

CHAPTER ONE

1.0.

INTRODUCTION

In a building, the surfaces which divide a building into different levels or storeys are known as floors. The floor above the ground level is called **ground floor**, whereas the floor constructed below ground level is known as basement floor. Any floor above the ground level, except the terrace or roof of a building is known as **upper or suspended floor**. The ground floor is laid over the joists, with floorboards the most widely used in houses built (Daerga et al; 2012)

A suspended floor is a ground floor construction method used widely in houses built in the early-mid 20th century. Suspended floors were popular in the early to mid-1900s because they required fewer foundations and were well suited to building many houses quickly. Suspended floors are constructed using supported joists below the floor covering (e.g. floorboards), with a void between the ground below and the ground floor. This type of construction allows builders to lay level floors even when the ground below is uneven. When properly constructed, the void stops damp becoming a problem by ventilating the space below the floor (Bernier et al; 2010). There are several different types of suspended floors. The most common are timber joists supported below by short loading-bearing walls (aka ‘Sleeper walls’) A suspended floor lets gives room for a dry, level floor without pouring a concrete base. The ground floor is always the floor at ground level, no matter the construction. A suspended floor is a ground floor constructed by fitting joists (usually supported on small, low walls beneath the floor) and then installing the floor on top (Birchall et al; 2011)

Suspended ground floor construction is a widely utilized technique in modern civil engineering, architecture and building design. It involves creating a floor structure that appears to float above

the ground, supported by columns, beams, or other load-bearing elements. This method offers several advantages in terms of aesthetics, functionality, and structural integrity.

1.0.1. Primary Benefits of a Suspended Ground Floor

One of the primary benefits of a suspended ground floor is its ability to create a sense of openness and lightness in a space. By elevating the floor, architects can incorporate various design elements, such as large windows or skylights, to maximize natural light penetration. This not only enhances the visual appeal of the interior but also contributes to energy efficiency by reducing the need for artificial lighting during the daytime (Beaumont 2007).

Structurally, a suspended ground floor offers advantages as well. This construction technique allows for better utilization of space beneath the floor, making it possible to incorporate services like plumbing and electrical systems without encroaching on valuable interior space. It also facilitates easier maintenance and repairs of these systems.

1.0.2. The Choice of Materials for a Suspended Ground Floor

The choice of materials for a suspended ground floor is crucial to ensure both durability and safety. Commonly used materials include reinforced concrete, steel, and composite materials. Reinforced concrete is often preferred due to its excellent load-bearing capabilities and fire resistance. Steel, on the other hand, offers the advantage of being lightweight yet strong, making it suitable for creating large open spans without excessive columns.

To design an effective suspended ground floor, structural engineers consider factors such as load distribution, deflection, and vibration control. The loads exerted on the floor, including dead loads (permanent loads like the floor itself) and live loads (temporary loads like furniture

and occupants), must be carefully calculated to determine the appropriate size and spacing of supporting elements.

Proper construction methods are essential to ensure the stability and safety of a suspended ground floor. Skilled professionals follow precise procedures to erect load-bearing elements, such as columns and beams, ensuring that they are securely anchored to the foundation. Quality control measures during construction play a vital role in preventing issues like uneven settling, which could lead to structural instability over time.

While the advantages of suspended ground floors are numerous, there are also considerations that need to be taken into account. Adequate insulation and soundproofing must be addressed to prevent heat loss and noise transmission, especially if the space below the floor is used for habitation. Additionally, the cost of materials, construction, and maintenance should be carefully evaluated, as suspended ground floor construction can sometimes be more expensive than traditional methods.

Suspended ground floor construction offers a blend of aesthetic appeal, functional advantages, and structural integrity. Its ability to create open, well-lit spaces while accommodating services and systems below the floor makes it a popular choice in modern architecture. When properly designed and constructed, suspended ground floors can contribute to the overall efficiency, safety, and visual impact of a building. As the architectural landscape continues to evolve, this construction technique is likely to remain a valuable tool in the hands of innovative designers and engineers.

1.1. AIM AND OBJECTIVES OF THE STUDY

The aim of this project is to construct a wooden suspended ground floor for an educational facility. The objectives are:

- ❖ To construct a prototype suspended ground level with admixture of plastic in concrete mixture
- ❖ To ensure the wooden floor serve as educational activities, such as workshops, lectures, and collaborative learning.

1.2.SCOPE OF THE STUDY

- ❖ Material Selection: Source high-quality, sustainable, and durable wood materials suitable for constructing the suspended floor. Materials that are environmentally friendly and have a long lifespan are prioritize
- ❖ Construction: Execute the construction process, ensuring proper installation of the wooden floor system, including joists, and subflooring. Attentions were given to safety measures and quality control throughout the construction phase.
- ❖ Environmental Considerations: Implementation of sustainable construction practices, such as recycling materials (Plastic) and exploring energy-efficient design options.

1.3.SIGNIFICANCEOF THE STUDY

There are several reasons why using suspended ground levels made of timber in educational contexts is justified. The wooden suspended ground floor will provide a unique and dynamic space for educational activities, fostering creativity, collaboration, and engagement among students and educators. The construction of a wooden suspended ground floor for educational purposes presents an exciting opportunity to create a functional, safe, and sustainable space

that supports the educational goals of the institution. This project aligns with modern construction practices, environmental responsibility, and a focus on enhancing the learning experience for students and educators.

1.4. OPERATIONAL DEFINITION

These terminologies provide a solid foundation for understanding and effectively communicating the concepts and processes involved in the construction of a wooden suspended ground floor in an educational project write-up

- **Suspended Ground Floor:** A floor construction technique where the floor appears to "float" above the ground, supported by columns, beams, or other load-bearing elements, creating space underneath for utilities and services.
- **Subfloor:** The base layer of the suspended wooden floor system, often made of plywood or oriented strand board (OSB), providing a stable foundation for the finished flooring.
- **Timber:** This is a term used to describe the wooden components used in building, frequently in the shape of beams, joists, or planks.
- **Floor covering:** The substance that provides the walking surface and covers the joists. This could be wood planks, plywood, or other materials in the case of a suspended ground floor made of timber.