

# DESIGN AND DETAILING OF BUILDING CONSTRUCTION IN PWD

Mahesh Kumar p<sup>1</sup>, Sanjai Kumar S M<sup>2</sup>, Sowmi Shruthiksha k<sup>3</sup>, Jayanthi v<sup>4</sup>

<sup>1,3</sup> UG – B.E Civil Engineering, Bannari Amman Institute of Technology,

<sup>4</sup> Assistant Professor, Artificial Intelligence, Bannari Amman Institute of Technology, Sathyamangalam, Tamil Nadu.

[maheshkumar.ce20@bitsathy.ac.in](mailto:maheshkumar.ce20@bitsathy.ac.in), [sanjaikumar20@bitsathy.ac.in](mailto:sanjaikumar20@bitsathy.ac.in),

[sowmishruthiksha20@bitsathy.ac.in](mailto:sowmishruthiksha20@bitsathy.ac.in), [jayanthi@bitsathy.ac.in](mailto:jayanthi@bitsathy.ac.in)

## ABSTRACT

Government facilities developed and maintained by Public Works Departments (PWD) are critical infrastructure for administrative, legislative, and public service responsibilities. It is critical that their design and detailing satisfy high standards in order for them to work, last, and be visually appealing. This abstract describes a thorough approach to the design and detailing process that is specifically adapted for PWD projects. The design process incorporates thorough research and stakeholder consultation. Utilising advanced technologies such as CAD, and ensuring compliance with regulatory standards. The case studies highlighted in this paper specify successful implementations of the specified approach, resulting in iconic government buildings that serves for efficiency and for public service. The key focus areas include architectural design principles, structural integrity and sustainable construction practises. This research aims to provide a comprehensive understanding of the design and detailing process for government buildings, enabling engineers and designers to develop efficient and sustainable buildings without resorting to plagiarism.

**Keywords:** Government building, design, detailing, Architecture, Structural integrity

## 1. Introduction

Government structures are lasting reminders of governance in towns and cities, representing parliamentary, authoritative, and civic duty values. The layout and detailing of government buildings are more than just architectural endeavours; they are profound statements of societal ideals, functional requirements, and aesthetic goals. Government buildings are fundamentally built to facilitate governance functions, including legislative contemplation, administration, and public involvement. In recent years, technological improvements and societal concerns have had an impact on the design and detailing government buildings. The rise of digital connectedness has transformed how public services are provided, needing flexible, adaptable buildings that can support evolving technologies and work habits. Similarly, an increased emphasis on sustainability has resulted in the incorporation of energy-efficient systems, environmentally friendly components, and sources of clean energy into the design process. Through a comprehensive review of design rules, case studies, and standards of excellence, it seeks to provide architects, urban planners, and legislators with the knowledge and insights they need to create places that not only meet the practical demands of governance but also resonate with democratic and societal aspirations. Those in charge of designing and detailing government buildings hold an immense amount of duty as caretakers of the built environment. By emphasising innovation, sustainability, and inclusion, they may ensure that these institutions not only serve their immediate function but also serve as eternal monuments to the lasting values of democratic and civic engagement. The design of government structures goes beyond simply practicality. These structures serve as illustrations of democracy in action, representing the principles of transparency, accountability, and public service. As a result, their architectural language must reflect dignity, authority, and inclusivity, inviting residents from all walks of life and instilling trust in the institutions they serve. The design phase of a building for the government is an important step in the process of developing a working, aesthetically beautiful, and symbolic structure that fulfils the demands of government and the public. This phase entails a thorough examination of several variables, including architectural style, usefulness, space utilisation, safety concerns, accessibility, sustainability, and budgetary restrictions.

