“Keep it Safe” Design Project

Using Pro/ENGINEER and RapMan

BITS FROM BYTES

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Brief

Context: There are many situations where small items need to be kept in a container to keep them safe. You should identify a situation where this sort of container could be useful.

Brief: Design and make a simple storage container.

Research

- Produce a “Moodboard” with examples of existing containers
- Analyse these containers 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 to store in a container.
- 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 storage container.

- Don't forget to specify who will be your target user group.
- Specify the main features that your storage container should should include.

Modelling ideas

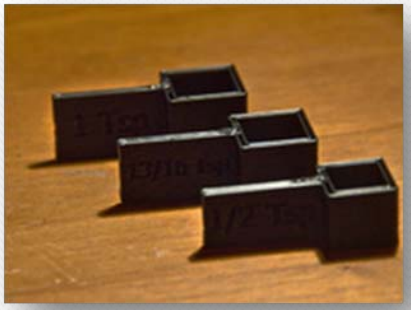
- Sketch some initial design ideas. Think about shape, size and function of your design.
- Produce a 3D model of your best design (use quick modelling materials such as styrofoam, card, modelling clay, etc.)

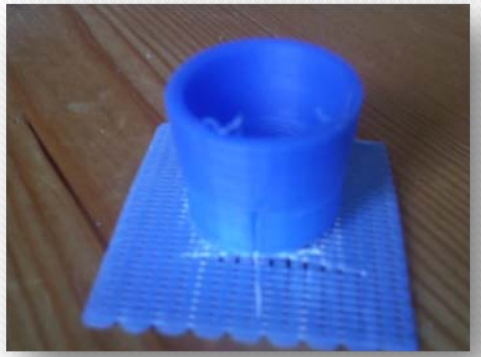
Designing

- 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.

Examples

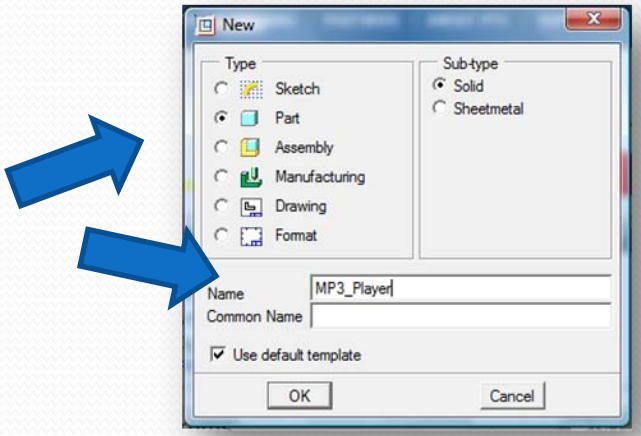




Design with Pro/ENGINEER

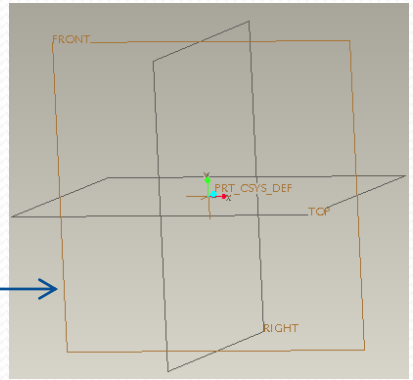
- Now that you have a good idea of what your design would look like you need to create your design in Pro/ENGINEER.
- Set up a new folder to save your work in.
- Start Pro/ENGINEER
- Set the folder you created as your “working directory”
- Click on the “New” button.

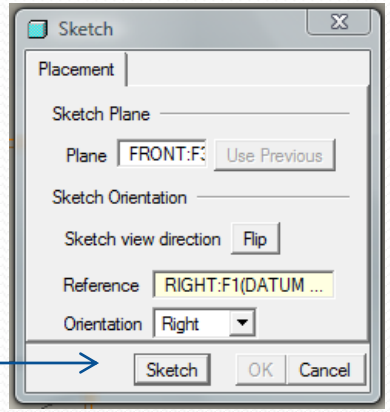
- Select “Part” and also type a name



Design hints

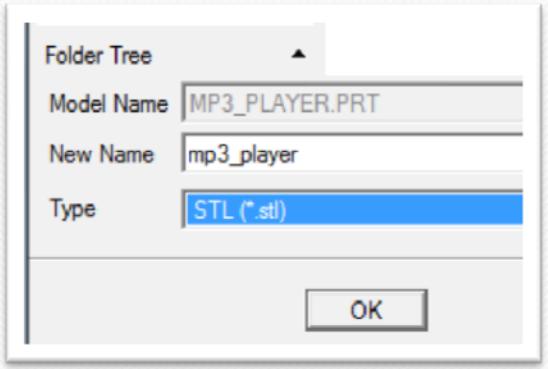
- To make manufacturing easier on the RapMan it is best to construct your design on the “Front” workplane.
- Use the “Extrude” tool to create the basic shape of the “ClipIt”.
- Right click on screen and select “Define Internal Sketch” from the menu.
- Pre-highlight (light blue) the front workplane and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





Preparing for manufacture

- The programme that is used to convert your Pro/ENGINEER design into a set of instructios (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.



