MY MOTORISED SNOWBOARD

By Teddy Isola

The motorised snowboard is self-propelled and aims to make navigating around the slopes easier, it works by using a material called mohair skin. This material is used in cross country skiing and is perfect for my application because it provides a tremendous amount of grip in one direction yet slides smoothly over the snow in the other. The first users of this technology were Eskimos that used a similar material made from seal skin to provide grip on the soles of their shoes whilst walking around the snow.

How does it work?

To this day I have created one prototype, the assistive board. I first thought of making a board that has a continuous powered (mohair) belt inbuilt into the snowboard however due to the small availability of custom sized belts I decided to create a mini version of this that clamps onto the side of the snowboard.

The way the assistive board works is by having two cylindrical rollers that are at either end of an aluminium chassis, one of which is connected to an electric motor via a toothed belt. The non-driven roller provides tension to the mohair belt. The driven roller grips the mohair belt due to the tension and causes the whole belt to move just like a conveyor belt. Using the wireless hand controller, the user can easily control the speed at which the belt turns. Despite the mounting system not being completed, I went ahead and tested the device on the snow. This highlighted the success of the mohair skin as it provided an exceptional amount of grip in relation to its size and outperformed my greatest expectations.

Moving forward

Having tested part of the assisted board I can confirm that my material of choice for the belt is perfect. However, the mechanics of the device still need a large amount of improvement. For example, the motor that drives the whole system takes up most of the space in between the rollers leaving very little space for a battery. To solve this issue, I recently inbuilt the motor with a planetary gearbox to fit neatly inside the driven aluminium roller. Apart from saving space, this new design dramatically increases the overall safety of the device as the toothed belt is no longer exposed. I am yet to build the second chassis for this roller, but on my return in September I am very excited to carry on. I also still have to create a mounting system and test the second prototype.

The problems I encountered

Having first set a target of two months to complete the first prototype at the beginning of the year I quickly realised that this was a huge underestimation partly due to all the problems I encountered on the way. I would say the largest problem was the aluminium welding, I could have avoided aluminium all together and gone for a more user-friendly material such as steel, but it would have resulted in a much heavier product and weight is of the essence. Aluminium welding is notorious for its difficulties but even more so without the

right equipment. I tested many different ‘DIY aluminium welding’ products most of which were a waste of money. I eventually found aluminium arc welding rods that just about stuck all my precisely machined components together.

The most recent aluminium roller had to be built not once but three times, as at every turn I encountered a new problem, that annoyingly made the rest of the components no longer compatible. Along with many other problems I eventually got the first prototype done four months overschedule. I now use this as a benchmark for estimating how long something is going to take me and multiply by three to come up with a more realistic time scale.

Why did I do all of this?
Having recently switched from skis to a snowboard, I have experienced a problem, for a beginner like me snowboarding on the flat areas near the ski lifts is very difficult. In these situations’ I usually have to unclip and walk towards the ski lift awkwardly. Furthermore, there have been several occasions where I have had to walk for a while at incline to get somewhere. For skiers this is not a problem as they use poles to propel them forward. After a lot of frustration on the slope during my first year of snowboarding I thought there must be a solution, so I did a quick search and only found one attempt to solve the problem. Louis Julien designed the ‘Propulsurf’ (below) which uses two Archimedes screws that turn in opposite directions to propel the snowboard forward. Although it does actually work, it is very slow and isn’t easily removable from the board. In my opinion, the ‘Propulsurf’ needed a lot of development and it used a system that would cause even more frustration to the snowboarder. As the project develops, I am confident that my alternative design will transform the experience of snowboarding to a hassle-free sport.