SLINGER HIGH SCHOOL

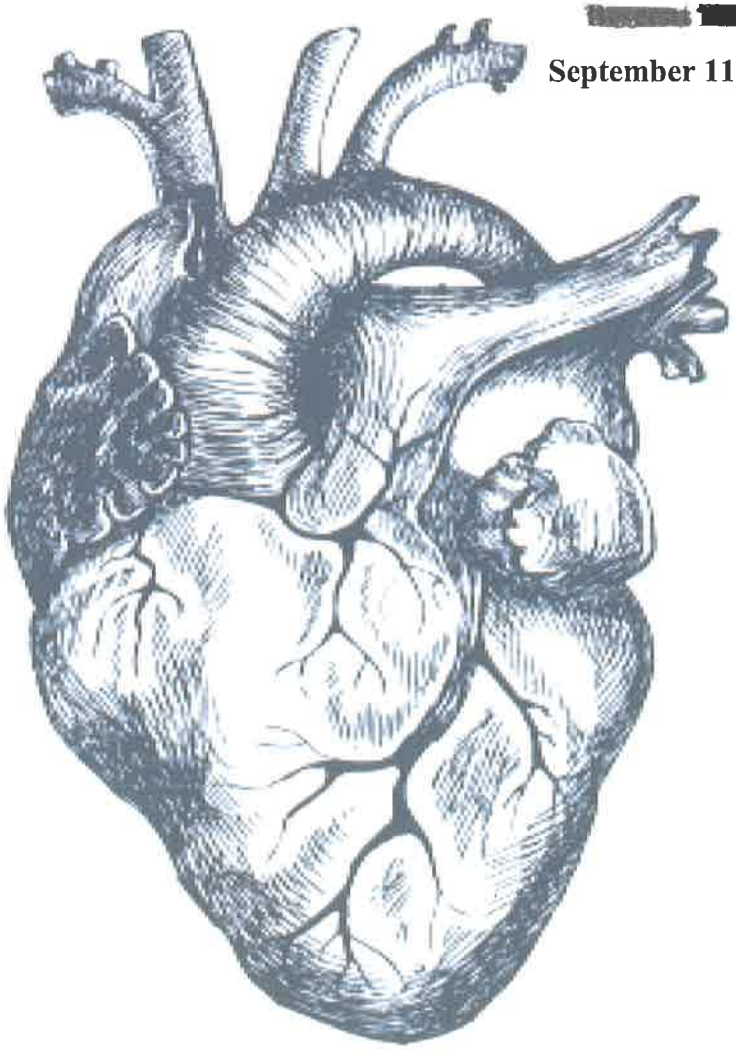
Introduction to Engineering

Technical Report

Stress Analysis

[redacted]

September 11, 2015



Submitted to: Hermann

Submitted by: [redacted]

Submitted on: September 21, 2015

Over the course of the last week, every students was to do a series of activities that involved physical movement and pulse per minuet determination. A pulse was to be taken at rest as a base line and after every activity was complete, the person's pulse would be measured for fifteen seconds, then multiplied by four to determine the heart rate per minute and record the time taken to complete the activity. Three activities included going up and down two flights of stairs five time, once without the back pack, another with the back pack, and the last with a back pack but moving up and down the stairs with speed as if the students was late to class. Last three activities included going around a track once without a back pack, another lap with a back pack, and the final with a back pack but with speed as if the student was late to class. The heart rate at rest and heart rates after each activity were then compared to one another by collection of data. Every test or activity was made so that you would physically move either with or without your backpack to measure stress made on our hearts. Objective of this experiment was to determine what affects does not having your backpack and having your backpack on during certain activities have on your heart to see if it provides unneeded stress.

