PRODUCT DISASSEMBLY, COSTED BOM, AND CUSTOMER FEEDBACK ON NEW FEATURES

EMGT 100 Intro to Entrepreneurship

10/4/2022
Yellow Team 9:00 am:
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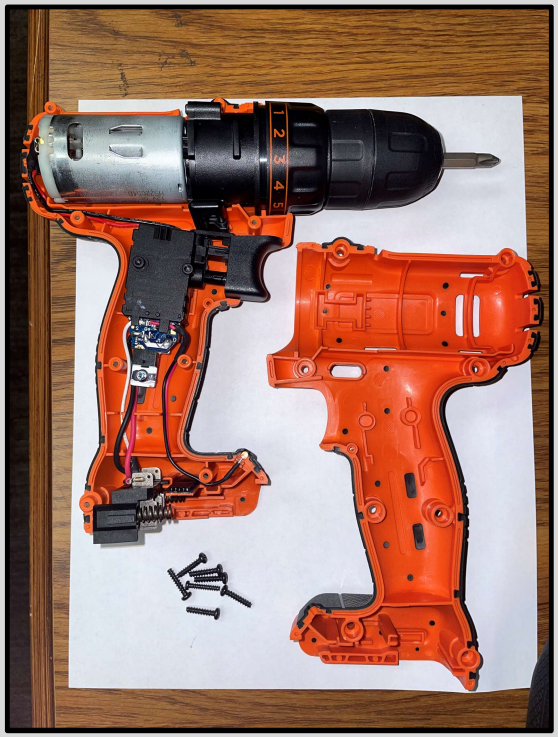
The Disassembly process



- Took around an hour

- Very simple disassembly

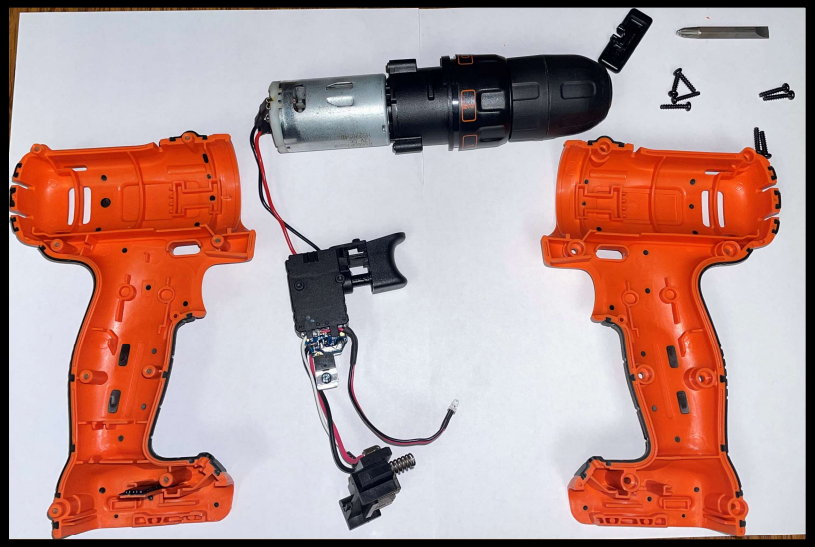
- Almost all components were visible upon opening the casing

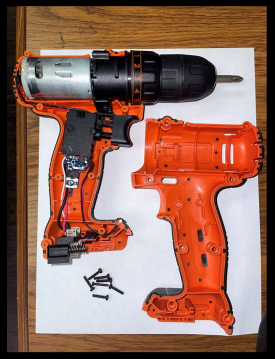
The Disassembly process

- Chuck was hard to separate

- Motor casing gave problems

- Didn't disassemble battery at all





BOM Packaging

Level	Part Number	Name	Material	Description/ Manufacturing	mass (g)	Quantity	Unit Price	Minimum Order	Price	BOM Cost
1	0-001	Box	Cardboard	Purchase with print	122	1	$1.50	1000	$1.50	$0.98
2	0-002	Cardboard Insert	Cardboard	Purchase	27	1	$0.20	1000	$0.20	$0.13
1	0-003	Tape	Plastic	Purchase	0	0.1	$0.03	2000	$0.01	$0.01
2	0-004	Small Sealable Bag	Plastic	Purchase	1	1	$0.03	1000	$0.03	$0.02
2	0-005	Large Protective Bag	Plastic	Purchase	5	2	$0.03	2000	$0.06	$0.04
2	0-006	User Manual	Paper	Print	29	17	$0.02/pg	1000	$0.34	$0.22

