Tensile Strength Tester

Team 5 — Point Break

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Overview

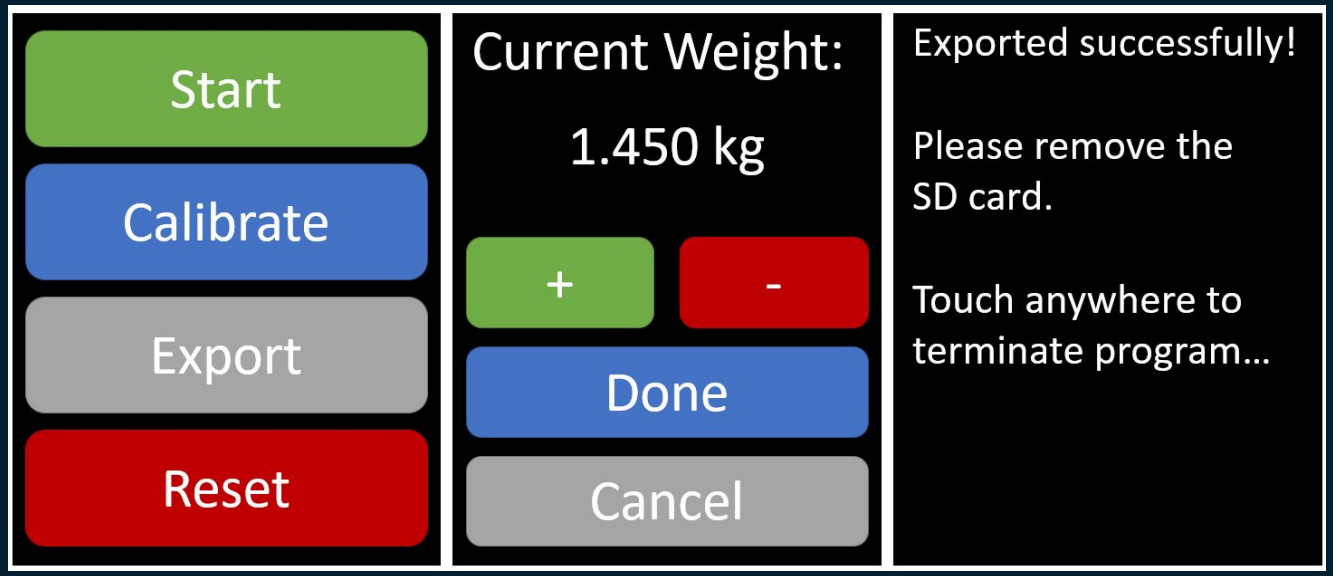
- Added touch screen interface for ease of use
- Upgraded clamps to G-clamps
- Upgraded 5kg load cell to 20kg for extra durability
- Removed drawer sliders due to excess friction
- Replaced pulling rope with vinyl-wrapped steel cable
- Added a pulley for more uniform force application

- Emphasis on stressing the material instead of the user

Data Collection Procedure

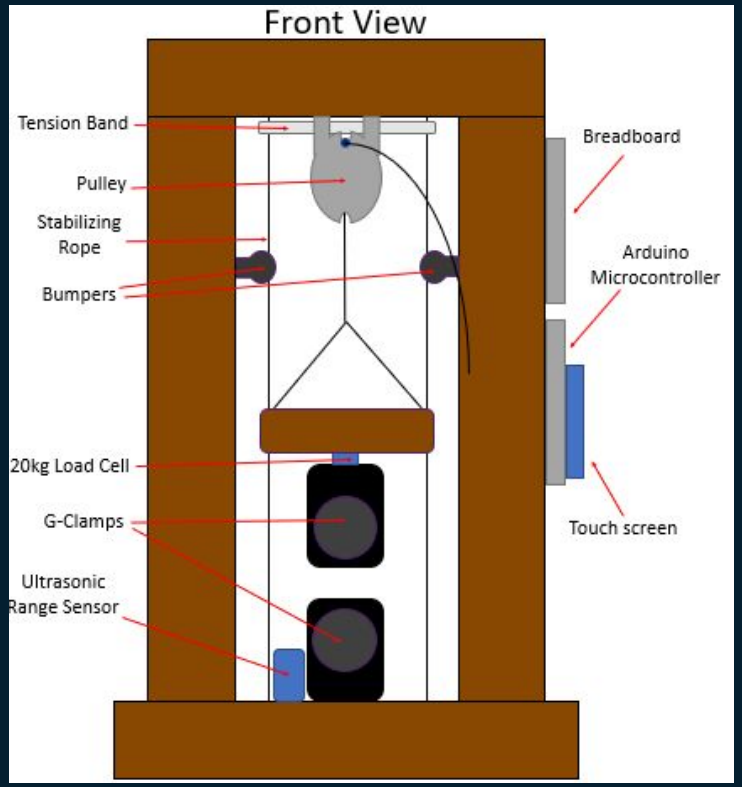
1. **Attach material between clamps**
   The included G-clamps make attaching the sample quick and easy
2. **Press "start" on touch screen**
   Other options can be used to calibrate the attached scale or export testing data
3. **Follow system instructions**
   Begin pulling sample when the touch screen indicates