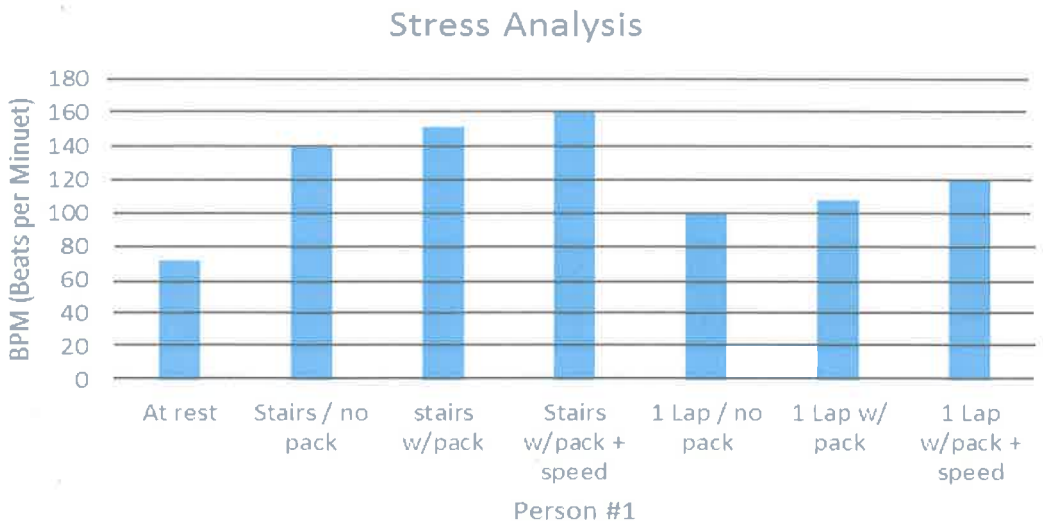
Data was collected after every activity and put onto a chart: Activities recorded-
Heart rates for; At rest, up/ down stairs with no pack, up/down stairs w/ pack, up/down stairs w/ pack and extra speed, one lap around track/ no pack, one lap around track w/pack, one lap around track w/pack and extra speed and lastly Time; how long each activities took.

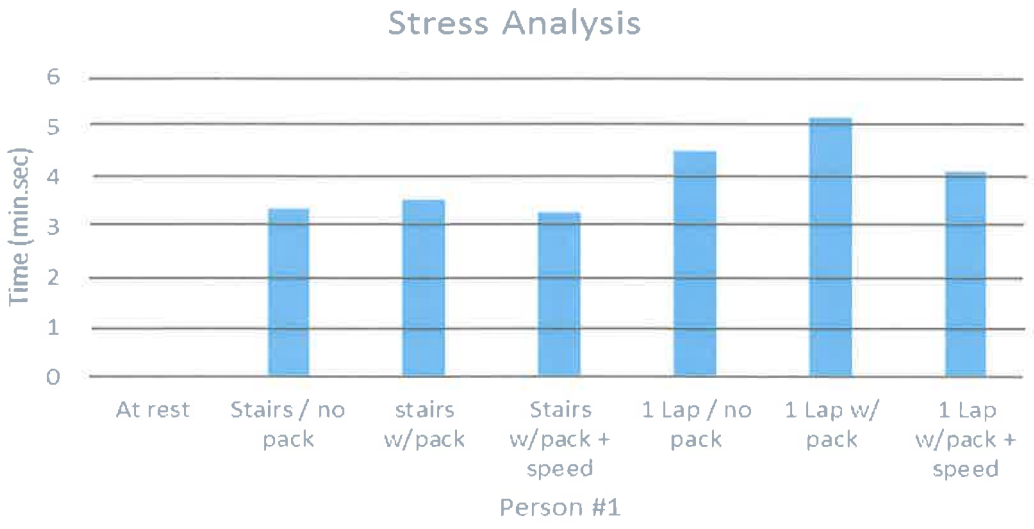
After data was collected for myself, data was also collected for six other students. All data was then made into a chart and then a graph to be analyzed, compared, and contrasted to make conclusions.