Total Packaging Cost:
$1.40

BOM Plastics and Metals

Level	Part Number	Name	Material	Description/Manufacturing	Mass (g)	Quantity	Unit Price	Minimum Order	Price	BOM Cost
2	0-007	Encasing Logo Side	Polypropelene	Injection mold, The half of the outer encasing with the logo	77	1	$1.22/kg	1000	$0.09	$0.13
2	0-008	Encasing Warning Side	Polypropelene	Injection mold, The half of the outer encasing with the warning sticker	77	1	$1.22/kg	1000	$0.09	$0.13
3	0-009	Staples	Metal	Purchase, Held the user manual together	0.0032	2	$0.01	5000	$0.02	$0.02
3	0-010	Driver bit	Steel	Purchase, The bit provided in the box with phillips and flathead	11	1	$0.10	5000	$0.10	$0.07
3	0-011	Chuck Assembly	Plastic/ Metal	Purchase, The chuck and everything that makes it work	121	1	$1.80	5000	$1.80	$1.17
3	0-012	Torque Dial	Plastic	Purchase, Allows change of the torque before the drill slips	122	1	$3.02	1000	$3.02	$1.96
4	0-013	Planetary Gear	Plastic/ Metal	Purchase, Takes input from the motor and increases torgue and decreases speed	63	1	$0.28	1000	$0.28	$0.18
3	0-014	Direction Toggle	Polypropelene	Purchase, Switches the direction of the drill	2	1	$1.22/kg	1000	$0.01	$0.02
4	0-015	9 Tooth Gear	Steel	Purchase, Outputs the motor to the planetary gears	3	1	$0.17	1000	$0.17	$0.11
4	0-016	Transistor Bracket	Aluminum	Purchase, Holds the transistor in place	3	1	$0.09	25000	$0.09	$0.06

Total Plastics and Metals Cost:

$3.85

BOM Fasteners, Electronics, and Wiring

Level	Part Number	Name	Material	Description/Manufacturing	Mass (g)	Quantity	Unit Price	Minimum Order	Price	BOM Cost
3	0-017	Battery	Lithium/Plastic	Purchase, 1.5 AH 12V Lithium Battery with casing	239	1	$8.20	500	$8.20	$5.33
3	0-018	Charger	Plastic/Copper	Purchase, Wall charger for lithium battery	130	1	$1.80	5000	$1.80	$1.17
4	0-019	Motor	Steel/Copper	Purchase, 21,000 RPM	199	1	$1.30	10000	$1.30	$0.85
4	0-020	Trigger	Polypropylene	Purchase, Trigger assemby with electronics	29	1	$1.40	1000	$1.40	$0.91
5	0-021	Copper Wire Red	Plastic/Copper	Purchase, insulated copper wire	2	28cm	$0.25/m	1000m	$0.07	$0.05
5	0-022	Copper Wire Black	Plastic/Copper	Purchase, insulated copper wire	2	28cm	$0.25/m	1000m	$0.07	$0.05
3	0-023	Outer Screws 3mm	Metal	Purchase, 7 same outer screws	0.57	7	$0.02	10000	$0.14	$0.09
3	0-024	Outer Screws 2.5mm	Metal	Purchase, smaller outer screw	0.5	1	$0.02	10000	$0.02	$0.02
4	0-025	Motor Mount Screws	Metal	Purchase, 7.8 mm screw, nut, washer	0.63	4	$0.03	1000	$0.12	$0.08
4	0-026	Torque Dial Screws	Metal	Purchase, 12 mm pan head screw	0.33	3	$0.01	50000	$0.03	$0.03
5	0-027	LED Light	Glass/Tungsten	Purchase, Shines on the end of the drill to provide visibility	0.5	1	$0.01	4000	$0.01	$0.01

Total F.E.W. Cost:
$8.59

Total Cost

BOM Setion	Cost
Packaging	$1.40
Plastics/Metals	$8.59
F.E.W	$3.85
Total	**$13.84**

The Total Cost of manufacture using the 80/20 rule is **$17.30**

Cost Bottom Up

Estimated price for manufacturer	**$17.30**
Mark up from manufacturer	**25%**
Estimated price for distributor	**$21.63**
Mark up from distributor	**15%**
Estimated price for retailer	**$24.87**
Mark up from retailer	**15%**
Estimated price for Consumer	**$28.60**

