

“GREEN BUILDING DESIGN AND SCHEDULING”

A

PROJECT REPORT

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of

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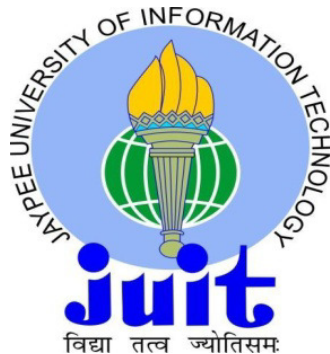
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1.ABSTRACT

A inexperienced building, which is additionally recognized as a sustainable constructing is designed to meet some targets such as occupant health; the use of energy, water, and different assets extra efficiently; and decreasing the ordinary have an effect on to the environment. It is an probability to use the assets efficaciously whilst growing more healthy constructions that enhance human health, construct a higher environment, and supply fee savings. All the improvement tasks lead to over-consumption of herbal resources. Infrastructure Industry is experiencing a fast increase in India. India is a us of a the place infrastructure is most important hurdle for the increase of Indian businesses. In 2010 budget, the whole allocation for infrastructure is 1, 73,552 corers, which is 46% of complete allocationThe inexperienced residence fuel emissions from these structures are contributing ordinarily for Global Warming, Acid Rain and Etc. Our demand on herbal and finite sources such as energy, water and constructing substances can be decreased and our contribution to environmental best can additionally be more advantageous via incorporating inexperienced constructing precept into the design, development and renovation. Green constructions are designed and developed to maximize the entire lifecycle performance, preserve assets and decorate the relief of occupants. This is performed via the use of science such as gas cells and photo voltaic heated water tanks and via interest to herbal factors such as maximizing herbal lights and constructing orientation. This lookup paper is going to analyze the market possibilities handy for inexperienced constructions and obstacles in accepting inexperienced buildings.

2. INRODUCTION

A inexperienced growing depletes as little of the herbal sources at some element of its development and operation . It entails format and setting up practices that limit the horrific influences of the constructions and its occupants on the environment. One of the most inspiring definitions of a inexperienced setting up is as follows – “A Green Building have to create pleasure when entered, serenity and fitness when occupied and ride sorry about when departed.”

The intention of a inexperienced improvement is to:

- Minimize the demand on non-renewable sources
- Maximize the utilization effectivity of these property when in use
- Maximize reuse and recycling of reachable resources, and
- Utilization of renewable resources.

In extraordinary words, a Green Building is a form that is designed, constructed, operated and demolished in a healthful and a resource–efficient manner. The thought of Green Buildings is no longer as nascent as each and every physique thinks it is.

CHAPTER -1

GREEN BUILDING

Green constructing buildings are power efficient, preserve resources, create more healthy indoor environments and provide long lasting and stunning areas that use environmentally appropriate substances. Green constructing comprises built-in diagram concepts, photo voltaic orientation, fantastic footprint sizing, glazing awareness, cloth durability, financial life-cycle analysis, material reuse and salvage, herbal fabric content, domestically handy substances and monetary sustainability. Historically, structures in the United States have been developed with domestically handy and normally sustainable substances. These substances had been regularly indigenous to the area and resulted in special graph options primarily based on their availability and the local weather the place the constructing was once developed. Today, the normal American domestic is a series of substances from each nook of the continent and from suppliers throughout the globe . Green builders renowned the environmental affects of substances chosen and shipped lengthy distances and make fabulous format choices.

1.1 Benefits of Green Building to the Environment

Modern building motives undesirable environmental impacts and limiting these affects is inside the scope of inexperienced constructing . Perhaps the best way to apprehend inexperienced constructing is to first consider the a variety of environmental affects that constructions generate and then reflect on consideration on how terrible affects can be decreased or eradicated via greater fantastic planning, sketch and development . Modern American constructions have an impact on the surroundings in the following areas: web page selection, substances and resources, electricity use and air pollution, water use and quality, and indoor air quality.

1.2 Green Building Materials

Negative environmental affects can be minimized via accountable and intentional use and software of inexperienced substances . Products that comprise a excessive share of unexpectedly renewable sources (such as agricultural by-products like wheat-board or substances with a excessive post-consumer recycled content, such as cotton/denim batt insulation) have a plenty lighter environmental footprint .Materials that are regionally mined, harvested and manufactured (usually described as coming from inside five hundred miles of the challenge site) have much less average influence than these shipped lengthy distances .Material sturdiness is an necessary consideration in inexperienced constructing . Material Resource Efficiency.

1.3 Life Cycle Assessment (LCA)

LCA is possibly the most complete and recognizable dimension of a material's genuine environmental have an impact on . LCA is a approach used to con-duct a full environmental accounting of a building's have an impact on primarily based on the substances used in its construction..

1.4 Life Cycle Cost Analysis

Life cycle price evaluation measures actual monetary advantages of a positive material, taking into account its “first-cost” (what a cloth charges to buy and install); its anticipated existence span; and alternative and maintenance expenses in evaluation to the fabric or product being replaced.

1.5 Embodied Energy Analysis

Besides the big have an effect on constructions have on electricity use and greenhouse gasoline emissions, the building substances used in a constructing can have a huge quantity of “embodied” energy. Embodied strength is the whole power used to produce and transport a particular constructing material. According to the employer Architecture 2030, embodied electricity regularly debts for 15 to 20 percentage of a building’s whole strength use at some point of a 50-year period. Using low embodied strength substances reduces a building’s normal existence cycle carbon footprint.

1.6 Locally Available Materials

Using regionally accessible materials, commonly de-fined as coming from inside a five hundred mile radius, is each an environmental answer and an economic improvement measure. Purchasing inexperienced constructing substances inside the project’s place helps the community’s financial stability. Many rural communities have nearby sawmills that can also be a supply for each structural framing and trim bundle lumber.

