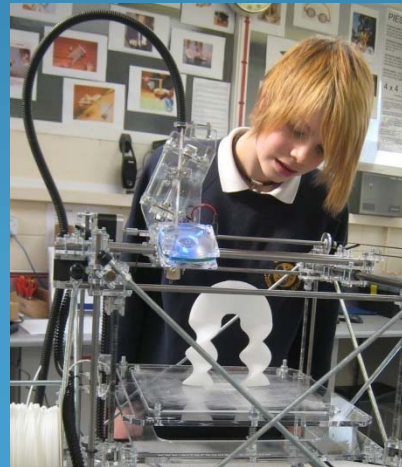


“Clip It” Design Project

Using Pro/ENGINEER and RapMan





Brief

Context: There are many situations where two or more items can be temporarily clipped together using simple removable clips. You should identify a situation where this sort of fixing could be useful.

Brief: Design and make a simple “Clip It” .

Research

- Produce a “Moodboard” with examples of existing temporary clip fixings
- Analyse these clips to find out what features are common to the different designs or manufacturers.
- Carry out some consumer research to find out what different target users would like a temporary “Clip It” to do.
- maybe do some simple modelling (styrofoam or card nets) to test your initial ideas for the “Clip It”.

Specification

- Write a specification for your new design of “Clip It”
- Don’t forget to specify who will be your target user group.
- Specify the main features that your “Clip It” should include.

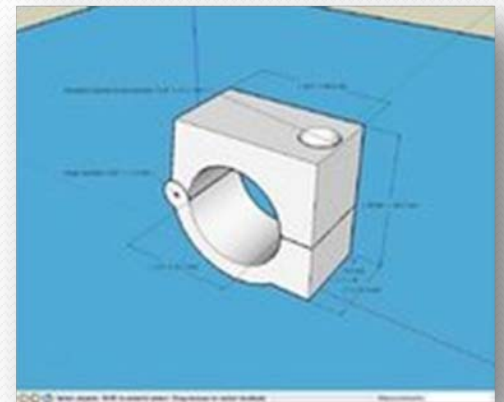
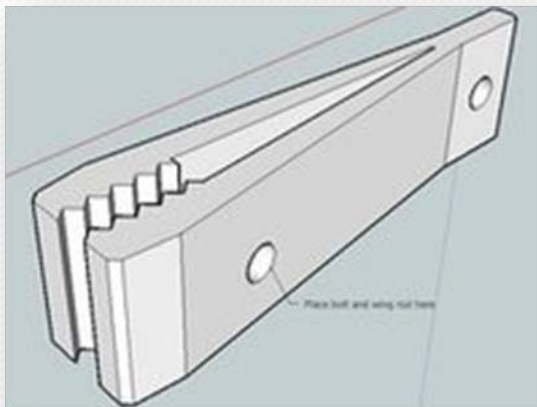
Modelling ideas

- Sketch some initial design ideas. Think about shape, size and function of your design.
- Produce a 3D model of your best design (use quick modelling materials such as styrofoam, card, modelling clay, etc.)


Designing

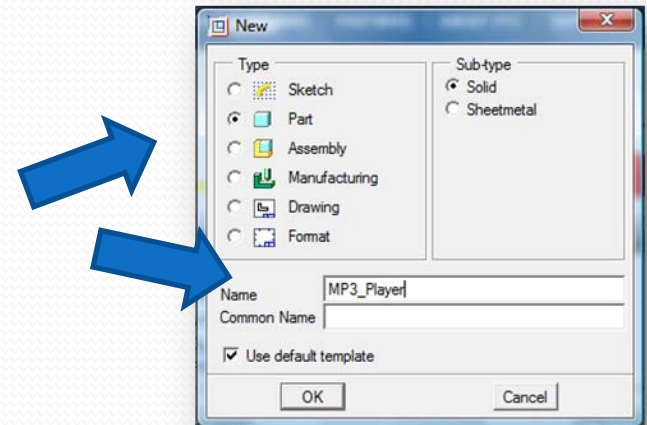
- This project assumes that you are fairly proficient with Pro/ENGINEER. .. So, you're on your own!
- Make sure your design fits within the parameters of the RapMan.
- Use the flexibility of the plastic to provide the springiness of the "Clip It". Avoid making an assembly of separate parts.

Examples



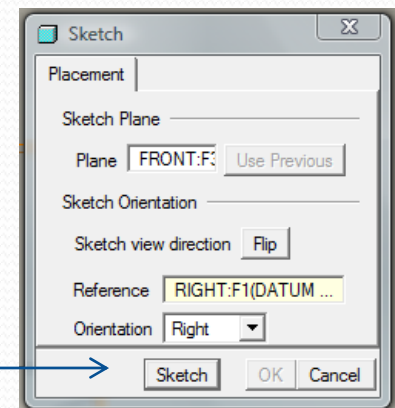
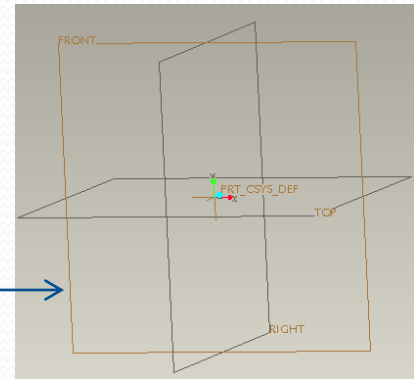
Design with Pro/ENGINEER

- Now that you have a good idea of what your design would look like you need to create your design in Pro/ENGINEER.
- Set up a new folder to save your work in.
- Start Pro/ENGINEER
- Set the folder you created as your “working directory”
- Click on the “New” button. 
- Select “Part” and also type a name



