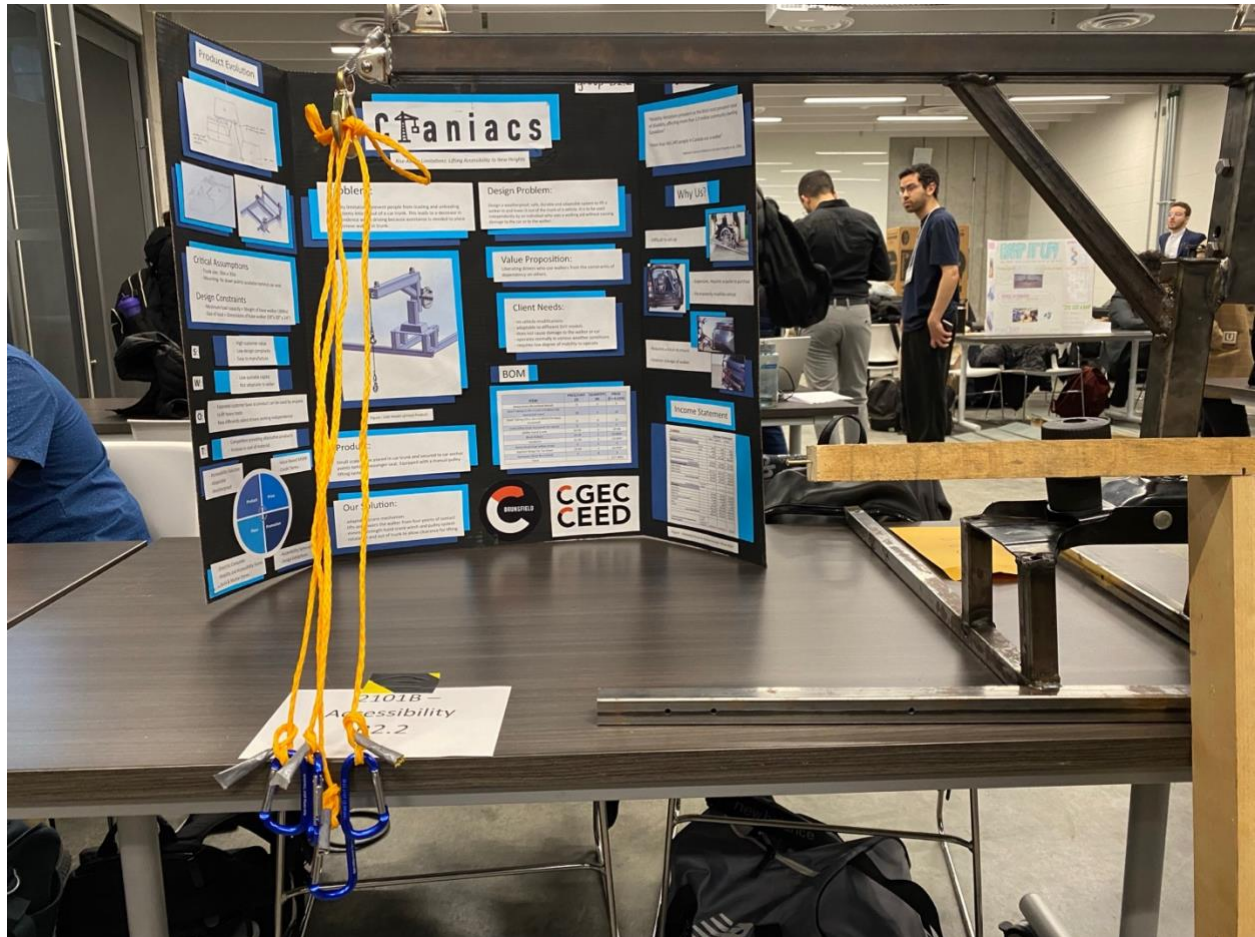


Project Description:

Design an adaptable, safe, weatherproof system to load and unload a walker from a vehicle trunk. Our goal is to provide opportunity to regain or maintain independence for drivers who use walking assistive devices.