Designing phase of government building usually includes several key aspects:

1. **ASSESSMENT AND PROGRAMMING:** The procedure normally starts with a thorough examination of the government building's functional requirements. This entails meeting with a variety of stakeholders, such government officials, managers of departments, and potential building users, to better understand their individual

requirements and preferences. Based on this information, a programme is created that specifies the space requirements for various departments, offices, meeting spaces, public areas, and other facilities

2. **SITE SELECTION AND ANALYSIS:** Choosing a suitable spot for the government buildings is critical, and it entails considering aspects such as setting, accessibility, zoning rules, environmental effect, and possibilities for future growth.

3. **CONCEPTUAL DESIGN:** During this stage, architects create early design concepts that convert programme objectives into layouts and architectural forms. Concepts may investigate different types of architecture, building gathering, circulation trends, and site organisation.

4. **PUBLIC ENGAGEMENT:** Throughout the design process, efforts are made to solicit feedback and input from the public, community groups, and other stakeholders. This may involve conducting public meetings, workshops, and design charrettes to gather ideas, address concerns, and foster community buy-in.

5. **DESIGN APPROVAL:** Once the customer and regulatory agencies have accepted the design, the project enters the procurement phase, in which contractors are chosen through a process of competitive bidding. Detailed construction documentation are created, and contracts are issued to the chosen companies.

## 2. Related Works and Literature Survey

O. E. Ogunsanmi<sup>1</sup>, O. A. Salako<sup>2</sup>, and O. M. Ajayi<sup>3</sup> <sup>1</sup> Senior Lecturer

“ RISK CLASSIFICATION MODEL FOR DESIGN AND BUILD PROJECTS” This study aims to use discriminant analysis to categorise risk factors in Design and Build projects as cost, time, and quality. A literature review was conducted to examine risk sources, classification, management, and effects on Design and Build projects, including the use of discriminant evaluation as a statistical technique. This literature review analysed published papers, journal articles, and reports on design and build project hazards. A questionnaire was devised to collect study data. The study found that time overrun and poor quality are the key criteria distinguishing cost, time, and quality risk groups. These two discriminant functions explain the differences between risk groups. The discriminating factors of cost overrun, time overrun, and poor quality show a relationship with the two classifier functions. The two discriminant models can categorise risks in Design and Build projects as cost, time, and quality. categorization models have a 72% success rate in identifying risks in Design and Build projects. These models are highly recommended for clients, design and build contractors, and risk managers to effectively manage and reduce future risks in new design and build projects.

## 3. OBJECTIVES

To prepare a plan of a building using cad as given by PWD. Estimation of quantity and bill of materials is to be done. Acquiring practical knowledge through practical visit. Design government buildings that are accessible to all people, including those with disabilities, in line with applicable accessibility standards and laws. This comprises barrier-free access, accessible paths, entryways, staircases, restrooms, signage, and other services that guarantee all users have equal access and usage.

### 3.1 KEY COMPONENTS AND TASKS

Include suitable security measures and features in the design and detailing of government buildings that safeguard occupants, assets, and sensitive data. This comprises measures like access control, video surveillance, blast-resistant materials, evacuation routes, and fire safety features to reduce security threats and protect the safety of the structure's occupants. Design government buildings with adaptation and flexibility in mind to meet changing needs, technologies, and work habits over time. This includes creating flexible spaces, adaptable layouts, and flexible infrastructure that can be altered or reused to meet changing needs and promote future growth and innovation. Optimise the design and details of government buildings to produce cost-effective solutions that maximise value, quality, and longevity while remaining within budget. This involves lifetime cost analysis, value engineering, and procurement techniques to cut construction costs, long-term operational expenses, and guarantee public monies are used efficiently. Design government buildings with resilience and disaster preparedness in mind to reduce the risks associated with natural disasters including earthquakes, hurricanes, floods, and wildfires. This includes adopting resilient design solutions, such as strong foundations, redundant utilities, and emergency response plans, to ensure operational continuity and public safety in the case of a disaster.

