Motorcycle Visual Modification
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Task 3
MOD MANIA
This guide should assist with the modification of any motorbike with the instructions on how to create new fairings for your outdated looking motorcycle. A guide showing the steps in the process that I undertook to modify my own motorcycle and give the capability to operate at night.

Materials
The first thing to consider is the materials for your bike reimagining. Usually the best material has been used for the original panels and is the most obvious and cheapest choice. Plastic was the original material for the bike. It is light, easy to mould and more importantly flexible for when the bike crashes and because of this property gives minimal injury to the rider.

Production
Metal fairing’s where considered but due to the nature of the bikes use a thermo plastic of any sort would suffice. The other reason that this plastic was chosen apart from the reasons mentioned earlier it can be molded using the process of vacuum forming. This involves heating the plastic up to a temperature which makes the plastic easily manipulated. This machining method along with injection molding was used to create the original panels on the bike making it a suitable choice. This method is quick, cheap and easy to create the shapes required for the panels.
Bike disassembly

This is the most crucial stage of the design process. Pulling the original panels of the design shows where the mounting points are on the bike frame and shows how the original paneling was attached. The way the panels are shaped also indicates areas that heat builds up and other strong points are.

To disassemble the 1997 XR 100 Honda you can consult the service guide which will explain in depth on how to remove each part and panel. But as this modification is purely visual no mechanical work needs to be done reducing the need for mechanical knowledge and skill. These bikes are designed to be easy to disassemble with few tools required. A 12mm socket wrench a shifting spanner a large flat bladed screw driver and standard Phillips head. Also the bike as it is a dirt bike needed a good clean. House hold detergent or cleaner will suffice and a rag. Also the damaged stickers where removed which made the bike look better strait way.

Because of the vac forming access issue being that the university’s of Rmit and monash university vac formers are broken, there was no point in wasting good materials on a job that to be done properly needed to be done on one of these machines. So for this guide I will be showing you how I created this finished replica of what my design would look like as a final product. To make this task easier I altered my design to be more plate orientated in its construction giving me a strong a durable 1:1 scale finalized mock up. The materials chosen to replicate the plastic were foam core. It is strong, easily cut, has a slight sheen to the surface finish giving a look of white plastic which was very important as this replica of the final design has to look as close to the real thing as possible. The downside of choosing this material was that it is only available in white and black. This was not to much of an issue as the design was to be white and black with a dark grey replicated with dark grey paper, but it is an issue if you want your bike to be in another colour. Foam core is available in most art and craft stores for any other bulk materials hardware stores and specialist stores can supply.
Initial cardboard mock up-
Even the vac formed version would require an original mock up. This mock up is created out of scrap cardboard or purpose bought. Doesn’t mater and it is a great way to work out any design issues.

- Cutting matt- Saves you buying a new desk
- Double sided tape- Great at joining cardboard
- Masking tape- Great stuff doesn’t damage most surfaces removes easily.
- Box cutter- preferably a snap off blade to keep the edge sharp and provide the best cut possible.

+ With these items you can create all of the existing parts that I have created in this guid excluding the electrical components and materials.

Step 1- After disassembling your motorcycle and seeing the panels that have been pulled of you can use these as a guide to the scale and mounting points needed to attach the panels securely.

Step 2- Make up some rectangular templates which show the mount points and the area that you can design in. ( tip label them for later reference)

Step 3- Start making anything you want in the constraints of these rectangles. When you have reached your desired look. Remove the cardboard pieces. These will now serve as your templates to use on your good material, in my case foam core.
You can start with any section but best to start with the side panels first as they are connected to the tank and rear guard sections of any motorcycle.
Selected Mock up
Sides-
These give scale to the bike and are the largest panels on the Honda Xr 100 at most motorcycles. To make the bike seem bigger as it is a small bike, I shrunk the size of these panels down. To create these panels with the material foam core you will need the following tools.

Items
-Cutting matt
-Box cutter
-Double sided tape
-Soldering iron
-Soldering wire
-Piece of scrap MDF or timber to use as a safe base for your soldering. (don’t inhale the fumes and wash your hands after touching the wire or any of the shouldered components as a health tip)
- Masking tape
- 4 LED’s Blue
-Insulated Wire
-Grey paper
(This list will now be referred to the standard material list (SML))

Step 1- Grab your templates from your mock up and place them onto the material in this case the foam core.

Step 2- Place a ruler or use the template as a guide to mark the cut lines or scribe lines. You can use the template directly to cut.