Description Board:



Caniacs

group B2.2

So What?

"Mobility limitations prevented as the third most prevalent cause of disability, affecting more than 1.9 billion consumers (excluding Canadians)"
"More than 400,000 people in Canada use a walker"
- Statistics Canada, 2016

Why Us?

difficult to set up
Expensive, requires a quote to purchase
Permanently modifies vehicle
Requires a hitch to install
Extensive storage of walker

Problem:

Mobility limitations prevent people from loading and unloading heavy items into or out of a car trunk. This leads to a decrease in independence when driving because assistance is needed to place and retrieve wicker on trunk.

Design Problem:

Design a mechanism with, simple and adaptable system to lift a wicker in and lower it out of the trunk of a vehicle. It is to be used independently by an individual who uses a walking aid without causing damage to the car or to the wicker.

Value Proposition:

Lowering items into car without the constraints of dependency on others

Client Needs:

no vehicle modifications
adaptable to different size models
does not cause damage to the wicker or car
operable manually in various weather conditions
requires low degree of mobility to operate

BOM

ITEM	QUANTITY	UNIT PRICE	TOTAL
1. Steel Trunk Mount	1	150.00	150.00
2. Hydraulic Cylinder	1	200.00	200.00
3. Piston Rod	1	50.00	50.00
4. Piston Seal	1	20.00	20.00
5. Piston Gasket	1	15.00	15.00
6. Piston Nut	1	10.00	10.00
7. Piston Washer	1	5.00	5.00
8. Piston Pin	1	5.00	5.00
9. Piston Spring	1	5.00	5.00
10. Piston Bracket	1	5.00	5.00
11. Piston Bolt	1	5.00	5.00
12. Piston Nut	1	5.00	5.00
13. Piston Washer	1	5.00	5.00
14. Piston Pin	1	5.00	5.00
15. Piston Spring	1	5.00	5.00
16. Piston Bracket	1	5.00	5.00
17. Piston Bolt	1	5.00	5.00
18. Piston Nut	1	5.00	5.00
19. Piston Washer	1	5.00	5.00
20. Piston Pin	1	5.00	5.00
21. Piston Spring	1	5.00	5.00
22. Piston Bracket	1	5.00	5.00
23. Piston Bolt	1	5.00	5.00
24. Piston Nut	1	5.00	5.00
25. Piston Washer	1	5.00	5.00
26. Piston Pin	1	5.00	5.00
27. Piston Spring	1	5.00	5.00
28. Piston Bracket	1	5.00	5.00
29. Piston Bolt	1	5.00	5.00
30. Piston Nut	1	5.00	5.00
31. Piston Washer	1	5.00	5.00
32. Piston Pin	1	5.00	5.00
33. Piston Spring	1	5.00	5.00
34. Piston Bracket	1	5.00	5.00
35. Piston Bolt	1	5.00	5.00
36. Piston Nut	1	5.00	5.00
37. Piston Washer	1	5.00	5.00
38. Piston Pin	1	5.00	5.00
39. Piston Spring	1	5.00	5.00
40. Piston Bracket	1	5.00	5.00
41. Piston Bolt	1	5.00	5.00
42. Piston Nut	1	5.00	5.00
43. Piston Washer	1	5.00	5.00
44. Piston Pin	1	5.00	5.00
45. Piston Spring	1	5.00	5.00
46. Piston Bracket	1	5.00	5.00
47. Piston Bolt	1	5.00	5.00
48. Piston Nut	1	5.00	5.00
49. Piston Washer	1	5.00	5.00
50. Piston Pin	1	5.00	5.00
51. Piston Spring	1	5.00	5.00
52. Piston Bracket	1	5.00	5.00
53. Piston Bolt	1	5.00	5.00
54. Piston Nut	1	5.00	5.00
55. Piston Washer	1	5.00	5.00
56. Piston Pin	1	5.00	5.00
57. Piston Spring	1	5.00	5.00
58. Piston Bracket	1	5.00	5.00
59. Piston Bolt	1	5.00	5.00
60. Piston Nut	1	5.00	5.00
61. Piston Washer	1	5.00	5.00
62. Piston Pin	1	5.00	5.00
63. Piston Spring	1	5.00	5.00
64. Piston Bracket	1	5.00	5.00
65. Piston Bolt	1	5.00	5.00
66. Piston Nut	1	5.00	5.00
67. Piston Washer	1	5.00	5.00
68. Piston Pin	1	5.00	5.00
69. Piston Spring	1	5.00	5.00
70. Piston Bracket	1	5.00	5.00
71. Piston Bolt	1	5.00	5.00
72. Piston Nut	1	5.00	5.00
73. Piston Washer	1	5.00	5.00
74. Piston Pin	1	5.00	5.00
75. Piston Spring	1	5.00	5.00
76. Piston Bracket	1	5.00	5.00
77. Piston Bolt	1	5.00	5.00
78. Piston Nut	1	5.00	5.00
79. Piston Washer	1	5.00	5.00
80. Piston Pin	1	5.00	5.00
81. Piston Spring	1	5.00	5.00
82. Piston Bracket	1	5.00	5.00
83. Piston Bolt	1	5.00	5.00
84. Piston Nut	1	5.00	5.00
85. Piston Washer	1	5.00	5.00
86. Piston Pin	1	5.00	5.00
87. Piston Spring	1	5.00	5.00
88. Piston Bracket	1	5.00	5.00
89. Piston Bolt	1	5.00	5.00
90. Piston Nut	1	5.00	5.00
91. Piston Washer	1	5.00	5.00
92. Piston Pin	1	5.00	5.00
93. Piston Spring	1	5.00	5.00
94. Piston Bracket	1	5.00	5.00
95. Piston Bolt	1	5.00	5.00
96. Piston Nut	1	5.00	5.00
97. Piston Washer	1	5.00	5.00
98. Piston Pin	1	5.00	5.00
99. Piston Spring	1	5.00	5.00
100. Piston Bracket	1	5.00	5.00



