The bottle shaped device successfully records and saves the forces and accelerations that glass bottles undergo at the Dr Pepper manufacturing facility. This allows the company to monitor and modify points on the manufacturing line based on the recorded data.

**Background**
- Glass bottles undergo loads in manufacturing process making them susceptible to cracks and breakages
- Each bottle failure results in processing delays and lost revenue
- Hundreds of thousands of dollars in lost revenue due to bottle breakages

**Goals**
- Create a bottle-shaped device to gather and report forces on glass bottles
- Force data will help determine magnitude of forces on process line
- Time data will help determine where in the line bottles undergo high stress
- Process can then be altered to ensure bottles no longer experience high stress

**Requirements**
- Device dimension based on 12 oz. glass bottle
- Sensors to gather force data on bottle
- Report magnitude of force and where in the line they occur
- Alert operator when forces exceed a set load threshold
- Bottle fabricated using a bright colored plastic

**Solution**

**Bottle Casing**
- 2-piece bottle design printed in red colored ABS M-30 plastic
- Allows easy access to battery and micro SD card
- Force sensors attached to the outside and connected to circuit board through slots
- Water-sealed with silicone in sensor slots and LED holes, and an o-ring at the joint

**Hardware**
- Circuit consists of Arduino Mega 2560, accelerometer, 9 Volt battery, micro SD card holder, and various other components
- LEDs attached on top of bottle easily alert operator

**Software**
- Code allows for establishing communication with accelerometer and converting voltage values from force sensors to values in pounds
- Micro SD card saves acceleration and force data in CSV file

**Conclusion**

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