Elaboration of my project:

Busbar

Dashboard

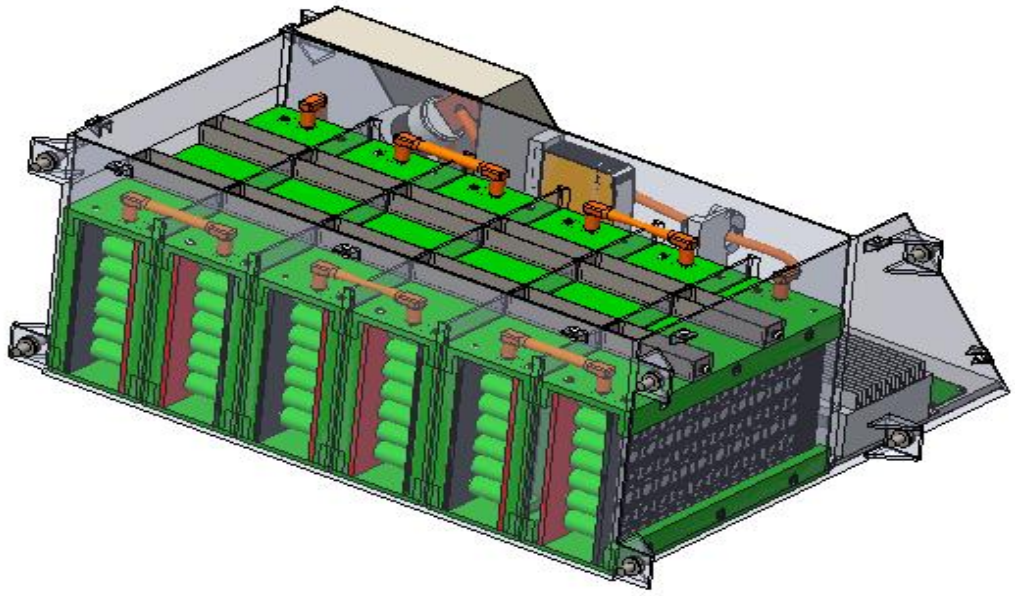
1.We procured 500 cylindrical lead cells from company Molicell to provide power to our electric vehicle among which 420 were used but don't know how how many should be in series and parallel and how many modules to form

2. Our vehicle need according to rulebook a maximum power generation of 80W.
and Maximum voltage of 176.4V

Maximum accumulator voltage [V] = maximum cell voltage [V] * # series connections

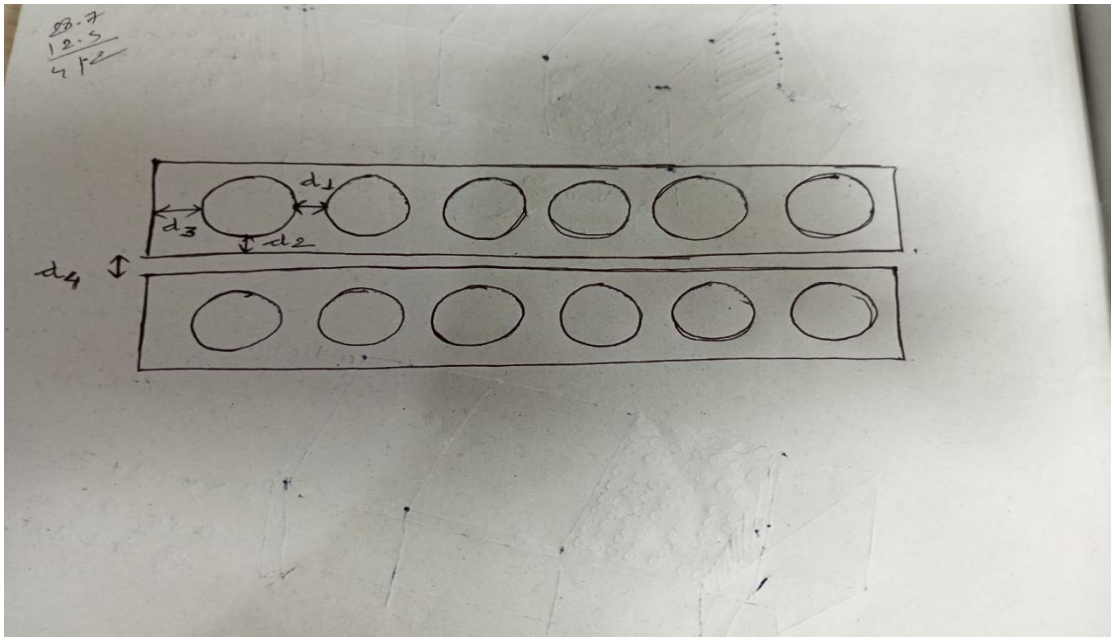
Capacity = nominal cell voltage [V] * cell capacity [Ah] * # series connections * # parallel connections

