The Piezoelectric Staircase

Team 1138 Eagle Engineering, from West Hills California, is attempting to combat a modern day problem with a solution built through the modern world. In this modern world we live in, we consume much more electricity than we used to, however, with this new demand for power, our power sources are mostly still dirty and can damage the environment. This use of dirty energy has attempted to be combatted in the recent years with solar, wind, and other fuel sources, however, without a wide scale use of these sources, the environment is damaged more and more each day. In addition, walking up and down stairs each day, whether it is in a subway station where thousands of people may go each day, a mall, or even a home, this energy is wasted. By creating a staircase which generates electricity as you walk up and down it, you are creating energy cleanly and effectively. By doing this we are reducing our impact on the environment and saving natural resources which would be used to burn and create electricity.

These staircases use piezoelectric generators which are placed underneath the steps to create small amounts of energy with each step. By retrofitting old subways or new buildings with them you could save money through electricity, generate clean energy, and put some of that wasted energy to good use. With the constant movement of a bustling city such as New York, the subway systems are used by millions of people each day, if you have 50 stairs or so each person has to walk through to get to the train, there are millions of moments for electricity to be gathered. Each year there are 1.6 billion passengers on New York subways, so if each person had 50 stairs to walk up and down, there would be 80 billion opportunities to gain electricity. With this only being in one city, and only with one form of transportation, you could seriously create electricity wisely with the wide spread implementation of the stairs.

DARPA is currently researching putting these generators in soldier’s boots to charge devices, which proves the technology is solid, and with an implementation in a suburban area it could be increased to bigger uses. This could be from lighting the subway, to any other electrical need.

Our model is a Vex- Scale model as it wouldn’t necessarily be possible to create electricity which can be stored with Vex parts, however we made a very accurate scale model with Vex parts to show layout and design.