DESIGN AND FABRICATION OF MOBILE AIR CONDITIONER COMPONENTS

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Abstract: Heat as always been a problem in every country such as india. Doing work in a hot summer day can be tiring and are prone to make silly and unwanted mistakes. Vertical Mobile air conditioning systems are used across all transport modes including cars, buses, trucks and trains to keep drivers comfortable and cool while driving safely. This product is design with wheel which make it easier to move and install. With the simplest installation procedure, anyone can easily install the air conditioner to wherever they are desired.

Keywords: Compressor, condenser, evaporator, blower and remote control.

I. INTRODUCTION

A Mobile air conditioner is features component that designed vertically. Vertical air conditioner is portable and also used in windows that give cooling to the entire room. It observes the air from outside. They are sometime referred to as "casement" unit and refer to freestanding industrial units that are typically used in office building. Vertical air conditioner is designed to cool the person and small room also.

Portable air conditioner is an innovation product originally from standard air conditioner that is limited to be used in room or inside building . Then, it is design to make it easier to move from one place to another. This product is design looks like a decoration tree which people mostly use it as an decoration in outdoor event such as wedding and talk. As we all notice that Malaysia has a tropical rainforest climate due to its proximity to the equator. It is hot and humid country all year round, with an average temperature of 27 °C (80.6 °F) and almost no variability in the yearly temperature.

II. PROPOSED ALGORITHM

A. Project Plan algorithm –

The project totally works on laws of thermodynamics called vapour compression refrigeration cycle. In this cycle, circulating liquid acts as a refrigerant which absorbs and removes heat from the space and makes cool by rejecting the heat. The project plan is as follows

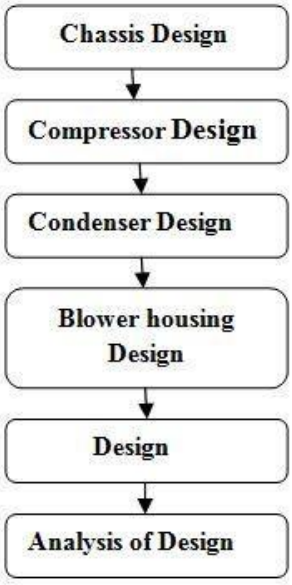

Figure 1. Project plan Block Diagram

B. Simulation algorithm –

The stress analysis of the material should be checked properly and the manufacturing process is as follows

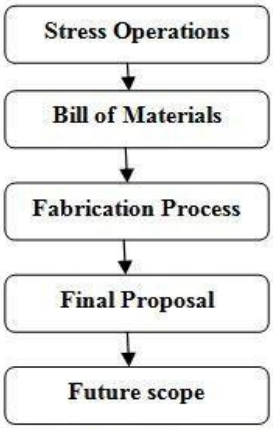

Figure 2. Simulation diagram Block Diagram

A manufacturing system must consider two customers namely, the external that buys that the product and the internal that makes the product. The external customer may be global in scope, but the internal customer is critical in determining the design and manufacturing stages

III. EXPERIMENT AND RESULT

The material is choosen first and make it in the cuboid shape with X,Y and Z diections with proper dimensions and the stress operations are carried .First a magnitude of 150N force is applied at the base in the Y-direction as shown in the table 1 and a magnitude of 45N force is applied at the motor as shown in the table2

Force: 1

Load Type	Force
Magnitude	150.000 N
Vector X	0.000 N
Vector Y	150.000 N
Vector Z	0.000 N

Table-1

Selected Face(s)

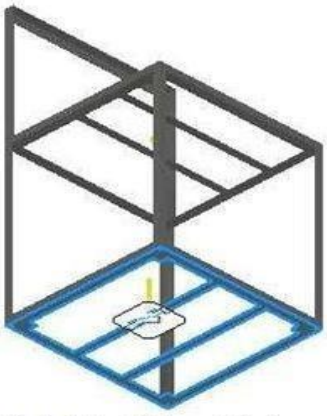

Fig 3: Selected faces at the base

Force: 2

Load Type	Force
Magnitude	45.000 N
Vector X	0.000 N
Vector Y	45.000 N
Vector Z	0.000 N

Table-2

Selected Face(s)