1.7 Indian Green Building Council (IGBC)

The Indian Green Building Council (IGBC), phase of the Confederation of Indian Industry (CII) was once fashioned in the 12 months 2001. The imaginative and prescient of the council is, "To allow a sustainable constructed surroundings for all and facilitate India to be one of the world leaders in the sustainable constructed surroundings by way of 2025. The council affords a huge array of offerings which consist of creating new inexperienced constructing ranking programmes, certification offerings and inexperienced constructing education programmes. The council additionally organises Green Building Congress, its annual flagship

match on inexperienced buildings. The council is committee-based, member-driven and consensus-focused. All the stakeholders of building enterprise comprising of architects, developers, product manufacturers, corporate, Government, academia and nodal corporations take part in the council things to do thru nearby chapters. The council additionally carefully works with quite a few State Governments, Central Government, World Green Building Council, bilateral multi-lateral companies in merchandising inexperienced constructing standards in the country.

1.8 GRIHA (Green Rating for Integrated Habitat Assessment)

GRIHA is an acronym for Green Rating for Integrated Habitat Assessment. GRIHA is a Sanskrit phrase that capacity – ‘Abode’. Human Habitats (buildings) interact with the environment in a wide variety ways. Throughout their life cycles, from constructing to operation and then demolition, they devour sources in the shape of energy, water, materials, etc. and emit wastes each at as soon as in the shape of municipal wastes or circuitously as emissions from electrical power generation. GRIHA tries to reduce a building’s resource consumption, waste generation, and wellknown ecological affect to inner tremendous nationally ideal limits / benchmarks.

1.9 Leadership Energy and Environmental Design (LEED)

The Leadership in Energy and Environmental Design (LEED-INDIA) Green Building Rating System is a nationally and internationally regular benchmark for the design, improvement and operation of immoderate standard overall performance inexperienced buildings. It used to be setup in the 12 months 1998 by way of the US Green Building Association to appear to be into the manner of rating the system on an internationally acquainted Standard which is primarily based absolutely on effective suggestions and moreover on credits. LEED-INDIA rating desktop gives a roadmap for measuring and documenting success for every establishing sort and phase of a setting up lifecycle.

1.10 Energy Conservation Building Code (ECBC)

The Energy Conservation Building Code (ECBC) used to be developed with the aid of way of the Govt. of India for new industrial constructions on twenty seventh May 2007. The cause of Energy Conservation Building Code (ECBC) is to furnish minimal requirements for energy-efficient format and improvement of constructions and their systems. The developing vicinity represents about 33% of electrical power consumption in India, with enterprise area and residential vicinity accounting for 8%and 25% respectively.

The ECBC offers diagram norms for:

- Building consisting of thermal normal overall performance requirements for Walls and windows;
- Lighting System, inclusive of day lighting, Bulbs and ' average overall performance requirements;
- HVAC System, which consist of electrical energy normal overall performance of air distribution systems;
- Electrical system; and
- Water heating and pumping systems, which consist of requirements for image voltaic hot-water systems.

1.11 NEED FOR A GREEN BUILDING

During the late 20th hundred years, insight of the impact of mechanical skill and the rising human people on the earth expanded. More people are moving to the city incurring a major enhance in the structure of designs and high rises, and consequently a blasting in the town monetary framework anyway with amazing repercussions in the environmental elements Individuals started to expand their endeavors to diminish their natural impacts and developments started to be recognized as fundamental supporters of the world's power use, landfill squander and lessening unpracticed region . Green building rehearses are presently not new peculiarities. A modest bunch of developments coordinating natural diagram components have been raised as soon as the late nineteenth and mid 21 20th centuries. A brought together unpracticed arrangement movement did never again begin to arise till the 1970s, when design and building rehearses first developed to be a focal point of consideration of ecological advocates.

Structures are probably the heaviest client of regular sources and record for an essential part of the nursery fuel discharges . With the creating evidence that the peculiarities of world warming and nearby weather conditions substitute are initiated by means of anthropogenic nursery fuel outflows, it has end up being fundamental to remove moment movement to save from unsafe punishments for stitch time . Structures never again exclusively use resources like power and uncooked substances anyway they moreover create squander and presumably risky air discharges .

The Structure industry is encountering an expedient charge increment with an ongoing enhance in gross developed spot of 12% per annum over the end decade Demand for lodging, augmentation of prepared, modern working environment regions by utilizing multinationals, the setting up of explicit financial zones , are expanding. Two of greatest difficulties by and by managing the worldwide people are neighborhood weather conditions substitute and social and money related disparity following from help shortage. The built environmental elements has a

gigantic effect on the natural climate, human wellbeing, and the economy. Critical will increment in synthetic responsiveness have been connected to shaky normal mixtures . Found in building substances and client items. Numerous Synthetic Awareness is a condition wherein a victim encounters more than one signs upon exposure to minute amounts of everyday synthetic substances, delivering some phase of un-wellbeing constantly.

The models above outline that people face a fluctuate of unfortunate influences connected to how developments are planned, fabricated, and kept up with. The turn of events and activity of structures, predominantly private structures, requires incredible enter of energy, water and uncooked materials. Structures are also responsible for enormous parts of waste and outflows, alongside ozone harming substances . Energy utilization and related nursery fuel discharges will subsequently continue to up push aside from moves to coordinate the structure undertaking toward manageable utilization and assembling are taken earnestly.

Green developments tackle these difficulties by means of incorporating the vital areas of natural and human wellbeing, security of biological systems, and insurance of home grown sources (counting water, horticultural land, lumber, minerals, metal, quarry product and petroleum derivatives), rebate of barometrical contamination related with power use and substances assembling and presentation of safe, non-harmful indoor conditions. A 'entire structure' procedure to private sketch and improvement consolidates economical web architecture, water preservation, power effectiveness, ecologically ideal substances and top-quality indoor natural top notch to procure an unpracticed stop item that meets essential human longings for asylum excepting compromising wellbeing, security and wellness needs. Green building is as of now not a recollect of want or sumptuous anyway a need for the earth mindful endeavor experts, proprietors, designers, specialists officials and unwinding of the partners. Solid, low-emanating decision substances and most valuable wind stream are two of the attributes of unpracticed designs that improve the wellness of inhabitants, and in flip diminish the money related trouble on families, businesses, and insurers. By taking on unpracticed developing systems, we can amplify each monetary and natural presentation. Green improvement strategies can be implicit into structures at any stage, from diagram and development, to redesign and deconstruction.³ At the miniature

level, the need for unpracticed lodging may likewise be engendered via a singular's wellness worries; on the full scale level, the need is pushed by means of the neighborhood weather conditions substitute debacle managing humankind, and the social distress and brutality following from help shortage. When inherent with duplicated transportation and pushing off starvation and dry season, unpracticed developing can wind up a main point of contention to fixing the world's greatest difficulties.

