slide to enable it to slide in the slot.

![Diagram of T-slot](image)

This completes the mould slide tutorial.