Cost Top Down

Estimated price for consumer	**$27.79**
Mark up from retailer	**25%**
Estimated price for retailer	**$22.23**
Mark up from distributor	**15%**
Estimated price for distributor	**$19.33**
Mark up from manufacturer	**15%**
Estimated price for manufacturer	**$16.81**

Error in Bottom Up

The Bottom Up had an error of $0.81 or 2.9%

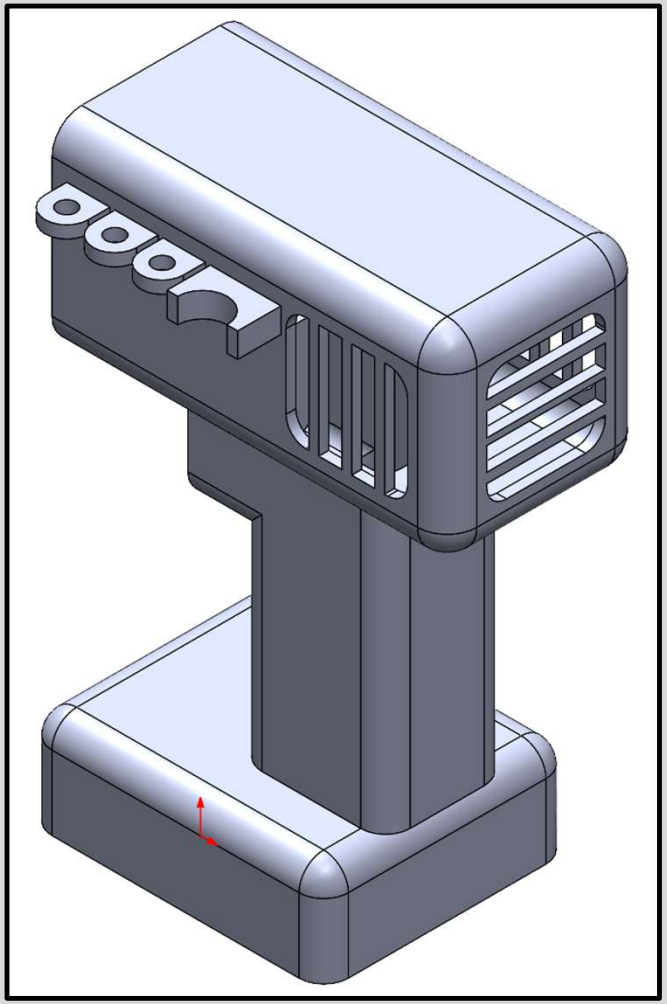
Reasons for Error:
Estimation of Part Costs
Estimation of Profit Margins
Inability to Completely Tear Down Parts

Decision Matrix

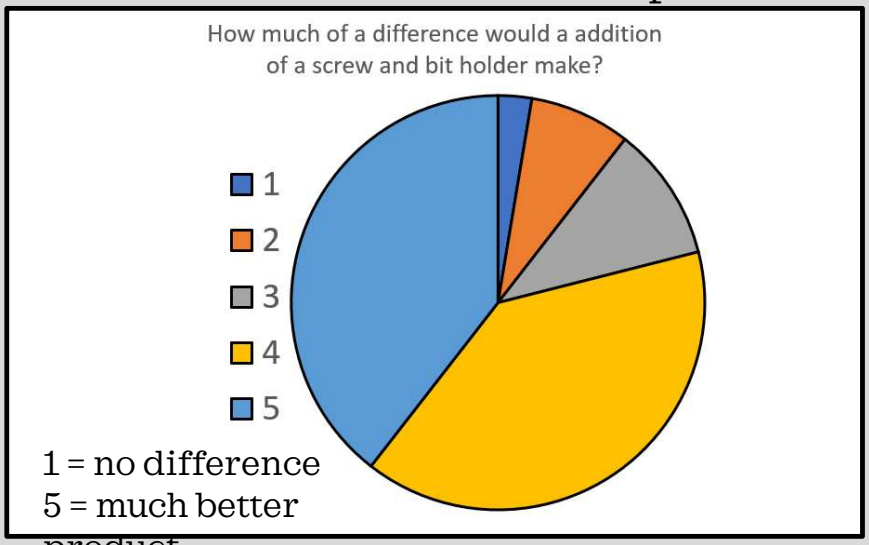
	Weight	Light delay	Battery Capacity	Battery Level Indicator	Motor Housing	Locking Motor
Competitive advantage	20%	3	4	3	5	2
Technical Assessment	15%	4	2	3	5	1
Profitability	25%	3	1	3	3	2
Value to consumer	40%	3.71	3.97	4.63	4.05	3.57
Weighted avarage	**100%**	**3.434**	**2.938**	**3.652**	**4.12**	**2.478**