1.12 GREEN BUILDINGS OF INDIA

India money related increment exclusively be supported with comparing to blast in foundation. By and by, the creating request is being met through disintegrating foundation, for example, road organizations, city transport, water and sterilization and so on. A response to the logical inconsistency requires an enormous development of city foundation which will correspondingly require later unpracticed and economical techniques for building this framework. These more moderen techniques typify the premise of unpracticed developments. Green developing structure has required off radically over shutting ten years in India. A few institutional and specialists our bodies have come ahead to develop reasonable structures. The unpracticed developing development in India started with the establishment of the IGBC in 2001, which used to be a drive of the Confederation of Indian Businesses close by with the Green Structure Board and the usgbc. The first unpracticed developing in Quite a while, Green Business Community in Hyderabad, was once initiated on 14 July 2004. This used to be a wonderful emblematic accomplishment. From that point forward, the wide assortment and amount of unpracticed developments in India has been remarkable .Nonetheless, ability building for unpracticed building experts, unpracticed developing substances and applied sciences is wished to get the fantasies of reasonable structure in India. Arising unpracticed building applied sciences and new unpracticed substances market is assessed to be cycle forty billion USD and it is anticipated to create. The unpracticed developing idea has been acquiring noticeable quality in India with a developing scope of drives, predominantly through Indian Green Structure Confederation of Indian Industry (CII), endeavoring to give information, introducing warning contributions to the venture on ecological factors and practices for unpracticed developments.

1.13 FEATURE OF GREEN BUILDING

1 .Reasonable Site: It alludes to a site that would represent the most un-ecological gamble eventually of building stage. The sites have get admission to basic offices in this way, diminishing air contamination provoked because of the reality of transportation. The scene plan should be with the end goal that it saves generally present shrubs and rebuilding home grown geology, use dry season safe trees. Enhance the utilization of on location storm water organization cure and arrangement for floor water re-energize. Measures are taken on to keep up with zenith soil by means of great procedures.

2. Water Productivity: The main point here is to intensify water effectivity use inside the structure, along these lines diminishing the amount of water wanted for tasks. A few procedures which can be embraced for this incorporate proficient finishing techniques and utilization of progressive wastewater organization mechanical expertise. Advances for reuse of water, for example, Water Collecting, Wastewater treatment plant, for preservation of water waterless urinals are connected.

3. Energy Effectiveness: It incorporates the set up of various procedures of on location inexhaustible power assembling can restrict the ordinary impressions of the developing and different capability of the utilization of unpracticed power. The streamlining of developing direction, massing, shape, plan and inside shades and completes is done which augments the utilization of home grown day lighting. This diminishes the reliance on engineered lights energy. Window edges, bands and shade divider contraption are so intended to advance power execution. Utilization of Honey bee evaluated electrical types of gear is incited . Without cfc refrigerants are utilized in Forced air systems and coolers are introduced. Sustainable wellsprings of force, for example, sunlight based, wind, geothermal and so on are utilized to limit the electrical energy hundreds.

4. Material Choice: As an outcome of extended utilization of certain substances they are taken steps to consume Subsequently, this viewpoints in general stressed with the reusing, bringing down and reusing of the waste. Boosts the utilization of reused content material materials, re-usable, inexhaustible, economically made

due, bio-based materials. Ways are perceived to utilize high reused content material substances which fluctuate from mixed concrete the use of fly debris, slag, reused substantial mix or various admixtures to primary steel, roof and ground surface tiles, covering, cover cushioning and so forth. Bio-based substances and completes, for example, various kinds of agriboard produced using farming waste and through product, for example, straw, wheat, grain, soy, sunflower shells, nut shells and so on. Reuse of family squander in the design of bio fuel is likewise a quality of this perspective.

5. Indoor Climate Quality: to enhance the prosperity of the inhabitants, diagram of a developing is to such an extent that materials with low outflow are utilized. Building is intended to expand the utilization of home grown gentle for all inhabitants. Bio degradable and environmental elements charming purging vendors are utilized that truly do never again send off VOCs or different dangerous merchants and buildup. There should be an arrangement for pass wind current and prevalent wind stream machine .

CHAPTER 2

LITRATURE REVIEW

1.SINGH(2007) did the query on normal developing substances in private structure with the objectives to situate out the degree of purpose of regular building substances in private development, to decide inconveniences gifted in care and redesign in the picked private development, to situate out the wellness inconveniences apparent through the inhabitants because of purpose of normal building materials, to confirm the comprehension and joy phase of occupants concerning regular building substances and to check level of human by and large execution in the picked private designs with normal building fabric development. Multistage purposive cum arbitrary testing design used to be utilized to pick 200 private designs in Uttaranchal. The discoveries distributed that lumber used to be the typically utilized regular building texture in every one of the region of the home in the bumpy regions. Care and upkeep of the home called for a ton of investment, power and cash. Rooftops and segments required least upkeep and deck required absolute attention to detail, purging and support. Disfigurement in dividers, moistness, chipping off, soil delivery, termite and warming up had been the difficulties gifted in the picked houses. Torpidity, weakness and indications of humidified fever had been the essential wellness signs articulated by utilizing the respondents. The greater part of them affirmed low phase of skill including normal developing substances utilized in their homes. Concerning, regular building substances have been positioned first on insurance and care and upkeep. The more unfortunate consideration stage was once demonstrated through the respondents staying in non-wooden houses than the wood houses. The phase of exhaustion was once reflected extra through the respondents staying in non-wooden houses. The offer intensify in temperature from outside to indoor environmental elements used to be more prominent in non-wooden

2. MOKAL.(2015) concentrated on parts of all building texture which are socially and financially benefits for building endeavor and human wellbeing. Green building substances, for example, lime, sand lime blocks, eco-accommodating blocks, shaded lime mortar and reflectasol glass lessens

perspective effect on environmental elements through decreasing the natural air contamination content material and wellness perils jumping up with the utilization of conventional developing materials. Lime diminishes the internal temperature of a room by means of four to 5° as opposed to solidify as pleasantly as its assembling utilizes substantially less power as rather than concrete creation. The compressive force of sand lime blocks was once more noteworthy as opposed to conventional blocks. Comparably eco-accommodating tile utilizes significantly less strength in its assembling and are provincially accessible. Shaded lime mortar requires zero upkeep as opposed to solidify putting and paint work, is water verification and scentless. Reflectasol glass decreases the amount of warmness switch in the room. Consequently a need was once focused on the utilization of these eco-accommodating substances for the higher the following day and wellness presence of coming age.