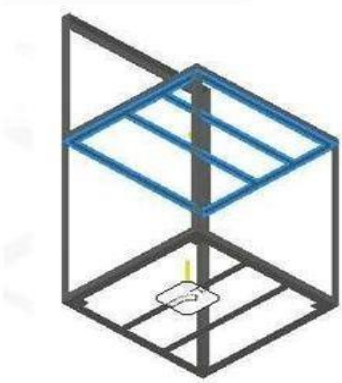

Fig 4. Selected faces at the motor

Fixed Constraint: 1

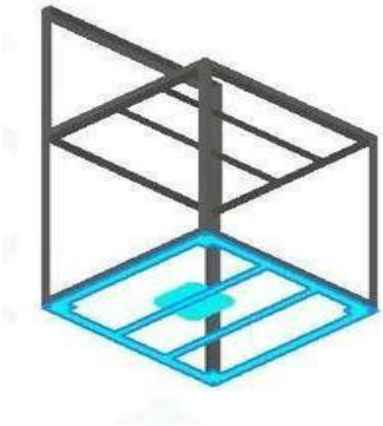

Fig 5. Fixed Constrains

RESULT

Following all the procedures such as by the process of refrigeration cycle the component is finalized by mechaniocal process followed by fabrication.Then component is designed by CAD analysis software.Hence the system mainly works on refrigeration process in which condenser makes the air cool by rejecting the hot air by the help of evaporator or blower.

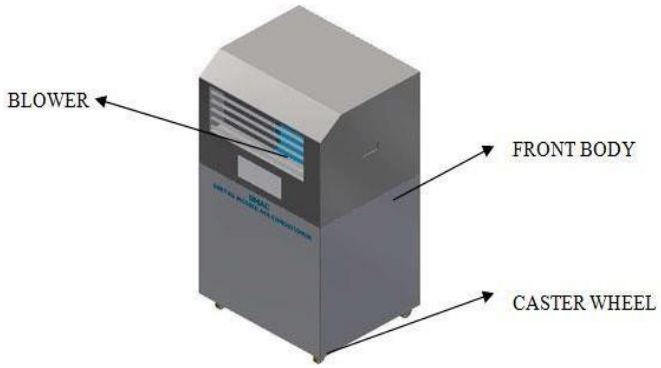

Fig 6. Final render

The result of the summary by applying the load at the base and at the motor is as follows

Reaction Force and Moment on Constraints

Constraint Name	Reaction Force		Reaction Moment	
	Magnitude	Component (X,Y,Z)	Magnitude	Component (X,Y,Z)
		0 N		-0.186352 N m
Fixed Constraint:1	195 N	-195 N	0.431722 N m	0 N m
		0 N		-0.389431 N m

Table 3 Reaction force and moment on constraints.

Name	Minimum	Maximum
Volume	617136 mm^3	
Mass	4.84452 kg	
Von Mises Stress	0.0000378469 MPa	14.4111 MPa
1st Principal Stress	-2.58853 MPa	15.5496 MPa
3rd Principal Stress	-16.2294 MPa	1.25956 MPa
Displacement	0 mm	0.802968 mm
Safety Factor	14.364 ul	15 ul
Stress XX	-5.15747 MPa	4.24881 MPa
Stress XY	-3.95989 MPa	3.57444 MPa
Stress XZ	-4.74161 MPa	4.74564 MPa
Stress YY	-5.01007 MPa	2.49571 MPa
Stress YZ	-1.4402 MPa	1.23763 MPa
Stress ZZ	-15.8003 MPa	15.14 MPa
X Displacement	-0.00455069 mm	0.0297881 mm
Y Displacement	-0.0022409 mm	0.802956 mm
Z Displacement	-0.0566873 mm	0.0565325 mm
Equivalent Strain	0.000000000146264 ul	0.0000583493 ul
1st Principal Strain	-0.0000000517396 ul	0.0000674968 ul
3rd Principal Strain	-0.0000669834 ul	0.0000000649339 ul
Strain XX	-0.0000214865 ul	0.0000174592 ul
Strain XY	-0.0000229494 ul	0.0000207155 ul
Strain XZ	-0.0000274798 ul	0.0000275031 ul
Strain YY	-0.0000217561 ul	0.0000189425 ul
Strain YZ	-0.0000083466 ul	0.00000717264 ul
Strain ZZ	-0.0000644964 ul	0.0000651227 ul

Table 4 Result Summary

Table 4 shows the Stress and strain analysis in all the X,Y And Z-directions of the final component.

IV. CONCLUSION

As a conclusion, we can conclude that a cheap portable air conditioner is achievable and can be marketable in reality. We can say that this portable air conditioner is movable and very economical as well as eco-friendly when compared to traditional air conditioner. After the product has been finalized, this product will be tested in workshop. it will test the portable air conditioner to use inside the workshop whether it can operate or not. If not, some modification should do to make sure it functions properly.

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