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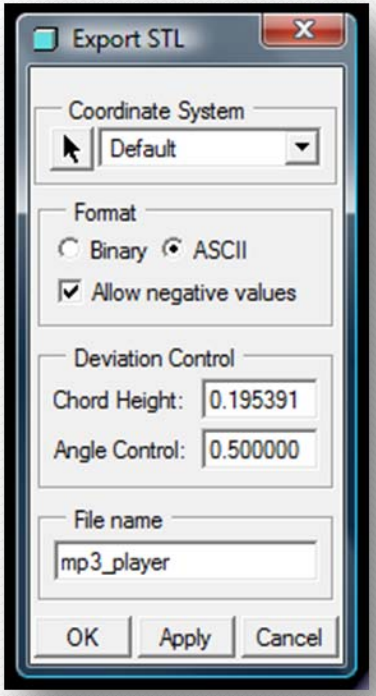
Preparing for manufacture 2

- To export the .stl file you then need to edit a few options.
- Change the format to ASCII
- Type “0” (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.



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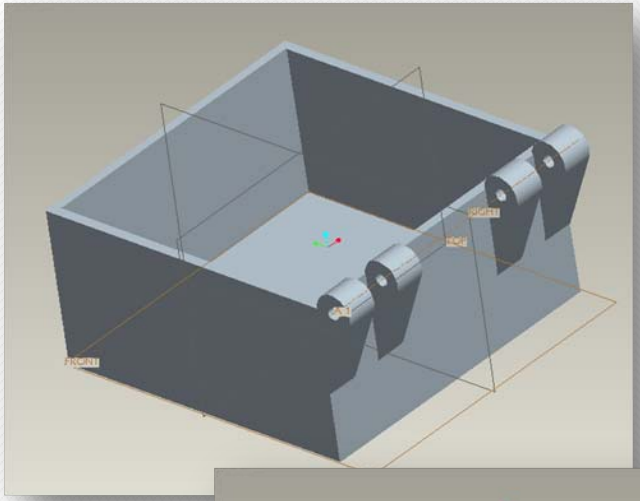
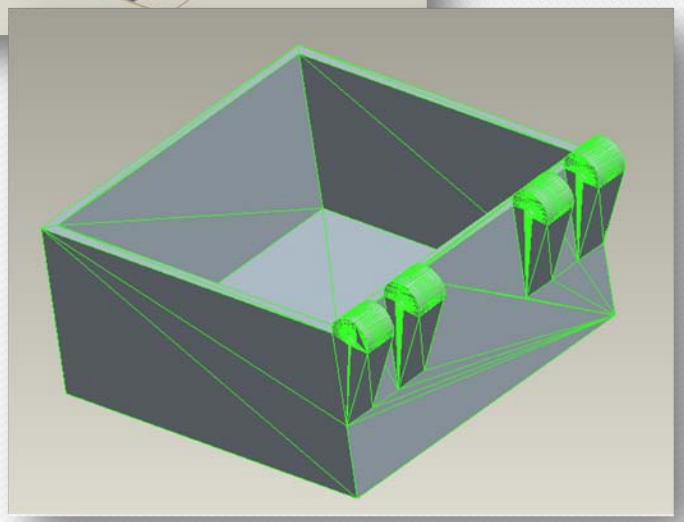
Preparing for manufacture 3

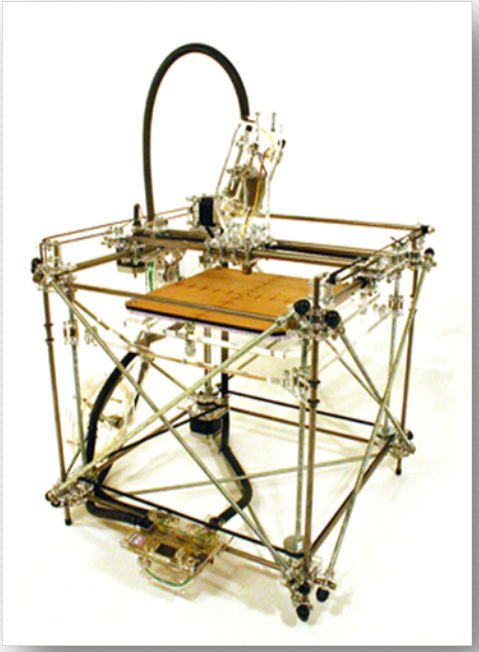
- Pro/ENGINEER will have now converted your design into an STL file. The shape is now just a surface made up of loads of triangles.
- STL files are the standard files used by most Rapid Prototyping machines… Including RapMan.





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