My Data: (person #1)

Activity:	Time	Heart Rate
At rest	N/A	72 bpm
Stairs / no pack	3min 37 sec	140 bpm
stairs w/pack	3 min 55 sec	152 bpm
Stairs w/pack + speed	3min 30sec	160 bpm
1 Lap / no pack	4 min 53 sec	100 bpm
1 Lap w/ pack	5 min 18 sec	108 bpm
1 Lap w/pack + speed	4 min 12sec	120 bpm

BMP (Beats per Minute) and Time taken-

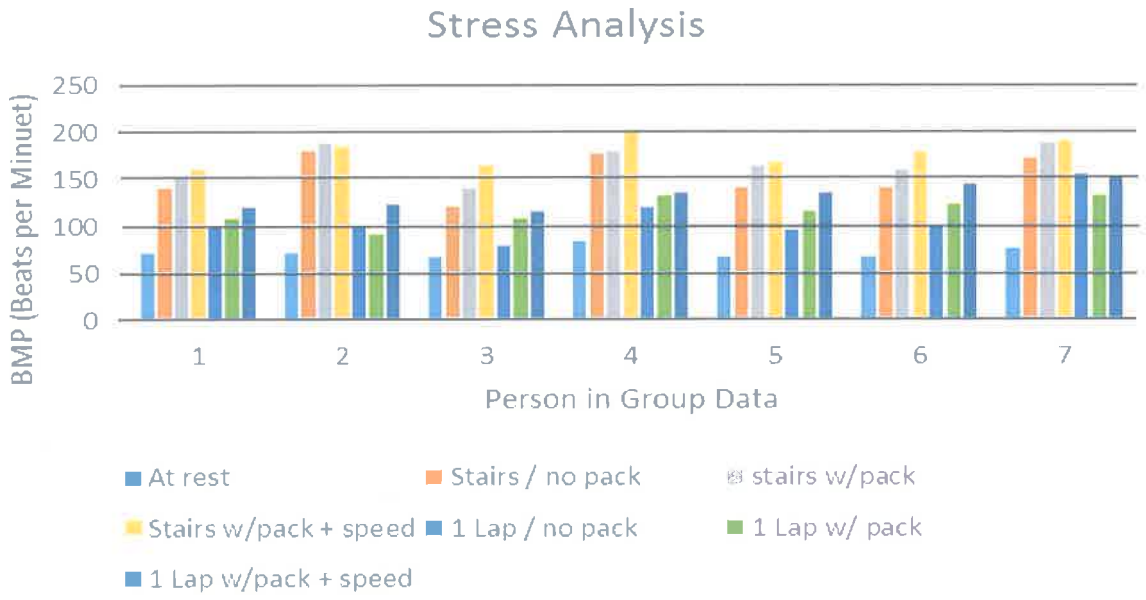




Group Data:

