



STYLING OF AN ALL-TERRAIN AMBULANCE

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Abstract: The aim of this paper is to introduce a styling for an All-terrain Ambulance vehicle. This vehicle can transport patient over any kind of terrain and perform on normal road as well. The paper concentrates on the ergonomic interior layout and design of the ambulance to fit perfectly for being an All-terrain ambulance vehicle. The interior and exterior styling is equally important to fit for the purpose of an ambulance vehicle. The various problems and difficulties in the existing ambulance vehicles has to be the key points developed through primary and secondary research. A number of concepts has to be developed; the best out of them is selected to develop the finalized concept virtual model. This styling becomes a solution for the medical health care services provided to the people living in isolated areas where transportation and roads are a major issue.

Index Terms - All-Terrain, ALS (Advanced Life Saving), BLS (Basic Life Saving), EMS (Emergency Medical Service), Golden Hour

I. INTRODUCTION

Around 10% of overall population of India is Tribal population. This counts of about 104282 people all over the country. A major part of this population is living in isolated areas where transportation and roads are a major issue. The govt. of India has introduced a lot of schemes and plans to enable the availability of medical services to this tribal population. The existing ambulance vehicles in the country are restricted to run on normal roads and other certain limit of terrains. There are situations where ambulances are stuck due to improper terrain travel and other mechanical inabilities. The requirement of an ambulance that can travel on all terrains is a solution for all these problems and can thus provide medical facility to these isolated areas. The Ambulance is the first responder in case of any medical or health related issues to any person in the world. A lot of research and developments in the medical field have been occurring for the past few years in order to make the medical facility available and feasible for all people all over the world.

In medical terms, Golden Hour is the initial hours immediately after an accident or health issue within which the availability of proper medical attention decides whether the person can live or not. This is the first response to the patient at the right time. The ability and performance of an emergency vehicle is very important. The aesthetics of an emergency response vehicle does not have much importance. However, the design plays a vital role. The interior spacing, functionality and aerodynamics are very important for the emergency response vehicle. The balance of design to provide aerodynamic performance, interior spacing and functionality is very important.

1. Background work

From a Research paper by Dandub palzor Negi, from Punjab 21University ^[1], the health care facility available for the tribal community in the country is limited. The paper highlights the various dimensions of healthcare facilities and tribal health available in the country. The paper also discusses the requirement of a national healthcare policy required to take care of tribal community health.

Mr.Purushottam from Kurukshetra University, Haryana ^[2] has highlighted the problems and issues faced by the tribal community like social, economic and health care.

The issues in the current ambulance design is in an Ambulance design survey ^[3].

Mrs. Prachi Sanghavi ^[4] helped in understanding the difference and the need of ALS and BLS ambulances in providing out of hospital medical healthcare facility.

The requirements, rules and regulations for a vehicle to be fit for the regulations paper obtains an ambulance released as National Ambulance Code ^[5].

The newest technology of hydro pneumatic suspension specifically developed for an ambulance is a part in the new styling ^[6].

II. EXISTING PRODUCT

III. The existing ambulance vehicle ^[7] analysis is in detail to understand the positives and negatives of the existing product in use. The normal ALS ambulance is equipped with defibrillator, portable ventilator machine, oxygen machine, suction apparatus, full sized ambulance stretcher, emergency medicines, technician seat and patient by stander seat. The stretcher is easily detached, can be took out to carry the patient, and can be took inside just with a simple mechanism without much load to use. The rear door is openable up to 270 degrees, which provides enough space for operating the stretcher. The side facing seats in the patient compartment enables the technician to be in contact with the patient and take care of the patient.

IV. The exterior aesthetics of an ambulance does not have much importance but the styling plays a vital role in providing aerodynamic efficiency and interior space utilization. The existing design is more space consuming and the overall dimensional practicality is less.

V. The exterior styling do play a role in seeking attention of other road users to recognize the ambulance and give way for it. The dimensions of the vehicle is important, as it has to move through different terrains and conditions. The maneuverability of the vehicle, interior spacing, drivability, ease of access to patient compartment, etc. all are dependent on the dimensioning.

VI. The various problems and difficulties faced by the end users of ambulance is generated through primary and secondary research. The access to all the equipment by the technician without moving from the seat is an issue. The technician has to move around in the patient compartment to access to all equipment and medicines as well as the patient. The availability of rear door alone for taking in and out the stretcher is difficult at times. The bulky design of the vehicle makes it difficult in maneuverability in certain conditions. The vehicle can perform on normal road. However, is stuck in other terrains. The lack of mechanicals as well as design limits the vehicle to go through different terrains.