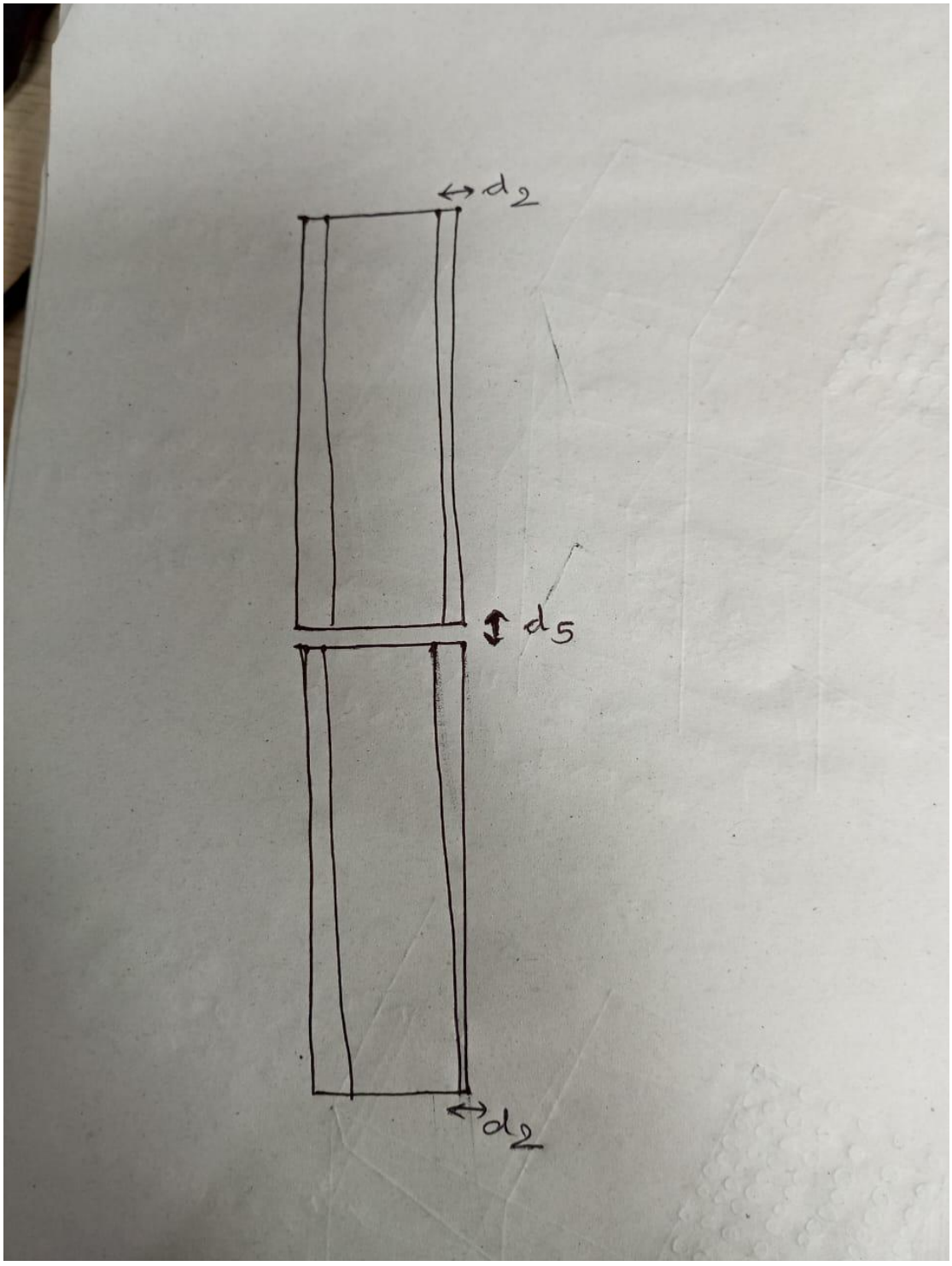
3. So referrring the value from Molicell Cells.pdf we calculated in each module there are 7 in series and 10 in parallel.



4.Now we needed distances between two cells in parallel which is (d2+d4+d2) and distances between

series connection which is d1 and distance between two modules id d5.





5.The goal is to minimize the overall volume of the battery pack and ensure that heat generation from each cells does not damage other cells , connecting wires or increase heat in the module .
6. First the parameters were decided through hit and trial : (d1=3,5,7 , d2=2,3,4, d3, d4=3,5,7,d5=3,4,5,6) and a geometry was made based on it in Ansys.
Values in setup were based on velocity of 4m/s keeping the normal speel of cooling fan in mind and 192683W/m^3 (if value were based on 15m/s and 106746.47W/m^3 the values of d1 , d2 , d3 , d4 and d5 would be more lesser)..
7.Considered two parameters at a time in the geometry along with value of heat generation from each cell which was of around 2.77 Watt . This was calculated for the overall track distance i.e., 1km which means how much power was consumed from each cell using simulink .Initially it was taken. 5W
8.By taking average of all 7 cells the analysis of distances at which the average was minimum were

finalised.
9. The values are d1=3,d2=3,d3=2,d4=3,d5=5