Figure 1: 3D Model of Crane Mechanism

Product:

Small scale crane placed in car trunk and secured to car under points behind passenger seat. Equipped with a hook and pulley lifting system.

Our Solution:

adaptable crane mechanism
lifts and lowers the wicker from four points of contact
mechanical strength based, ratchet catch and pulley system
retains in and out of trunk - allow clearance for lifting



Income Statement

	2018	2019	2020
Revenue	100,000	150,000	200,000
Cost of Goods Sold	(40,000)	(60,000)	(80,000)
Gross Profit	60,000	90,000	120,000
Operating Expenses	(20,000)	(30,000)	(40,000)
Operating Income	40,000	60,000	80,000
Interest Expense	(5,000)	(7,500)	(10,000)
Income Before Tax	35,000	52,500	70,000
Tax Expense	(10,000)	(15,000)	(20,000)
Net Income	25,000	37,500	50,000

Figure 2: Estimated Income Statement for Three Years

Product Evolution



Critical Assumptions

Trunk size: 30" x 30"
Maximum load capacity: weight of base wicker (30kg)
Size of seat: dimensions of base wicker (30" x 30" x 24")

Design Constraints

High customer value
Low design complexity
Easy to manufacture

- S:** Low available capital
- W:** Not manufacturable in custom
- O:** Expanded customer base as product can be used by anyone to lift heavy loads
- T:** New differently abled drivers seeking independence



- Accessibility Solution
- Adaptable
- Weatherproof
- Value-Based Market
- Crutch Sticks
- Direct to Consumer
- Accessibility Services
- Google Collaborations
- Brick & Mortar Stores