Figure1: Existing ALS Ambulance

III. PROPOSED DESIGN

The course of my styling begins with the initial research, which includes literature survey and background study. Then follows the secondary and primary research to obtain the requirements of the final concept. It is followed by concept generation phase which includes evaluating existing ambulance vehicle, user requirements, problem solutions and concept design. The final concept model will be along with dimensions to enable the best practicality and performance.

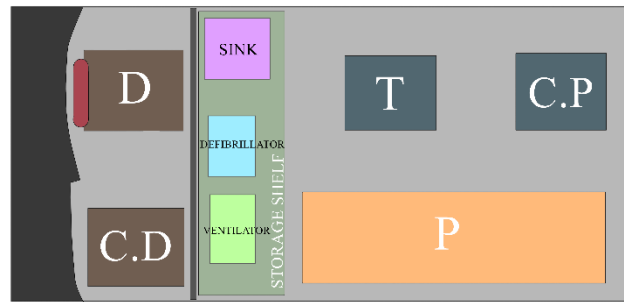


Figure2: Proposed Interior Layout

IV. DEVELOPMENT OF THE CONCEPT DESIGN

The aim of the project is to do styling for an All-Terrain ambulance that can travel over any kind of terrain with the facilities of an ALS ambulance. The design should provide the best interior space utilization as well as the overall design should fit the practicality of being an all-terrain vehicle. All the mechanical factors of an all-terrain vehicle is included in the design.

- The concept is compact to move around in traffic as well as in congested areas with ease.
- The wheels are large enough to tackle any kind of route conditions.
- The interior spacing and seating is in accordance with safety.
- The Interior is ergonomically efficient and space utilization is the most practical.
- The exterior aesthetics include the graphics and painting as per regulations in National Ambulance Code.

V. FINAL CONCEPT DESIGN



Figure 3 : Exterior Design

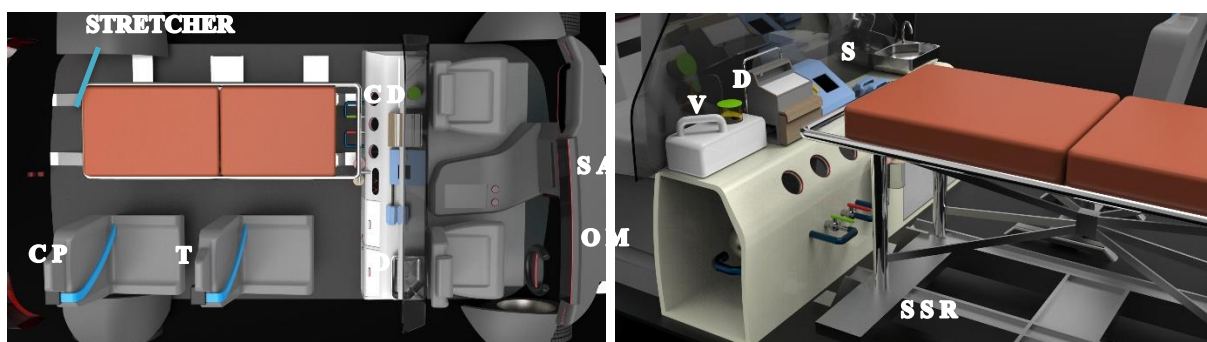


Figure 4 : Interior Patient Compartment Design

**C P = Patient Bystander T = Technician D = Driver C D = Co Driver O M = Oxygen Machine
S A = Suction Apparatus V = Ventilator D = Defibrillator S = Sink S S R = Stretcher Slider Rail**

VI. CONCLUSION

In this project CAD modelling is used to create the final concept design. The 3D model is created using Catia V5 software and the 3D model was rendered to represent the real world model using Keyshot 8. The model is according to the Specifications of an ALS ambulance. The future scopes include the use if design for other types of ambulance vehicles as well as other emergency response vehicles with concerned mechanical and layout changes. The outcomes of the design was ergonomically designed patient cabin layout. All the equipment were within the reach of the technician so that the technician can access and reach the patient without moving from the seat. The patient cabin seats are rotatable up to 90 degrees so that the side facing as well as front facing seat position is achieved.

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