

➔ Desktop Manufacturing

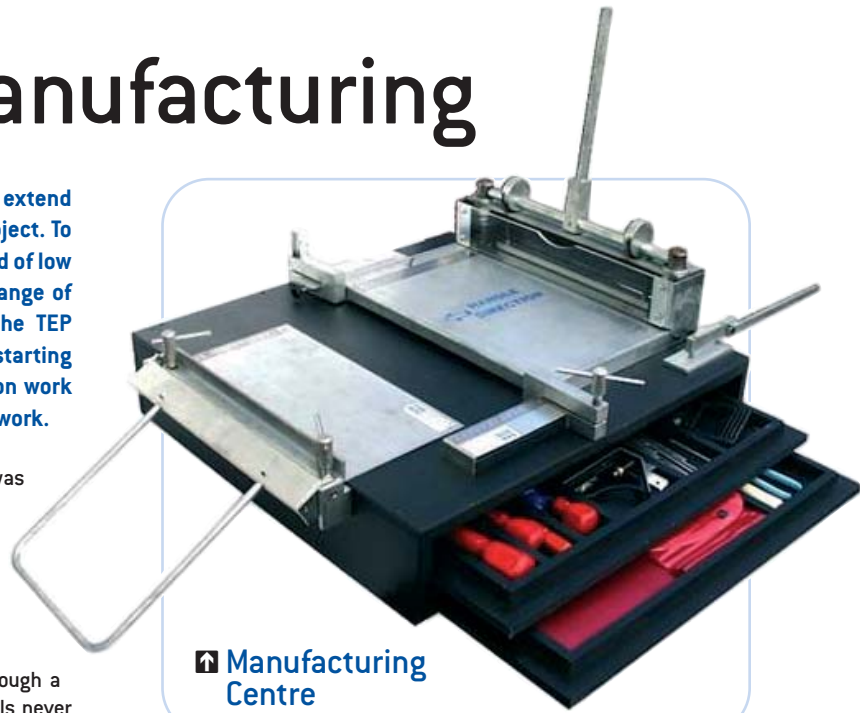
Part of the philosophy within TEP is to promote and extend a range of 'Desktop Making' strategies into the subject. To a large extent departments can implement this kind of low cost approach using existing resources. A wide range of TEP equipment is already available including the TEP Manufacturing Centre which has proved a superb starting point for achieving low cost sheet metal fabrication work from entry at Key Stage 3 right through to post 16 work.

Several years ago when the Manufacturing Centre was launched projects like the TEP Post It organiser became very popular as an introduction to working with sheet metal. A number of examples shown opposite have cleverly integrated a number of other materials and processes to create desktop products.

Sheet metal fabrication seems to be starting to go through a renaissance at long last with the cost of sheet materials never looking so good compared with other forms of stock material. This is not surprising when you consider that you are buying steel and aluminium priced by the kilogram.

So why adopt a sheet metal strategy in school, what are the advantages?

Modelling prior to manufacture is easy in card and bears a high correlation to sheet metal fabricated outcomes. Using the modern range of fixings and fixtures available, working with and assembling sheet metal components together is more attractive. Not to mention the exciting range of pre-coloured and pre-coated materials available. The speed of working with and achieving results is far quicker than with many other processes. The opportunity to integrate CAD/CAM activity is an obvious one, but requires careful consideration, pre-cutting profiles from designs prior to cold forming. Teaching students about nets and developments as part of the modelling process is particularly useful too.



↑ Manufacturing Centre

As part of Engineering and Manufacturing courses, sheet metalworking and fabricating represents a highly appropriate route to teach. A very real relationship to manufacturing industries exists through the process too. With batch manufacture, quality assurance and concepts of fits and tolerances plus use of jigs, is easily delivered.

Tools

The TEP manufacturing centre includes a **guillotine** for cutting sheet aluminium up to 1mm gauge and a **metal folding unit**, both will handle materials up to 300mm wide. Two **hole punch tools** and a **rod guillotine** are also included. It is supplied with a sturdy base unit with two equipment and tool drawers, the centre is an ideal flexible manufacturing centre for all D&T workshops. The only other small investment required to complement it is a set of sheet metal rollers, a set of hand **taper reamers** and a couple of hand **de-burring tools** for a few pounds.