3. O'MARA and BATES (2012) in their query find out about tried to learn about the thought processes in putting resources into unnecessary generally execution unpracticed structures. The reasons featured the need to limit neighborhood weather conditions change, to ensure power emergencies and dependability, to alleviate danger of solidarity rate unpredictability and award security and to meet strength effectivity and manageability guidelines, impetuses and so forth. Further it distributed two realities; quick gear and strategies at the sketch, right off the bat, area work with productive inherent plan/develop impacts and also, continuous checking, assessment and updates force supported execution. It used to be guided that cunning developments should be connected with sharp lattice therefore allowing two-way power drift between the framework and burden (building) consequently, disseminating strength shrewdly all through an area to control the heap better. The query featured the need and conveyed benefits of unpracticed developments whether work environments or homes. With the propelling need manufacturers are thinking of new drives on Green Structures. IGBC is planning the necessary pointers for example IGBC Green Homes Rating Framework or 'to be sent off' IGBC Finishing Rating System.G.

4. KHOSLA and SINGH (2014) attempted a find out about for the recently evolved and current designs to confirm its practicable and capacity to keep energy. Different power saving principles which can be incorporated at the hour of arranging, planning, advancement and execution stage to have strength effectivity

in building safeguarding in thought the worth perspective are referenced in the review. For this a few unpracticed designs have been conceptualized integrating a number boundaries for power monetary investment funds and demonstrated in the product program Autodesk Revit. These designs have been broke down in Autodesk Green developing Studio to actually take a look at its power effectiveness, with the goal that a number measures might need to be improved.

In this way, it was once presumed that awesome data and science is available for developing power climate amicable and unpracticed designs anyway conduct, authoritative and financial restrictions need to be defeated for accomplishing leaned toward results. Dividers covered through vegetation or terrace assists with diminishing the entrance of warmth in the house. This enhance the power effectivity in the structure. Some examination with respect to vertical nursery/cultivating have been articulated here.

5. WONG, 2009 completed a query on warm correlation of vertical plant life structures for developing dividers. The eight interesting vertical plant life structures (VGSs) have been research set up in Hort Park to consider the warm affect the general exhibition of designs and their quickly environmental elements essentially founded on the floor and encompassing temperatures. The impacts reflected the conceivable warm benefits of vertical plant life structures in diminishing the floor temperature of developing exteriors in the heat and humidity, principal to a rebate in the cooling burden and strength costs. By restricting the diurnal change of divider floor temperatures, the life expectancy of building veneers is delayed, dialing back have been and tear as pleasantly as monetary investment funds in upkeep cost and option of façade parts. The results of vertical plant life structures on encompassing temperature are found to depend on exact vertical vegetation frameworks. Given the greater part of divider exteriors in the built climate, the utilization of vertical vegetation designs to cool the surrounding temperature in it is promising to build gullies. Besides, ait admissions of cooling at a cooler surrounding temperature convert into saving in strength cooling load.

6. SHIAH , 2011 did a query on the product of vertical lawn at the new SUB Chamber with an objective to see after evaluation of social, ecological and monetary impacts of vertical terrace on the new SUB at the College of English Columbia. It was once inferred that the upward patio is truly useful in friendly, natural and money related viewpoints. The upward terrace applied at the New

SUB will empower UBC understudies and traffic through the unpracticed components of the upward nursery. The upsides of placing in vertical patio will urge to rehearse the idea. Therefore, more noteworthy vertical nurseries will help in arriving at the motivation behind upgrading the climate.

7. PAVASIVA, 2014 focused on the planning of the upward patio for the abode of Vadodara city. For the thought process 33 homes had been picked purposively who had vertical lawn and 30 modelers and 30 inside architects have been picked by means of solace testing procedure. The discoveries distributed that the householders and inside creators had unreasonable degree of insight connected with vertical lawn while the designers had normal degree of mindfulness. Greater part of the house proprietors talented sensible degree of issues in the utilization of vertical nursery. A Private vertical terrace was once proposed according to the discoveries and climatic requirements of the Vadodara city.

8.ELMELIGY (2014)presented a near outline to perceive the varieties in the utilization of extraordinary kinds of difference frameworks, uncommonly in classes of each and every one, and generally speaking execution of their effect as used to manageability, each from the view element of typical data, pertinence, affirmation levels, convenience, classes and current a case learn about as appropriately as an example of online assessment. It used to be finished up, despite the fact that there is a extensive recognition of shared characteristic between unmistakable positioning designs which was once presented in the paper in expressions of their points, strategy and construction, but there had been enormous varieties in expressions of extent of the ecological issues tended to, measurements and in general execution principles. In this way, it was once exhorted that it is irreplaceable that the assurance of suitable positioning gadget is done in understanding to its classifications.

9. NDUKA and SOTUNBO(2014) played out a learn about to decide the consideration notoriety of unpracticed developing positioning designs as appropriately as the most preferred positioning gadget for attainable reception in Nigeria. A structures poll was once used to aggregate records from a scope of respondents who have been building experts. Arbitrary examining strategies have

been utilized to pick hundred and fifty respondents out of which 91 had been utilized for data examination. Seven appropriately perceived unpracticed developing positioning designs and 25 saw benefits of unpracticed building components had been perceived from the writing. The outcomes demonstrated that a large portion of the developing endeavor masters in Nigeria have been familiar with unpracticed building positioning designs and inclined toward Initiative in Energy and Ecological Plan (LEED) for attainable reception in Nigerian structure projects.