Rated on a 1 to 5 scale in which 1 is lowest (worst) and 5 is highest (best)

Product Addition: Bit and Screw Holder



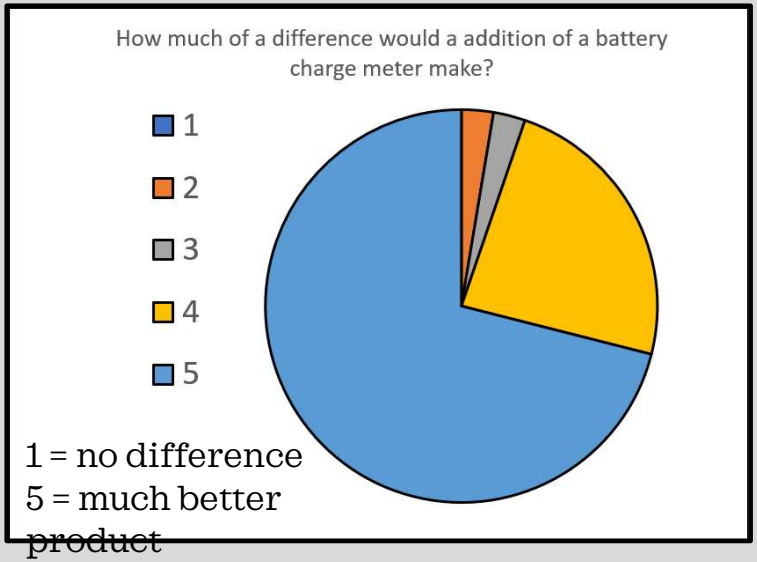
- Add to housing an area to hold a few screws and the included bit
- Also add in more heat vents to increase heat output
- No cost



1 = no difference
5 = much better product

Product Addition: Battery Level Indicator

- Allows user to see how much of the battery is left
- Was by far the most valuable feature to the customer
- Adds $0.30 to manufacturing cost



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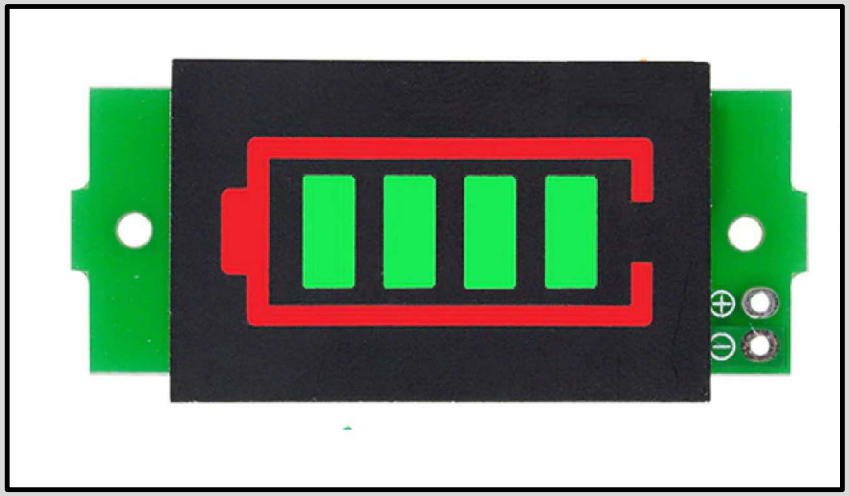

Customer feedback on improvements

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Cost Reductions

01

Lose the Operator's Manual

02

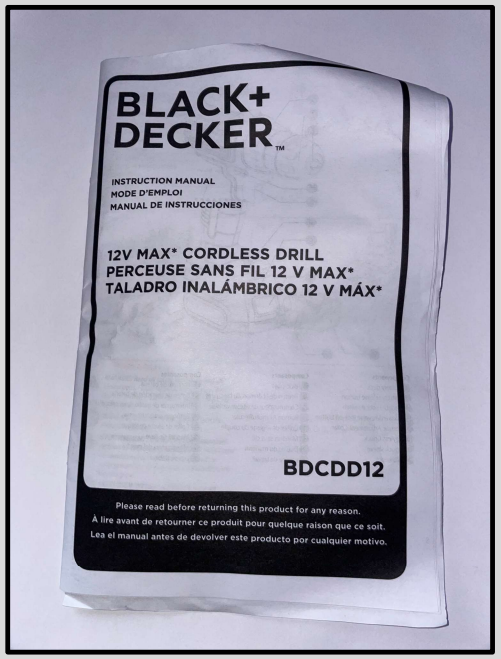
Standardize the Screws

03

Replace springs on the battery connector

Cost Reduction: Get Rid Of The Operators Manual

- 17 pages of wasted paper and ink
- People know how to use a basic hand-held drill
- Takes up a significant amount of space in the box
- Results in a $0.22 cost reduction
- Replace it with a QR Code that has all the same information and more