Design hints

- To make manufacturing easier on the RapMan it is best to construct your design on the “Front” workplane.
- Use the “Extrude” tool to create the basic shape of the “ClipIt”.
- Right click on screen and select “Define Internal Sketch” from the menu.
- Pre-highlight (light blue) the front workplane and then click on it.
- Click “sketch” in the popup window accepting the default settings



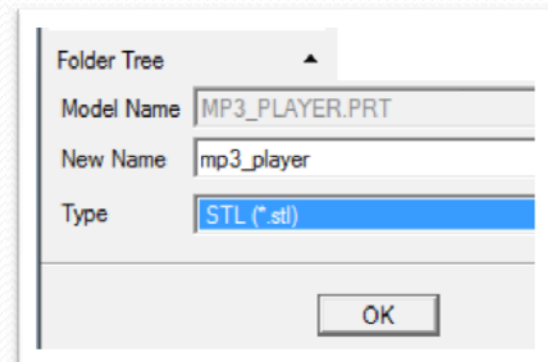
Colour and appearance

- It's really beyond what is required for this project but if you are able to use the “Colour and appearance” feature of Pro/ENGINEER you can render your design to make it very realistic.
- Don't forget to **SAVE** your design!!!



Preparing for manufacture

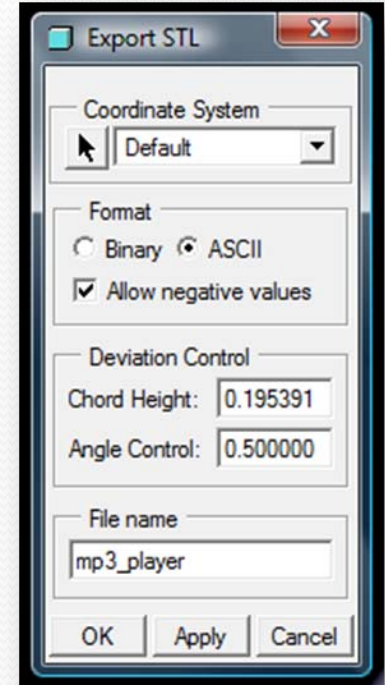
- The programme that is used to convert your Pro/ENGINEER design into a set of instructions (called G-Code) is called Skeinforge.
- Skeinforge does not understand Pro/Engineer files so you will need to convert it into a Stereo Lithography file (usually known as .stl).
- In Pro/ENGINEER make sure that your design is open then click on “File” and select
- “Save a copy”. When the popup
- window opens select STL and
- click OK.



Continued.....

Preparing for manufacture 2

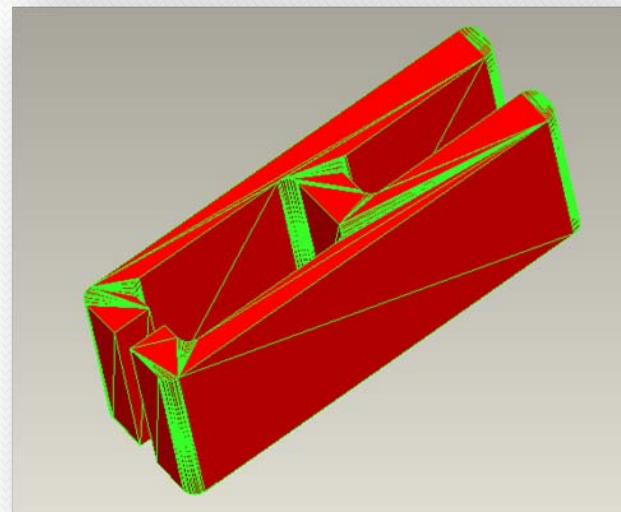
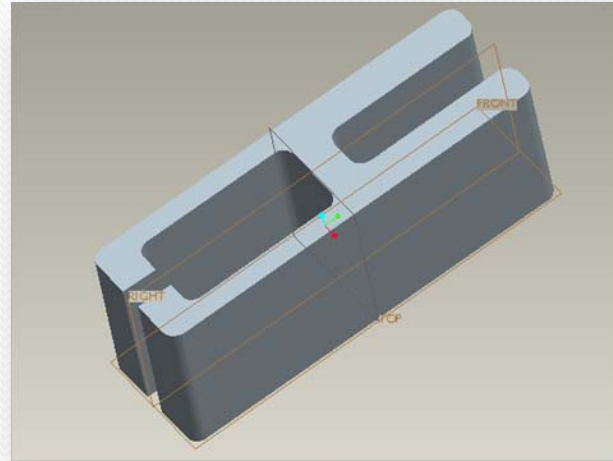
- To export the .stl file you then need to edit a few options.
- Change the format to ASCII
- Type “o” (zero) into the “Chord Height” box and press enter (Pro/ENGINEER will automatically select the smallest value that is possible. This makes the shape as smooth as possible.)
- Click “OK” and the STL file will be automatically saved to your working directory.



Continued.....

Preparing for manufacture 3

- Pro/ENGINEER will have now converted your design into an STL file. The shape is now just a surface made up of loads of triangles.
- STL files are the standard files used by most Rapid Prototyping machines... Including RapMan.



Converting to G-Code

- The STL file now needs to be converted to G-Code (the instructions that control the RapMan. This is covered in a separate PowerPoint- “Skeinforge and Printing”.



RapMan

- RapMan is a low cost 3D printer available from Bits from Bytes www.bitsfrombytes.com
- Further assistance can be found on the BfB forum and wiki.

Forum

<http://www.bitsfrombytes.com/fora/user/index.php>

Wiki <http://www.bitsfrombytes.com/wiki>