### 3.2 METHODOLOGY

Project start-up refers to the initial step of "Design and Detailing of government building in PWD". To give the project a clear direction, it must first determine its scope, goals, and stakeholders. The undertaking's goal,

objectives, and anticipated outcomes are specified at this stage. Important stakeholders are identified, and their goals and points of view are taken into account throughout the project's length. Furthermore, communication channels are established to promote efficient sharing of knowledge between teammates and stakeholders. This promotes team communication, decreases misunderstandings, and promotes speedy decisionmaking.

Putting together a task team is a vital first step in any project. Roles, duties, and reporting systems are established to ensure the effectiveness of work allocation and accountability. The initial phase of a project sets the tone and provides a roadmap for subsequent stages. An effective start phase lowers uncertainty, unites stakeholders, and puts the project up for success by developing an agreed-upon set of objectives and objectives.

To match the project to the needs of the client, it is critical to understand their viewpoints and expectations. Clear communication channels are established to facilitate the seamless sharing of knowledge among stakeholders and project team members. Transparency is assisted by open channels for discussion, which also reduces the possibility of misunderstandings and improves decision-making efficiency.

The project team is assembled all at once, with roles, responsibilities, and reporting structures thoroughly defined. This creates a sense of accountability and clarity, ensuring that everyone in the team understands their unique commitments to the project's achievement. In general, the project's start phase sets the tone for the project as a whole by removing uncertainty, bringing stakeholders together, and providing an outline for the stages that will follow.

### 3.2.2 LITERATURE REVIEW:

A review of the literature for the project "Design and Detailing of Government Buildings in PWD" would involve researching and analysing existing scholarly articles, books, reports, case studies, and other relevant literature about the planning, design, and construction of government buildings managed by the Public Works Department (PWD). It usually includes overviewing of building rules, codes, and standards applicable to government construction and design of buildings. Analysis of particular laws and regulations for accessibility, fire safety, environmental sustainability, and structural integrity. Comparison of building regulations and standards for government buildings across areas or jurisdictions. Examining the functional and space requirements of various government departments and organisations. A review of methods for space computer programming, design, and layout optimisation in government buildings. Case studies demonstrating best practices for space allocation and utilisation in government office buildings. Study of architectural design ideas and methodologies for government buildings, such as building massing, facade design, and interior layout. Analysis of styles of architecture, symbolism, and cultural influences on government building design. Examination of case studies showing outstanding architectural design and detail for government buildings. A review of policy frameworks, government efforts, and financial systems that promote the design and detailing of governmental buildings. An examination of developing trends, breakthroughs, and future directions in government building planning, building, and management. Identification of gaps in knowledge and avenues for future investigation in the subject of governmental building design and detailing. By performing a thorough literature analysis that includes these subjects and themes, researchers can obtain helpful knowledge, uncover best practices, and inform the design and detail process for government buildings operated by the Public Works Department (PWD) and related entities. Furthermore, a literature assessment can serve to lay a sound theoretical framework, guide decision-making, and contribute to the successful completion of excellent, sustainable, and resilient government structures that fulfil the needs of governance and the public.

### 4. PROPOSED WORK MODULES

Site Assessment: Evaluate the land for suitability, accessibility, and potential challenges. Permits and Approvals: Obtain necessary permits and approvals from local authorities. Design and Planning: Collaborate with architects and engineers to design the school building according to educational requirements and local regulations. Excavation: Dig and prepare the foundation trenches. Foundation Construction: Pour concrete and lay the foundation. Waterproofing: Apply waterproofing materials to the foundation to prevent water damage. Frame Construction: Erect structural steel or wooden frames for the building. Wall Construction: Build walls using bricks, concrete blocks, or other suitable materials. Roofing: Install roofing materials such as metal sheets, tiles, or shingles. Plumbing: Install plumbing systems for water supply, drainage, and sewage. Electrical: Set up electrical wiring, outlets, switches, and lighting fixtures. HVAC: Install heating, ventilation, and air conditioning systems for climate control. Flooring: Lay flooring materials such as tiles, hardwood, or laminate. Interior Walls: Install partitions and finish interior walls with paint or other surface treatments. Doors and Windows: Mount doors

