

LIFE SAVER, Modified Version of an Ambulance

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Abstract: 'LIFE SAVER' is a modern iteration of a conventional ambulance with crucial medical equipment that can be vital to save the patient during a critical condition. This paper mainly focusses on the exterior design of the conventional ambulance to use its more space for better treatment. The conventional ambulance has its basic exterior structure, in LIFESAVER, the size and shape of exterior part is use and remodified in such a way that interior part can use at maximum space. The use of GPS system and surveillance camera for the new ambulance for easy handling. Using power efficient led lighting systems which run on auxiliary power supply from a battery pack. In a country with 50% cases of loss of life during transit we need anything but a need of an efficient ambulance like the Life saver.

Keywords: Ambulance exterior design, Surveillance camera, GPS, health care.

1. Introduction

A modern version of a conventional ambulance with crucial medical equipment that can be vital to save the patient during a critical condition. The conventional ambulance is just a vehicle which can take a patient or victim from a point to a hospital leaving the patient unattended with some basic first-aid, these few minutes can be a question of fatality for the victim. 1,46,133 people are victim to road accidents out of which 30% die in ambulance. 50% of cardiac arrest cases reach late. Minimum 400 minutes are needed to reach the hospital which is 30times more than the ideal window Government data shows. 20% deaths in transit & 84810 ambulance crashes of which 121 are fatal.

65% don't acknowledge the ambulance despite the fact that Gov. has levied 10,000RS fine for not giving way to ambulance. A life saver is a modern ambulance which can offer the patient in-transit treatment which can be extremely vital to save the life if a patient. Few add-ons to the life saver in addition to all equipment found in a conventional ambulance are like a pulse oximeter, transport ventilator, nebulizer, along with creature comforts considering NHV factor are noise insulated cabin, stretcher with suspension consider the rigid axle hard ride of most ambulances. The lifesaver also feature some first features like a camera based lane monitoring system allowing the driver to plan the change in lanes by avoiding the traffic congestion ahead, also the Life saver being a minivan it's easy to maneuver in tight places and narrow alley ways.

2. Literature survey

A. International status of ambulance service

About 50,000 ambulances travel on U.S. roads every day. In 2010, there were more than 250 U.S. ambulance crashes that were reported in the news media. Many more ambulances must have been involved in major accidents that did not make it into the headlines. During such accidents, emergency medical technicians (EMTs), who ride in the ambulance patient compartments while caring for patients, are at high risk of suffering injuries. Restraint systems are the first line of defense against injuries or death; however, using restraints makes it difficult to access items and treat the patients. Nevertheless, improving safety necessitates EMTs to remain restrained and to locate most of the items required to perform a wide range of clinical services within arm's reach. An ideal layout of the patient compartment and location of the equipment, medicine, and supplies should optimize performance of the EMTs while ensuring their safety.

B. National status of ambulance service

The real concept of an ambulance is missing in India. Existing ambulances are more like transport vehicles and any vehicle suitable to lay a patient is called an ambulance without consideration to the overall ambulance design. Research has shown that ambulances are more likely to be involved in motor vehicle collisions resulting in injury or death than either fire trucks or police cars. Unrestrained occupants, particularly those riding in the patient-care compartment, are particularly vulnerable. It is, therefore, all the more necessary in an ambulance to take care of occupant safety, patient care ergonomics, medical equipment selection & placement, vehicle engineering & integration, etc. The ambulance service in India is not under government supervision, which is one of the most important services which government should look upon to provide their citizen in their ultra-panic situation. And there are lots of private players who charge a huge sum of money for the service, knowing once emotional condition and taking advantage out of it. The charge for the service (ambulance) which everybody thinks is of humanity has lost its purpose. The only thing which has existed is just a hard emotionless selfish money minded business. As on internet, you will see various private agency provide this type of service but all are an agent

who will charge you a huge sum of money and actually only 1 or 2 company provide this service. They just book you and transfer the call.

3. Types of land based emergency vehicles based in India

Mainly There Are 6 types of Ambulance [6].