10..KANIKA (2014)executed a research on interior environmental assessment of Green Buildings in districts i.e. Noida and Zirakpur for checking the pleasure diploma of the occupants of green buildings. It was once positioned that considering all of the IEQ statistics of green and conventional buildings, green buildings were far better than that of conventional systems in all of the IEQ additives except the humidity level. The noise diploma in conventional building was once tons much less than that of green building. The occupants of green buildings were extraordinarily satisfied. There become as soon as increase in knowledge of the metropolis and rural regions respondents after the intervention program.

11.ABBASZADEH(2006) performed a lookup on occupant pleasure with indoor environmental nice in inexperienced buildings. A complete of 181 structures of United States, Finland and Canada and 33,285 respondents had been surveyed thru a net primarily based questionnaire containing self said productiveness in 9 Indoor Environmental Quality categories. It used to be published from the findings that occupants in inexperienced constructions are on common extra cozy with their air first-class and thermal comfort, lighting fixtures and acoustic fantastic in inexperienced structures do now not exhibit a enormous enhancement in assessment to non-green buildings.

12.KUMAR(2013)ascertained significance and relevance of Green low cost houses with wonderful connection with the Indian scenario to have a examine and examine the affordability, attitudinal and one-of-a-kind additives of green low price residences from the perspectives of clients of such houses and ultimately to make suggestions for sustainable development of green much less pricey houses for mutual benefit of all of the stakeholders. The intention population of the

discover approximately was from affordable and coffee income group residing in . The discover approximately has hired a descriptive analytical research approach. Both main and secondary data have been used for the research. The green homes selected for the find out about had taken the hassle of “affordability” hassle into attention thinking about that the questioning development level of the building. It was decided that people were unaware and unprepared to make heavy investments in putting in green buildings, therefore, popularity is required. Further the find out about recommended that housing finance institutions and one-of-a-kind lending organizations need to insist on compliance with green necessities while extending their financial savings facilities. Green finance have to be influenced continuously with the resource of all concerned.

13.MATAR EL .(2015) studied the environment best systems (inexperienced buildings) in particular withinside the u . s . of Jordan and its benefits. Descriptive qualitative approach used for use to gain knowledge of the green systems and its benefits. Data have been collected from important and secondary sources. The outcomes showed that ordinary systems are characterised via way of means of the use of 3 important characters, which might be the drain electricity and resources, polluting the environment thru emissions and fumes, liquid or solid waste, and the terrible have an effect on the health of the clients of systems as a stop end result of using one of a kind chemicals and distinct pollutants. It was once moreover determined that the have an impact on of organising an normal building on the amount of using energy, water and building materials belongings which has cause the priority of depletion of those resources, and based totally on those negatives, the ideas of the environmentally best systems raise mind and theses which might be succesful to triumph over the drawbacks stated above.

14.ELIAS and LIN (2015) studied the green building implementation from the point of view of housing developers. The data were amassed via a head to head semi established interview, image collections and a few observation with housing developers on a sample of twenty-two respondents concerned sooner or later of the records collection duration from home and belongings exhibitions. The findings published that 77 consistent with cent have been aware of green residential questioning while the one of a kind 23 consistent with cent of the respondents found out approximately the green residential idea and the perceived benefits but indistinguishable. All the respondents agreed that the dearth of technology transfer and the know-how of developing kingdom have averted the close by housing developers to encompass green technology of their task. Secondly, housing developers have faced a problem of finance so as to in advance

the green technological expertise expenses into the initial housing development. Majority of the respondents showed no hobby in utilising recycled materials for the house constructing projects. Very few developers showed a possible need to apply the rainwater harvesting for housing challenge in near future. Many of the house developers were now not successful to seize 'green' opportunities because of inner organizational problems. More than 3 fourth of the respondents mentioned approximately the problem to advantage a trendy or standard overall performance whilst it's far driven with the useful resource of the context of development, the neighborhood climate prerequisites and the region of the constructing site.

15. TEIG (2007) completed a survey on "Why Green Buildings has Staying Power? The survey drew responses from 218 enterprise clients and 166 developers of enterprise real estate. The findings posted that 54% of enterprise respondents and 33% of developer's respondents currently very own, manage or hire at the least some "green" properties. Respondents are maximum possibly to be involved in place of work and retail. Among developers, 54% very very own or manage retail, followed via place of work (48%) and mixed-use and hospitality (34%). On the enterprise side, 57% of the respondents very very own or hire place of work space, followed through the usage of industrial (44%) and retail (27%). Corporate clients and developers anticipated that the amount of green offerings they very very own or hire will more than double from 9% to 21% withinside the next five years. About one 1/2 of of the enterprise clients (48%) and developers (53%) seemed green layout each vital or noticeably important. Only 17% of enterprise clients say green layout is now not in any respect critical withinside the internet site desire process, even as truly 11% of developers said that it's miles now under no circumstances vital to their organisation for present day or destiny development.

2.1 . GREEN BUILDING RATINGS

GRIHA (Green Rating for Integrated Habitat Assessment)