Metal Folder ↑



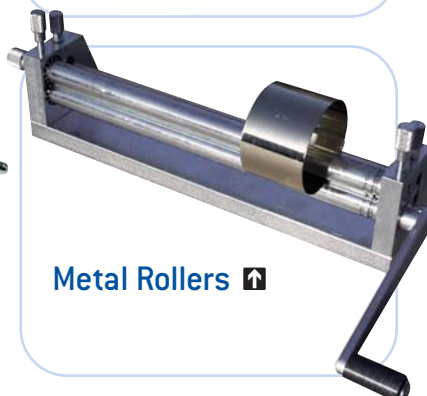
↑ Guillotine



↑ Bar Cutter



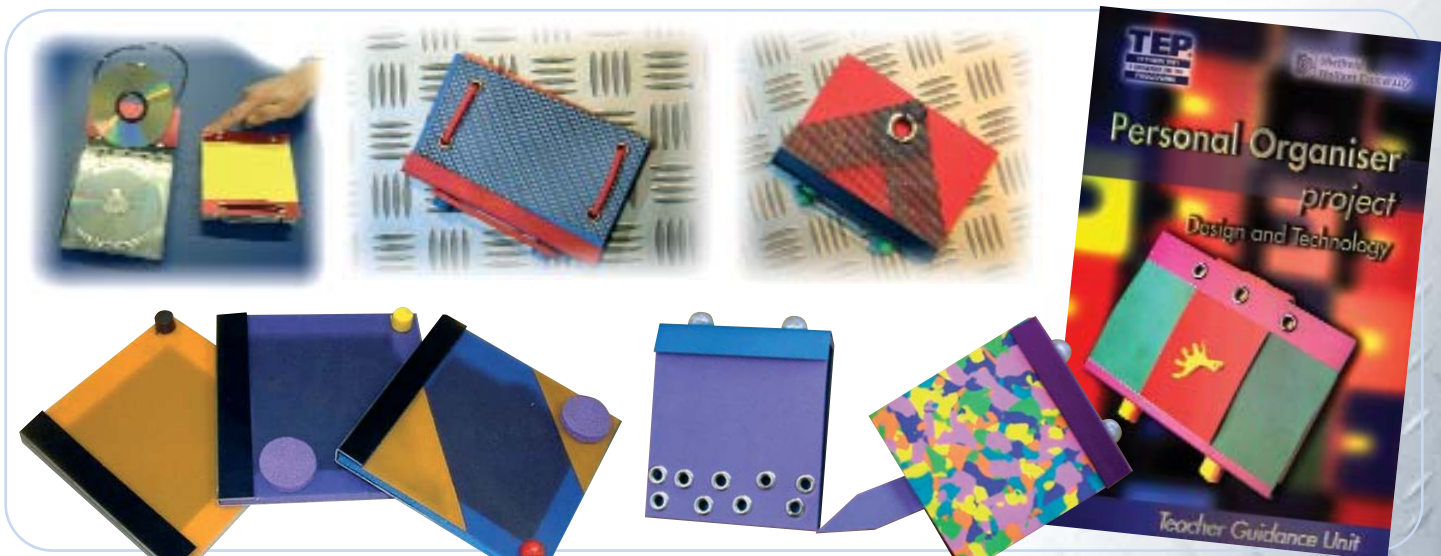
Hole Punch ➔



Metal Rollers ↑



Taper Reamer Set ↑



Sheet metal work can be used in various projects such as TEP Personal Organiser and Desk Tidy

Cutting and Shaping

In particular using the guillotine and punches appropriately and teaching correct use of them will yield great results. The supplied hole punch tools have fixed diameters of 4.7mm and 10mm. Alternatively a wider range of seven hole sizes is possible using a handheld sheet metal punch. However, using hand taper reamers also avoids the pitfalls of drilling sheet materials safely and a budget de-burring tool solves all those issues relating to handling 'unsafe' edges on parts. Marking out, a traditional often messy and altogether intensive aspect of working with metals is also neatly avoided using paper or card templates and does not damage coated and pre-coloured workpieces.

Because the shearing forces are very high and quickly applied, common sense approaches to working with bench mounted tools is required but that also applies to any workshop equipment. The guillotine often represents a challenge to thinking because you have to consider where the datum line and the cutting line is and measure exactly between the two, as almost always the cutting line is obscured by the guillotine blades or safety guard, thankfully. Try getting pupils to do a dry run in card to establish the datum and cut lines.

Keeping up Appearances

Aluminium sheet is undoubtedly the most attractive sheet material to work with especially with an anodised finish in Black, Red, Purple or Blue. There are less expensive alternatives that are no less striking in appearance including Copper, Gold and Silver brushed anodised finish aluminium. There is even a white, polymer coated variation available at very low cost. Sourcing alternative supplies of sheet steel coated or uncoated is possible but far less inspiring for pupils and with the attendant need to colour it and increased effort required to punch it and fold it is an altogether less attractive proposition. Many white goods traditionally made exclusively from mild steel sheet now feature an increasing level of plastic mouldings and aluminium trims. A closer look at the future with car bodies like the new Jaguar, feature extensive use of aluminium and rather limited use of mild steel. Providing longer life, lower weight, ease and speed of fabrication and longer tooling life in industry and in the classroom.

Do note aluminium hardens rapidly during cold working and generally cannot be reworked easily; this is especially so with 1mm thick half-hard aluminium – other thinner grades are more forgiving. The technical appearance of aluminium sheet in all its guises has a machine aesthetic appeal especially when combined with funky fastenings. Creating folds using the sheet metal folder and cylinders, cones and tubes using sheet metal rollers is especially gratifying for pupils where no other way of achieving such results is easily possible.

So do take a closer look at the Manufacturing Centre and explore what can be achieved in fabricating a wide range of components for structures, mechanisms, jewellery, desktop products and artifacts and of course 'almost' rapid prototyping.

Available from Teaching Resources

- Manufacturing Centre – stock code T00 001
- Sheet Metal Rollers – stock code IT5 002
- De-burring tool – stock code T00 021
- Taper Reamer Set – stock code T00 044

Punch Tool Kit ➡



De-burring Tool ⬆