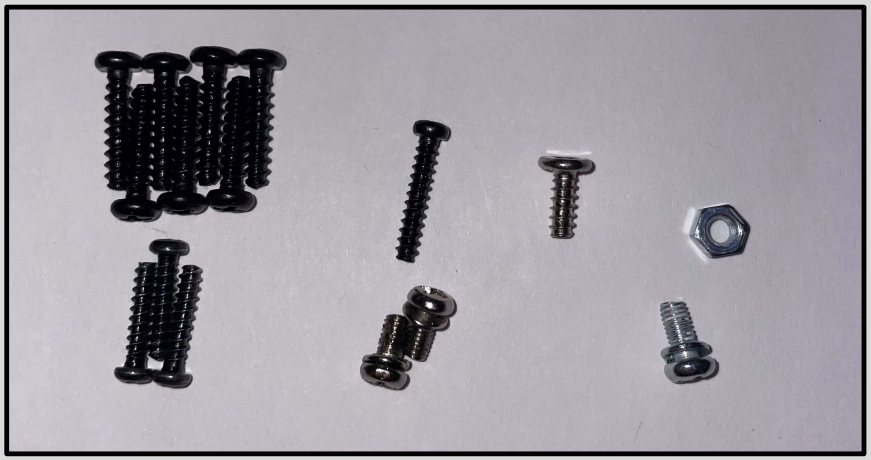
Cost Reduction: Make All The Screws The Same

- No point in having a 3mm screw and a 2.5mm screw

- Cheaper to buy a bunch of the same screws in bulk

- The quantities are also relatively small

- Results in a $0.16 cost reduction



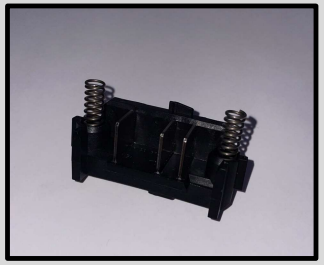
Cost Reduction: Get Lighter, Smaller Springs For The Battery

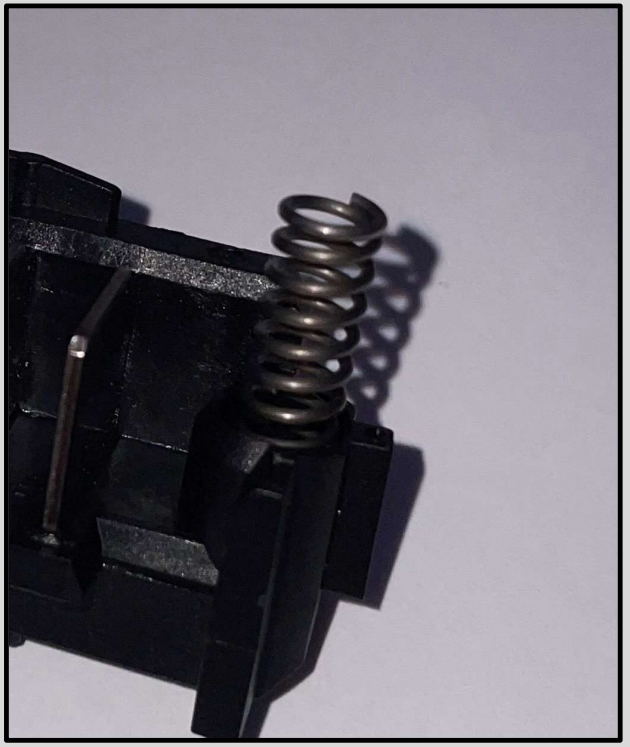
- Current springs have too much tension

- Excessive tension makes operation hard

- Less tense springs will be easier to use

- Results in a $0.18 reduction





Conclusion

- The new drill will include an upgraded motor housing with places to store the bit and the screws

- There will also be a battery meter that indicates how much charge is left

- In total, these changes will reduce the cost by $0.26

- These improvements allow us to charge more and reduce manufacturing cost

Any Questions?