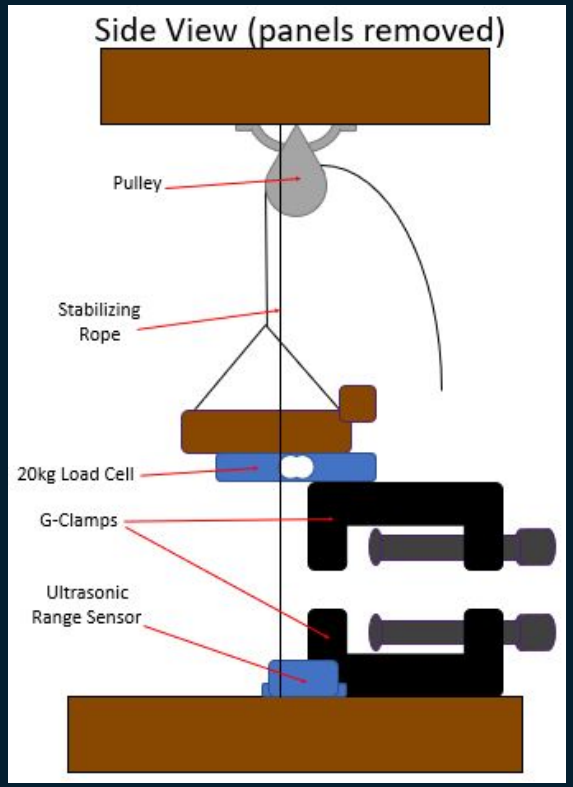
Touch Screen User Interface



- Creates an easily-readable interface to allow the user to use the system without requiring an Arduino installation

Physical Design Model

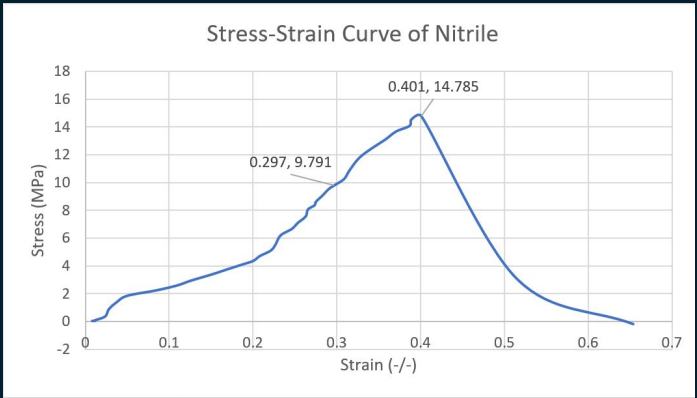




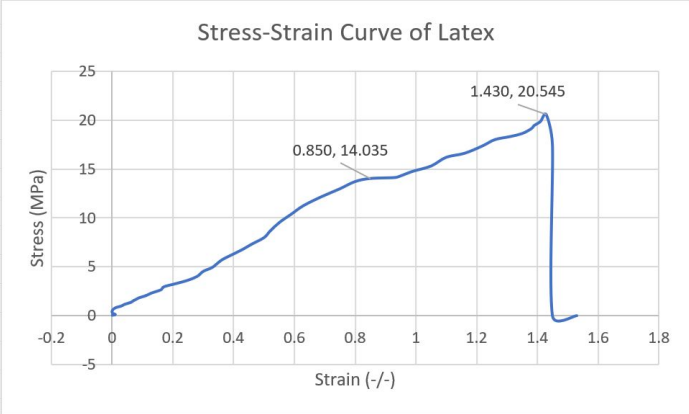
System Data

		Our System	Known Value	Error
Ultimate Tensile Strength	Latex	20.5 ± 0.1 MPa	18 - 36 MPa, avg 20 MPa	2.5%
	Nitrile	14.8 ± 0.1 MPa	14 - 30 MPa, avg 16 MPa	7.5%
Young's Modulus	Latex	1.35 ± 0.2 MPa	1.2 ± 0.1 MPa	12.5%
	Nitrile	2.13 ± 0.2 MPa	2.4 ± 0.2 MPa	11.25%

Stress-Strain Curves



Nitrile



Latex

Individual Contributions

Brii

- Software implementation
- UI design

Alex

- Circuit design
- Hardware implementation

Omar

- Clamp design
- Calibrated load cell
- Assisted in hardware implementation

Project Budget

Arduino Mega 2560	$40
2.8” Touch Screen w/ SD card mount	$16
microSD Card + Converter	$14
Load Cell 20kg	$4
50lb Fishing Line	$13
Various Hardware	

TOTAL $87

THANKS!

Any questions?