TunnelBot

In the world we live in, making new inventions “green” and sustainable is more important than ever. TunnelBot addresses environmental concerns in many ways. These include aspects of its design and uses.

First, it uses a minimum of parts to reduce material usage. This is made possible by the efficient geometry of the base and arm. Because of this, it is also able to be very light, yet strong. Using VEX Robotics Design System parts means that manufacturing the TunnelBot is very easy. The use of nylock nuts means that it is extremely difficult for anything to become loose. Also, using aluminum and plastic parts means that once a part has outlived its usefulness, it can be recycled and used for something else. In this way, nothing is wasted. The TunnelBot also runs on 100% clean energy. The solar panel on its back collects energy directly into a battery while it is on the surface.

TunnelBot can also be applied in many situations with environmental connotations. It can explore caves in small, tight spaces using its sonar sensors. This means that humans do not have to break rock to widen the cave or disturb the ecosystem. The robot may also be used to search out ruins after natural disasters, or structurally unsound buildings. In much the same way, TunnelBot can help explore in mines, before having to put humans in danger. It does all of this with minimal harm to the environment, while keeping people and environments safer.

My design process for creating TunnelBot was very involved and took many steps. First, I sketched a rough idea of what the robot would look like on paper. I then made a more accurate version using graph paper. I knew that I wanted to use VEX parts for sustainability reasons, so after I had my idea of what the robot would look like, I set about making a list of what parts would be needed to create it. In this stage I also designed a solar panel with a battery for use on the robot on the computer. Finally, I used Autodesk Inventor Professional 2013 to create the TunnelBot. I created the two main assemblies, drive base and arm, separately. This makes for easier maintenance of the actual robot, as the arm can be removed easily to work with the base. I spent a lot of time working with various ways of implementing essential parts of TunnelBot. This was to find what would best fit in, and work well. Finally, both assemblies were combined to create the completed TunnelBot.

The Autodesk Sustainability Workshop helped me a lot in the creation of this robot. Before I even thought about what I was going to make. I watched the videos that Autodesk has online. They got me thinking about what exactly goes into creating a “green” design. I think that watching these videos really helped me make TunnelBot the best it could be in sustainability aspects.