and windows for access, ventilation, Painting and Finishing: Apply paint and finishings to interior and exterior surfaces. Landscaping: Landscape the surroundings with greenery, walkways, and outdoor amenities. Furniture and Fixtures: Furnish classrooms, offices, and common areas with desks, chairs, cabinets, and other necessary fixtures. Quality Assurance: Conduct quality checks at various stages of construction to ensure compliance with standards and specifications. Structural Testing: Test the integrity and safety of the building structure. Code Compliance: Verify that the construction meets building codes and regulations. Cleaning: Remove construction debris and clean the interior and exterior of the building. Final Inspection: Conduct a final inspection to address any remaining issues or deficiencies. Handover: Hand over the completed school building to the client or school administration.

## 5. RESULTS AND DISCUSSION

**Budget:** The budget for constructing a school building varies depending on factors such as the size of the building, location, materials used, and any additional features like technology integration or eco-friendly designs. **Timeline:** Construction timelines can also vary based on factors like weather conditions, permits and approvals, availability of materials, and the complexity of the design. Generally, constructing a school building can take anywhere from several months to a couple of years. **Contractors and Suppliers:** Typically, multiple contractors and suppliers are involved in the construction process, including general contractors, architects, engineers, subcontractors for various trades (e.g., electrical, plumbing, HVAC), and suppliers of construction materials. **Quality of Construction:** The quality of construction is essential to ensure the safety and durability of the school building. Results might include adherence to building codes and regulations, quality of materials used, and the final inspection report. **Community Impact:** Constructing a school building often has a significant impact on the local community, including creating job opportunities, improving infrastructure, and providing educational facilities for children. **Sustainability:** Increasingly, there is a focus on constructing school buildings with sustainable and environmentally friendly features, such as energy-efficient designs, renewable energy sources, and green building materials. Without working along the group, we can't achieve things

To summarise, the process of designing and specifying government buildings in PWD is a multidimensional endeavour that relies significantly on the construction phase to bring environmentally friendly supplies and design concepts to life. Construction is the critical step at which the concept of sustainable architecture is realised, ensuring that the building not only satisfies aesthetic criteria but also coincides with environmental and energysaving objectives. Throughout the construction process, different tasks such as preparing the site, foundation laying, structural work, and the use of sustainable materials are methodically carried out to ensure the building's sustainability and functioning. By incorporating sustainable materials such as recycled steel, bamboo, reclaimed wood, and energy-efficient glass, the construction phase considerably reduces environmental impact while improving overall building performance. Furthermore, sustainable construction approaches prioritise resource efficiency, waste reduction, and indoor environmental quality, all of which are critical components in designing a sustainable government building in PWD. Builders and contractors play an important role in applying these practices, ensuring that the building not only meets architectural criteria but also has a good impact on the environment and community. By emphasising sustainable materials and design ideas during the construction process, government buildings in PWD can serve as models of eco-friendly architecture, setting a precedent for future building initiatives and encouraging a more sustainable built environment for future generations. Integrating sustainable methods into government building design not only benefits the immediate residents, but also helps to a greener and more sustainable future for everybody. It is critical to recognise construction's pivotal role in the realisation of sustainable government buildings, emphasising the importance of collaboration among architects, designers, and builders, and legislators to create structures that are not only appealing to the eye but also environmentally conscious and energy efficient. Highlight the incorporation of sustainable design ideas and green construction practices. This may include incorporating renewable energy sources, maximizing natural light and ventilation, using eco-friendly materials, and applying watersaving systems.

Design the structure with adaptability and versatility in mind to meet changing needs and future changes in population or usefulness. Incorporate resilience and disaster preparedness strategies into the building's design to reduce the risks connected with catastrophic events, climate change, and other possible dangers. Invest in continuous professional growth and training for the teams involved in designing and detailing government structures. Create a thorough maintenance and lifecycle planning strategy to maintain the long-term viability and operational efficiency of the government facility

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