A. Basic Ambulance

Basic Life Support Ambulance is for the patients who need medical transportation. It comprises of patient bed, pulse oximetry and oxygen delivery devices.



Fig. 1.

B. Advance Ambulance

ALS ambulance is equipped with ventilator, ECG, monitoring devices and paramedic staff.



Fig. 2.

C. Mortuary Ambulance

Mortuary ambulance services are used for the transportation of the dead body. It is also called as Hearse Van.

D. Neonatal Ambulance

Neonatal transport services are a vital part of care for premature and sick babies, to ensure that babies can be moved quickly for the right care in the right place for their needs.

E. Patient transport vehicle

PTV is a non-emergency patient transport vehicle equipped with patient bed & other life-support devices.

F. Air Ambulance

Air ambulances contain ventilators, defibrillators, infusion

pumps, balloon pumps, oxygen cylinders, trained doctors, & nurses. There are various ambulance services providers in India which provides timely services in emergency & needy people. Medico Ambulance is the one India's largest ambulance aggregator of ambulance and emergency medical services providers.



Fig. 3.

4. Design

A. Methodology of plan work

The total duration of the project work is 7 months. Each month will consist of a specific task. The first month will be a literature survey and last month will consist of real world testing of the implementations. The total work of the project will start from scratch from drafting designing fabrication and fixing. The month of July will be for literature review wherein we gather all the necessary information and details of the specific regulations for the exterior of an ambulance. The designing and drafting will be the next step and later will be followed up by fabrication work on selected materials.

B. Drafting and Design

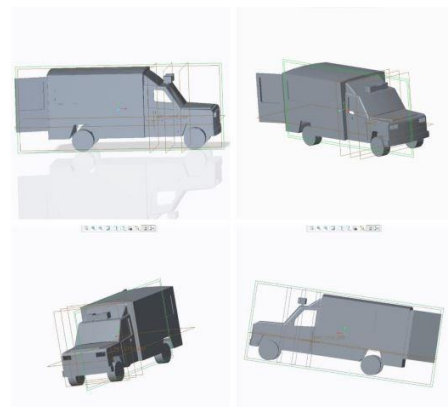


Fig. 4.

Design of exterior of ambulance consist following areas:

- 1) Driver Cabin: Vinyl flooring & roof F.R.P. with insulation.
- 2) Patient Cabin: Seamless, Hygienic and easy to clean ABS (Acrylonitrile Butadiene Styrene) interiors.
- 3) Power Supply: 12-VDC & (220-V Inverter) soft internal lighting with ceiling fitted high intensity patient procedure light.
- 4) It is also important to design the exterior part in software before manufacture it. The exterior is to be designed

considering the factors like length, height, ventilation, maximum comfort to the patient and doctors and supporting staff for the treatment of the patient.

The design i.e. CAD modelling is performed by using software's such as PRO-E and Solid-works. Design gives the optimum size and shape of the vehicle.

5. Conclusion

The given review paper mainly modifies the GPS unit. GPS unit contain the IOT part for that reason the programming must be included. The surveillance camera mounting and handling should be at its maximum efficiency. The economical part should be covered and use of modern technologies for even more better performance of an ambulance. Also Remove the unwanted interior trim and seats, fabricate new floor pan as current is rusted, fix minor rust spot on bonnet and front quarter panel. Use of virtual assistance (Google assistance/alexa) can be more useful. The use of high grade NVH material make the cabin more comfortable.

6. Scope of review

The following issues can be solved or can be defined by this review paper:

1. EMS providers cannot be securely restrained in transport while simultaneously providing care to the patient.
2. The providers cannot reach all critical equipment and

medical supplies while remaining seated and restrained.

3. The location of the cabinets relative to the CPR seat creates a "head strike" zone.
4. The activity area and the cabinets are too far away from the seated EMS providers.
5. The bench seat height is fixed. It is too high relative to the patient cot.
6. There is inadequate leg room.
7. Equipment and supplies are not securable; they can become projectiles in an accident.
8. Seat belts provide safety, but they limit patient care.
9. Confined environment causes physical discomfort and stress for the EMS providers.

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