Points achieved	GRIHA Rating
50-60	★
61-70	★★
71-80	★★★
81-90	★★★★
91-100	★★★★★

Figure 1 GRIHA RATING SYSTEM

LEED Rating System



Figure 2 LEED RATING SYSTEM

CHAPTER-3

STAAD PRO DESIGN

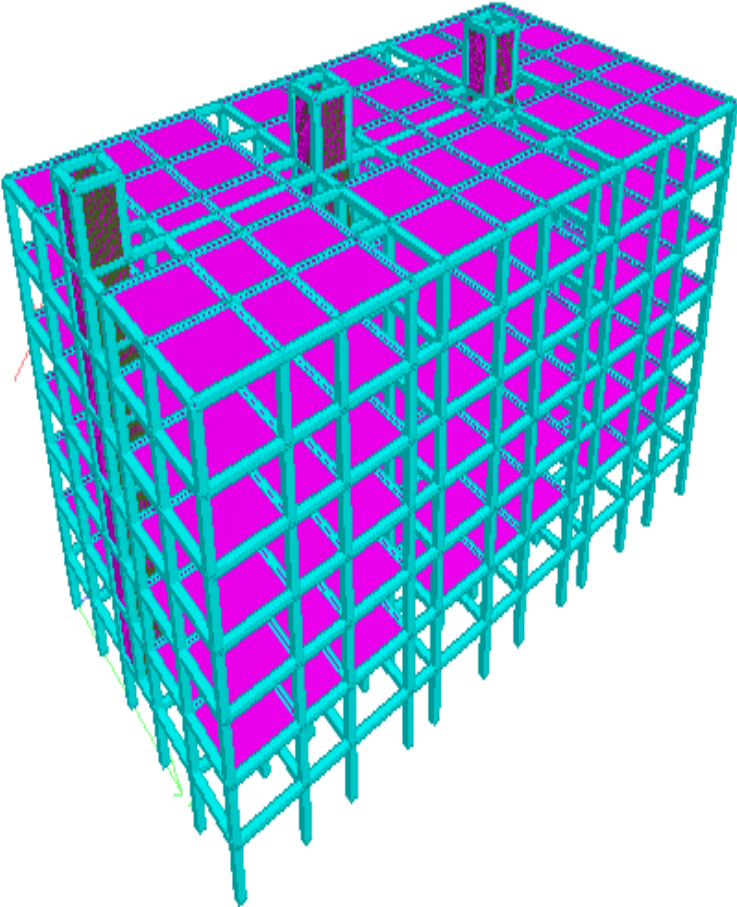


Figure 3 STAAD MODEL 1

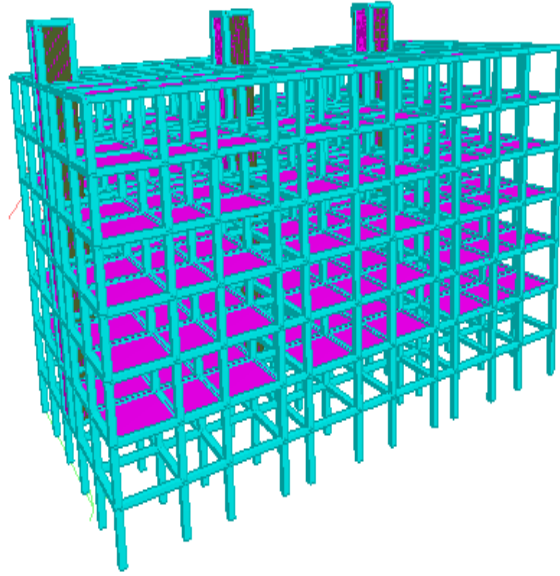


Figure 4 STAAD MODEL 2

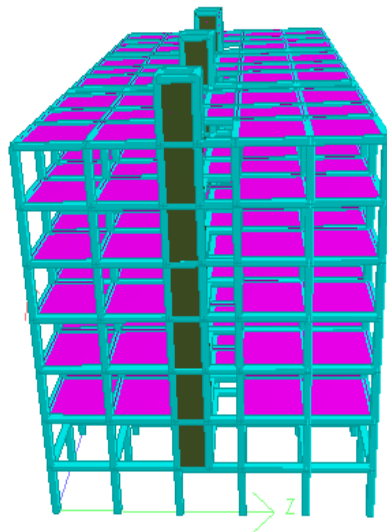


Figure 5 STAAD MODEL 3

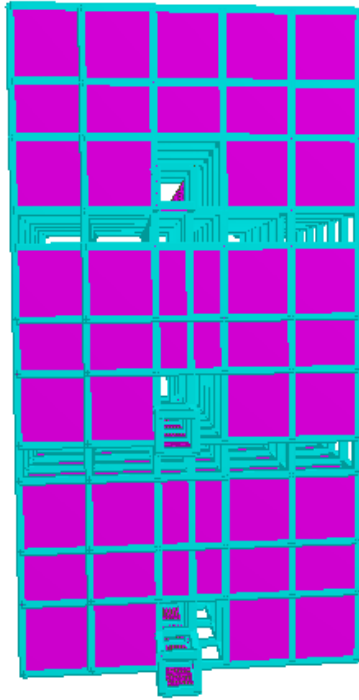
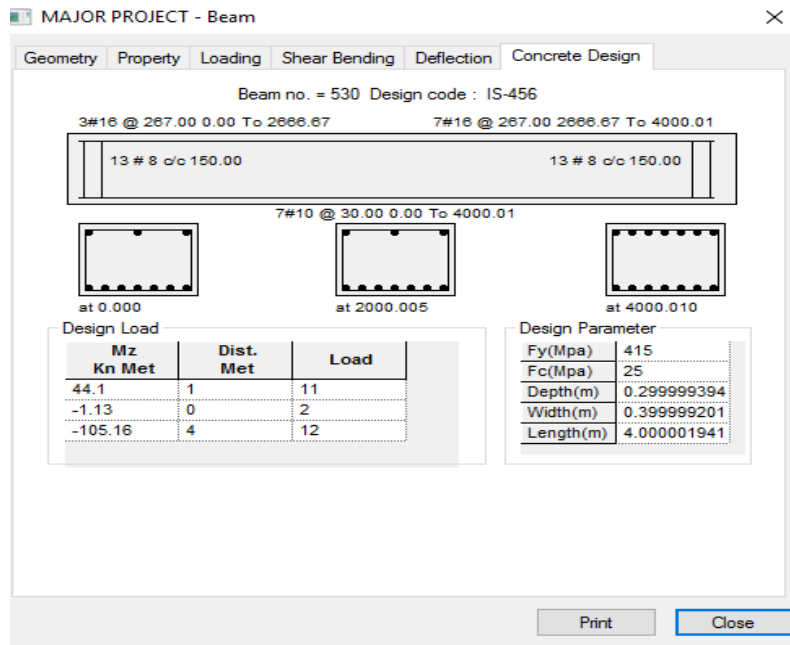


Figure 6 STAAD MODEL 4

3.1 BEAM DESIGN



M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 4000.0 mm SIZE: 400.0 mm X 300.0 mm COVER: 25.0 mm

SUMMARY OF REINF. AREA (Sq.mm)