Step 3- With a fresh blade cut into the material.
Step 4- With a new material you may find it will not fit into an area like cardboard due to its properties or size difference. This is when you have to make adjustment, no design is perfect straight away and changes to your plan have to be made so you can progress.

Step 5- Electronic components- The design requires 2 led’s on each side panel. These are wired in parallel to avoid any lose of light. These blue led’s do not provide a safe driving light and are only decorative.

Step 6- The led’s are require to be soldered together. Using the soldering wire to weld the led to the wire and give it the range to reach the power supply. If you need assistance with your soldering there are many tutorials online and video’s on YouTube to look at.

Step 7- Once they have been soldered check if the circuit works this makes sure you are putting working components in your bike and not dud wiring or led’s. This although time consuming it will save you the trouble in the long run.
Step 8- Power source these led’s will be wired to a breadboard and battery casing under the seat. The reason they are not being wired to the bikes battery is that the possibility of a short would to great and no one wants a flat battery out in the bush. The added advantage of the power supply being under the seat is weather proofing and protection.

Step 9- The black piece for my side panel is cut using a blade and a template.

Step 10- The led’s now need a cradle to securely hold them in position. It is made of black foam core to avoid attention and minimize led hot pots. Hot spots are where the led’s create a concentrated circle of light in one area. Also the grey paper was cut and added to give the led’s a better surface to reflect off.

Step 11- One the components area installed test them again to check they are still working.
Tank Section-
Following a similar pattern to the first panel this requires the same tools and electrical components.

Items
SML

Step 1- Using the existing templates cut out the desired shapes from the material.

Step 2- This design requires bending of the foam core. As this material is stiff, the method of scribing is used. This is where a cut is made at half depth of the material if thick or if thin, lightly on the surface. It creates a sharp clean weakness in the material, that when bent will fold to this weakness. It is a method to create a neat fold. To achieve the large bend multiple scribes are placed in on the back of the panels to create the desired bend.

Step 3- This is a 3 part panel. After the first was bent the 2nd and 3rd are joined by double sided tape. This is to keep it clean and simulate the Araldite an epoxy adhesive that would be used with the real materials.

Step 4- The installation of the electronic components. Because they are far from the seat where the power supply is they have extra long wire attached which can be cut down. It is in experience that connecting two separate wires together to add rang creates weakness, more likely hood of a short and complexity to any wiring job.
Step -5- Although trivial and wires that pass near the tank must be inspected for breaks in insulation. This is just a precaution, but safety is huge factor with motorbikes so why risk it.

+The design for the tank section if vac formed would be a 3 part mould in a tri layer pattern. For strength and looks with different colored layers.

Tail section-
Items
SML
-Only 2 LED’s required

The back mud guard is only effective with length, but also poses and issue especially with dirt bikes with injury this is why they are extremely flexible. With this design I have shortened it although making it less effective it decreases the risk of it injuring the operators back.
The construction follows the previous formula’s-

Step 1- Cut from template                                                                 Step 2- Install components

Step 3- Check if it fits on the bike                                                                 Step 4- Modify to fit on the bike.
Step 5- Check to see if the components work

Front Items SML
- Replace 4 Led’s with 2 3 watt white light led’s.
Along with the side profile of the bike the front gives the bike character.

Step 1- Cut using template as a guide

Step 2- Modify to fit

Step 3- These led’s will give the bike the ability to operate at night due to the fact it hasn’t been able to its entire life. This was the main goal of this mod was to give the Honda the ability to operate at night. 3 watt led’s wired to a switch with easily assessable battery pack that would be larger on the proper model but provided a glimpse at its new found illumination.
Was having issues with the front back cables so I used some sip ties to secure them and allow for the front light pieces to sit more securely.

Another issue was the circuitry adding a switch atop the bar made for quick access to the new lights.

The ease of the light unit going in was a testament to the initial mock up in make an idea 3d and solving space compatibility issues for the different parts.

Front Guard-Items
SML

Step 1- Use the template to cut the material.

Step 2- Scribe

Step 3- Fold

Wrapping the wire around the panel made it more secure and looked nice.
Bush Guards-
Items
SML

Step 1- Use the template to cut the material.

Step 2- Scribe

Step 3- Fold

Well done for making it this far I hope you like the finished final mock up to simulate my design and I hope in the future to post the real one. Good luck with yours and if you picked up one good idea from this it was worth making.