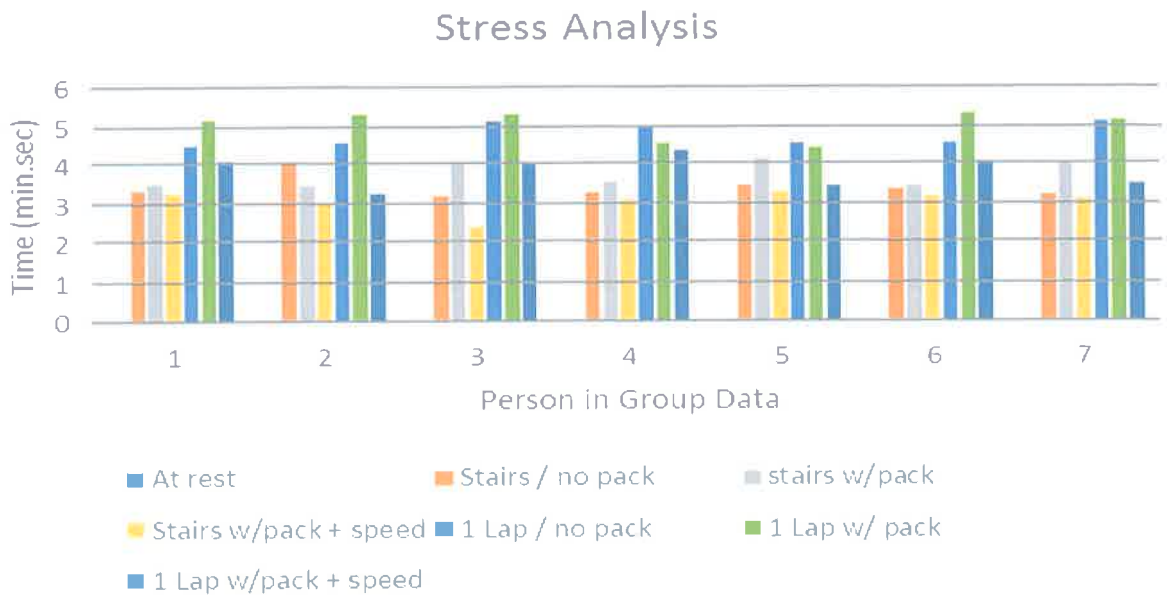
BPM (Beats Per Minute)-

Activity:	1	2	3	4	5	6	7
At rest	72 bpm	72 bpm	68 bpm	84 bpm	68 bpm	68 bpm	76 bpm
Stairs / no pack	140 bpm	180 bpm	120 bpm	176 bpm	140 bpm	140 bpm	172 bpm
stairs w/pack	152 bpm	188 bpm	140 bpm	180 bpm	164 bpm	160 bpm	188 bpm
Stairs w/pack + speed	160 bpm	184 bpm	164 bpm	200 bpm	168 bpm	178 bpm	190 bpm
1 Lap / no pack	100 bpm	100 bpm	80 bpm	120 bpm	96 bpm	100 bpm	156 bpm
1 Lap w/ pack	108 bpm	92 bpm	108 bpm	132 bpm	116 bpm	124 bpm	132 bpm
1 Lap w/pack + speed	120 bpm	124 bpm	116 bpm	136 bpm	136 bpm	144 bpm	152 bpm



Time Taken-

Activity:	1	2	3	4	5	6	7
At rest	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Stairs / no pack	3 min 37 sec	4 min 6 sec	3 min 22 sec	3 min 30 sec	3 min 46 sec	3 min 38 sec	3 min 22 sec
stairs w/pack	3 min 55 sec	3 min 51 sec	4 min 7 sec	3 min 57 sec	4 min 18 sec	3 min 49 sec	4 min 4 sec
Stairs w/pack + speed	3 min 30 sec	3 min 1 sec	2 min 41 sec	3 min 13 sec	3 min 28 sec	3 min 20 sec	3 min 10 sec
1 Lap / no pack	4 min 53 sec	4 min 59 sec	5 min 16 sec	5 min 0 sec	4 min 58 sec	4 min 57 sec	5 min 12 sec
1 Lap w/ pack	5 min 18 sec	5 min 31 sec	5 min 31 sec	4 min 56 sec	4 min 44 sec	5 min 33 sec	5 min 15 sec
1 Lap w/pack + speed	4 min 12 sec	3 min 29 sec	4 min 10 sec	4 min 37 sec	3 min 57 sec	4 min 8 sec	3 min 50 sec



Analysis conclusion: The relationship between the heart rate and the stress of the activity are direct. As the stress of the activity increases so does the heart rate and vice versa.

In total conclusion it seems that by the data it would be better to leave our back packs in our lockers to relieve and reduce stress made on our hearts for health as well as reducing time to get to classes. Even though the data reveals this we (students) still find it easier to carry our back packs around to prevent having to go to our lockers after every class to also reduce time between classes. Because carrying our backpacks become a normal part of a student's routine, stress is eventually relieved since the body adjusts to stress to sustain the changes and set a new base line for normality or in other words the heart and body is conditioned if done right. Engineering disciplines used for this report was the process of finding information for a concern for the heart of every student by interpreting the data collected, and conducting conclusions from research, design, and development.