

**DEVELOPMENT OF A COLLAPSIBLE SPACE SAVING
CHAIR-BED FURNITURE**

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ABSTRACT

Space is an asset that has service potential or future economic benefits, which is owned and/or controlled by men. However, mismanagement of space is common to all and sundry, this has been a core problem for developed countries and some developing countries in their major mega cities including Nigeria. In this work, chair-bed furniture was designed and fabricated to optimize the use of space with its dual functions. This can be used in conference hall, hostels, offices, homes and outside the station for vacation or execution of road projects where it functions as seat during the day and unfolded in the night as double bunk bed for two people to sleep on it. The chair-bed consist of frames, bunks, bushing, ladder and upholstery. The chair-bed was designed using Autodesk inventor and the simulation result shows that load exceeding 72.25 Mpa and 34.52 Mpa on chair and double bunks respectively could lead to its failure. Frames were cut into various dimensions. A metal pipe cold cutting machine was used to cut all the parts into their dimensions. Thereafter, these parts were welded together, based on the design specifications through arc welding process. The upper bunk side frames is 900 mm with diameter of 46 mm and the back frame 1850 mm, it has four lock pins that were welded to its sides for suspension when the chair-bed furniture is to be used as a double bunks bed. The lower bunk has four side frames that serve as the feet of the chair-bed furniture. These feet have two welded parts, one is mild steel and the other is stainless steel, 300 mm length from the base with diameter of 46 mm and 600 mm length with diameter of 38 mm respectively, welded together. The smaller part of the lower bunk allows the upper bunks to move up and down. The clearance between upper bunk and lower bunk when it functions as chair is 60 mm while the clearance between upper bunk and lower bunk when it functions as double bunk bed is 580 mm. The cushioning effect, foldability, ergonomics, aesthetic and anti-corrosion properties were considered in the design resulting into a durable and with little

effort, converts into a comfortable bed to ensure great sleep. The performance evaluation of chair-bed furniture was carried out using three men of 65 kg each to seat on it without any deflection on the frames when using it. Also, the developed furniture could be folded into bed at night. The overall weight of the chair-bed is 285 kg. The total cost of constructing the chair-bed is ₦165,000. This work will enhance optimum use of our available space.

CHAPTER ONE

1.0

INTRODUCTION

1.1 Background of the Study

Space is a valuable asset that is available for different purposes such as structures, farming, institutions, sports, and as a continuous source of income if efficiently and effectively managed (Ahamad, 2005).

Space can also be a non-occupied area which is bound or boundless in which objects and events have relative position and direction. Also, Space is an asset that has services potential or future economic benefits.

Geographical space is often considered as land, and can have a relation to ownership usage (space is seen as property or territory). Public space is a term used to define areas of land collectively owned by the community, and managed in their name by delegated bodies (Amit, 2019). Such spaces are open to all, while private property is the land culturally owned by an individual or company, for their own use and pleasure (Hamid *et al*, 2016).

Space management is to effectively manage the space in order to reduce the cost of wasted space, productivity and optimize the use of space (Archibus, 2014). Space management is one component of facility management that encompasses various disciplines to ensure a working environment to function properly through the integration of human resources, workplace, process and technology (IFMA, 2005). Also, space is an art and science that maximizes the value of existing space and minimize the need for new space (Archibus, 2014). Space management should be one of the most important components in the facilities management.

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