

Senior Capstone Design

Project: **Assistive CPR Device**

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Team: **120CCs**

Date: **10/13/2020**

Design Validation Plan & Results (DVP&R)

Requirement	Test	Test Subject	Target Date	Result	Recommendation
The Material of the product must be light with medium-high flexural strength to provide ample compressibility.	Flexural strength is the same as tensile strength if the material is homogenous. Can test Flexural strength by applying a three point bend set up. $\sigma = 3FL/2bd^2$	Designated Material of the Prototype	7/30/20	According to Results posted by Rocky mountain motion control, device meets tensile and yeild strength criteria. using 80/20 alloy	
Device should be infinitely reliable according to a S-N curve	Calculate stress life of material then apply curve to a finite design Surface Factor/ loading	Final prototype	10/25/2020		
The device must be able to compress the chest a minimum of 5cm and maximum of 6cm	Using the CPR manequin compress the chest to acceptable depth.	Physical Prototype	8/30/20	Device compressed manequin chest to a maximum of 6cm with ease.	
The device must maximize force applied to compress the chest the minimum distance	Using a scale to measure force out, and applying X force in, can test the force multiplication. Additionally Force body diagram can be calculated.	CAD Drawing with Force body Diagram, as well as Initial prototype	7/30/20	FBD concluded that the device met standard for compression.	
The device must be capable of continously applying compressions at a depth of 5-6cm at a minimum of 100 compressions per minute and a maximum of 120 compressions per minute.	Using a designated test person and pace counter or metronome- One can apply the compressions at a constant rate on the manequin.	Physical Prototype	9/10/20	Using hightech manequin, proper pace and depth of compression were achieved using the prototype.	
Device needs to be light weight (<20lbs)	Simply weighing the device on a scale to measure its weight.	Physical Prototype or CAD rendering with chosen materials for estimated weight.	10/25/2020		
The Device needs to be portable and/or easily storable.	Two Tests: 1. Collapse the device and store the device in a small closet or shelf. 2. Carry the Device on a wheelchair and in hand for a distance of 100meters with out issue	Final Prototype	10/25/2020		
The Device shall be attached to a wheel chair and be operable from the seat	Invite the student to come test out the device.	The Device shall be tested on the CPR Mannequin	9/4/20	Client was able to supply enough force to compress the manequin	Have client do home workouts to assist in their endurance.
The Device shall adhere to all CPR examination requirments outlined by those involved	Present to CPR instructors/ WWAMI dean and confirm viability	Working Prototype	9/4/20	Device met standards with WWAMI	