

# WEIGHT ESTIMATION

## INTRODUCTION:

Unlike engine, motor has specific Torque and Load characteristics. So the weight must be in synchronization to the best working condition of motor. For that the design is greatly optimized to reduce weight. The below weights are estimated based on market survey and mass properties in Design software.

Weights are in Kilogram (Kg)

<b>MOTOR AND CIRCUITS</b>			
S no.	Components	Quantity	Weight
1	Hub Motor (Motor+Rim+Wheel+Drum brake)	1	10
2	Driver Circuit	1	0.5
3	Other(Pedal, pulley, cable)		1
<b>TOTAL</b>			<b>11.5</b>

<b>SOLAR PANEL</b>			
S no.	Component	Quantity	Weight
1	Solar Panel	50 Feet	50
2.	MPPT Algorithm circuit	1	0.5
3	Aerodynamic adjustments	4	0.5
<b>TOTAL</b>			<b>51</b>

<b>BATTERY &amp; OTHER ACCESORRIES</b>			
S no.	Components	Quantity	Weight
1	Batteries	4	28
2	Wires & Switches & driver controls		1.0
<b>TOTAL</b>			<b>29</b>

<b>FRAME</b>			
S no.	Component	Quantity	Weight
1	Frame (Estimated using Solid Works)		16
2	Welding (Gas + filler rods)	Required	2
3	Base covering	40sq. feet	8
<b>TOTAL</b>			<b>26</b>

<b>STEERING SYSTEM</b>			
S no.	Components	Quantity	Weight
1	Steering Wheel	1	0.5
2	Steering rod	1	1
3	Steering arm	2	0.5
<b>TOTAL</b>			<b>2</b>

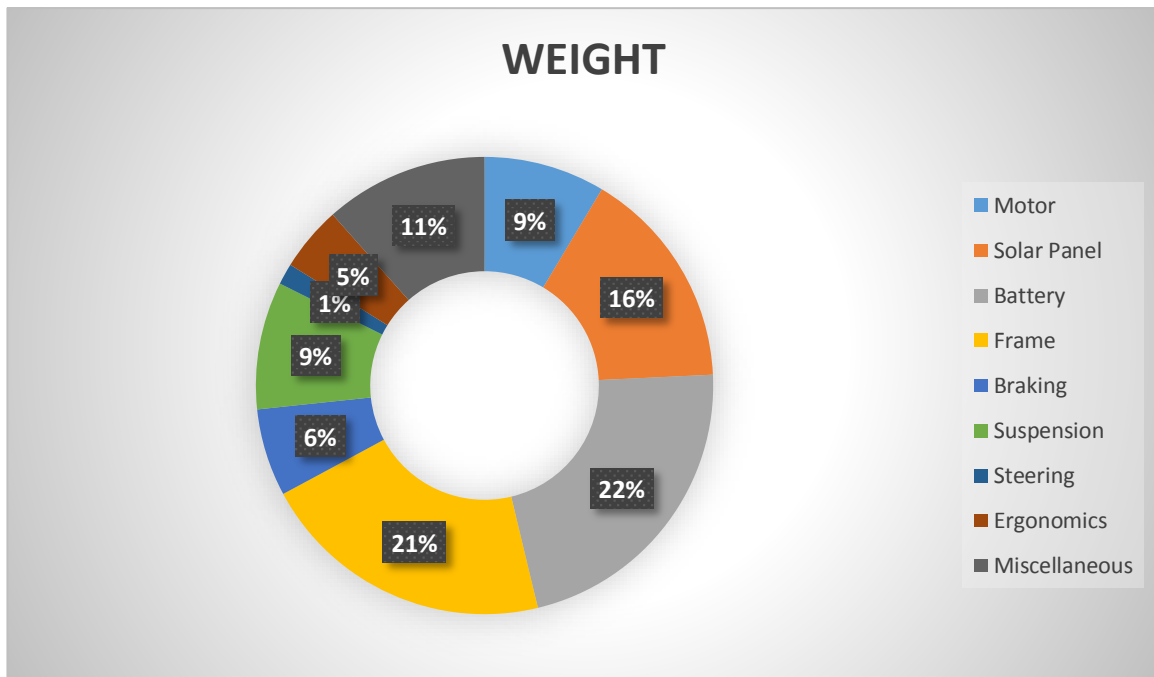
<b>BRAKING SYSTEM</b>			
S. no	Component	Quantity	Weight
Front Disc Brake			
1	Caliper & Brake pad	2	2
2	Rotor Disc	2	4
3	Tandem Cylinder	1	1
4	Other (Pedal, tubes, brake fluid)	1	0.8
Rear Drum Brake (Cable, pedal)			0.5
<b>Total</b>			<b>8.3</b>

<b>SUSPENSION SYSTEM</b>			
S no.	Component	Quantity	Weight
1	Front Suspension	2	5
2	Rear Suspension	1	2.5
3	King Pin (Machining)	2	1.0
4	Upper A arm & Lower A arm	4	1.5
5	Bearing (in Kingpin)	2	0.4
6	Ball Joint	2	0.4
<b>TOTAL</b>			<b>9.3</b>

<b>ERGONOMICS</b>			
S no.	Component	Quantity	Weight
1	Seat(Seat + seat belt)	1	2
2	Extinguisher	1 (2 Kg)	2
3	Lock nuts	25	1
4	Kill Switch	2	0.2
5	Wire covering(PVC)	10m	0.2
8	Rear View mirrors	2	0.5
<b>TOTAL</b>			<b>6.15</b>

<b>Miscellaneous</b>			
S no.	Component	Quantity	Weight
1	Nut + Bolt	80+80	1.5
2	Primer and Paint	2.5 liter	2
3	Shaft (King pin to wheel)	2	3
4	Lights and indicator	6	1
5	Unaccounted		4
<b>TOTAL</b>			<b>11.5</b>

<b>TOTAL WEIGHT OF CART</b>	<b>155.1</b>
Driver Weight	60
<b>TOTAL WEIGHT ESTIMATED</b>	<b>215.1</b>



**CONCLUSION:**

The motor was able to carry 250Kg easily during load test. The weight estimated is well below that range. Thus the design can do well on the roads and desirable for the driver