SECTION 0.0 mm 1000.0 mm 2000.0 mm 3000.0 mm 4000.0 mm

TOP 218.75 218.75 218.75 326.00 1576.93

REINF. (Sq. mm) (Sq. mm) (Sq. mm) (Sq. mm) (Sq. mm)

BOTTOM 425.65 587.75 314.63 218.75 310.99

REINF. (Sq. mm) (Sq. mm) (Sq. mm) (Sq. mm) (Sq. mm)

SUMMARY OF PROVIDED REINF. AREA

SECTION	0.0 mm	1000.0 mm	2000.0 mm	3000.0 mm	4000.0 mm
TOP REINF.	3-12í 1 layer(s)	3-12í 1 layer(s)	3-12í 1 layer(s)	3-12í 1 layer(s)	14-12í 2 layer(s)
BOTTOM REINF.	3-16í 1 layer(s)	3-16í 1 layer(s)	3-16í 1 layer(s)	3-16í 1 layer(s)	3-16í 1 layer(s)
SHEAR REINF.	2 legged 8í @ 150 mm c/c	2 legged 8í @ 150 mm c/c	2 legged 8í @ 150 mm c/c	2 legged 8í @ 150 mm c/c	2 legged 8í @ 150 mm c/c

SHEAR DESIGN RESULTS AT DISTANCE d (EFFECTIVE DEPTH)
FROM FACE OF THE SUPPORT

SHEAR DESIGN RESULTS AT 467.0 mm AWAY FROM START
SUPPORT

$VY = 14.72$ $MX = -0.35$ $LD = 5$

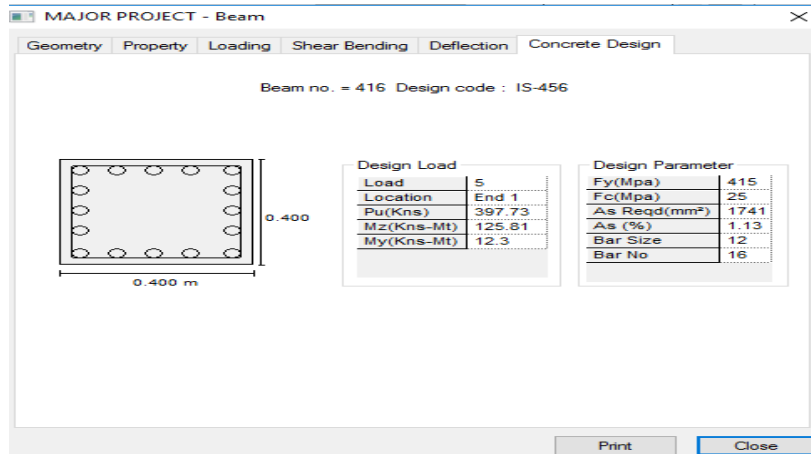
Provide 2 Legged 8í @ 150 mm c/c

SHEAR DESIGN RESULTS AT 461.3 mm AWAY FROM END SUPPORT

$VY = -95.03$ $MX = -0.35$ $LD = 5$

Provide 2 Legged 8í @ 150 mm c/c

3.2 COLUMN DESIGN



COLUMN NO. 4 DESIGN RESULTS

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 3000.0 mm CROSS SECTION: 400.0 mm X 400.0 mm COVER: 40.0 mm

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 3000.0 mm CROSS SECTION: 400.0 mm X 400.0 mm COVER: 40.0 mm

** GUIDING LOAD CASE: 5 END JOINT: 96 SHORT COLUMN

REQD. STEEL AREA : 956.00 Sq.mm.

REQD. CONCRETE AREA: 119500.20 Sq.mm.

MAIN REINFORCEMENT : Provide 4 - 20 dia. (0.79%, 1256.64 Sq.mm.)

(Equally distributed)

TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 300 mm c/c

M25

Fe415 (Main)

Fe415 (Sec.)

LENGTH: 3000.0 mm CROSS SECTION: 400.0 mm X 400.0 mm COVER:
40.0 mm

** GUIDING LOAD CASE: 5 END JOINT: 112 SHORT COLUMN

REQD. STEEL AREA : 685.63 Sq.mm.

REQD. CONCRETE AREA: 85703.39 Sq.mm.

MAIN REINFORCEMENT : Provide 8 - 12 dia. (0.57%, 904.78 Sq.mm.)

(Equally distributed)

TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 190 mm c/c

3.3 STAAD PRO STRESS MODELS

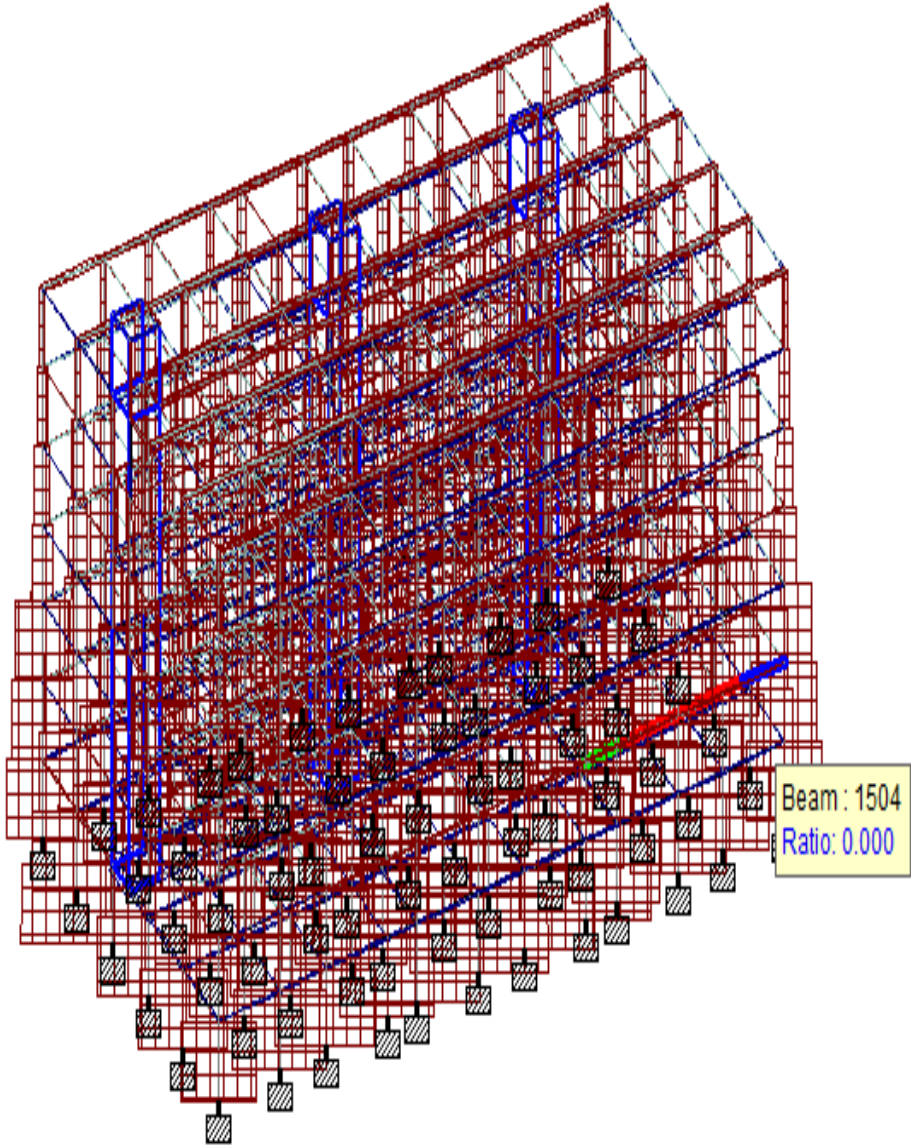


Figure 7 - AXIAL FORCE

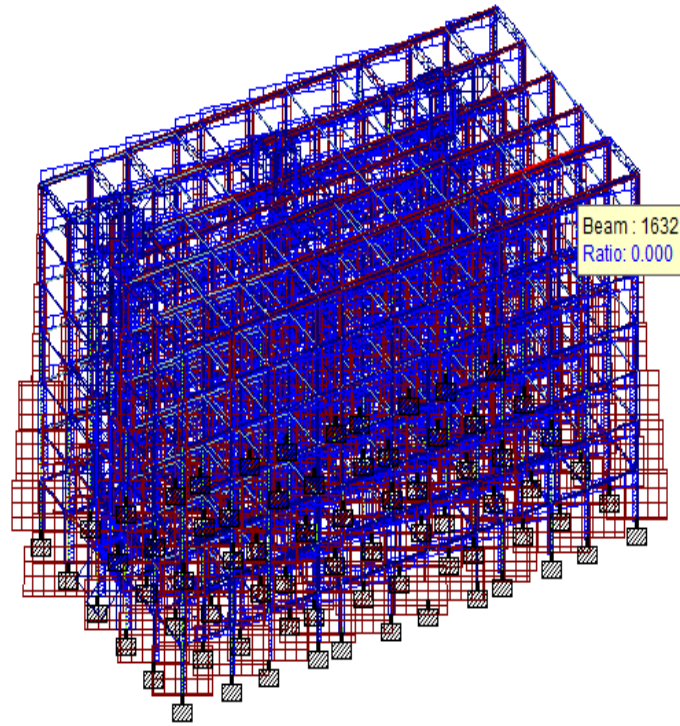


Figure 8 - BENDING MOMENT

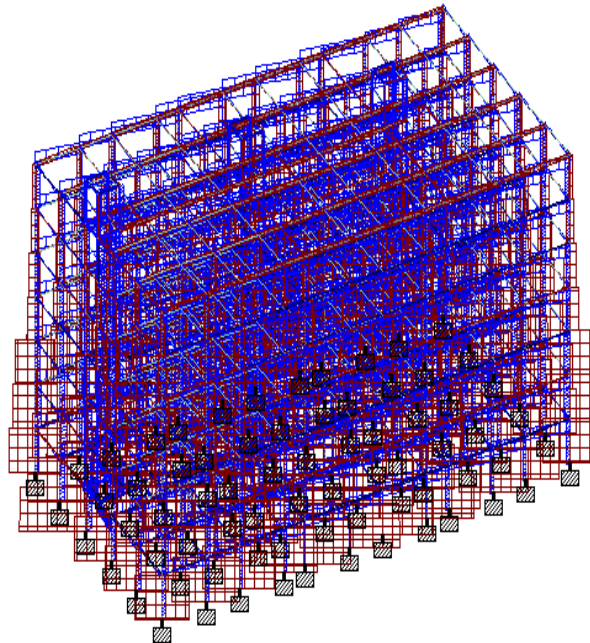


Figure 9 - SHEAR FORCE

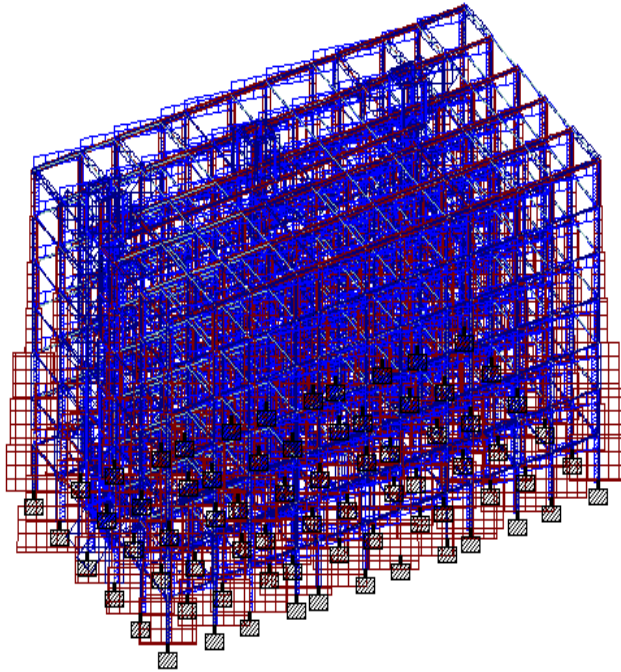


Figure 10 – TORSION

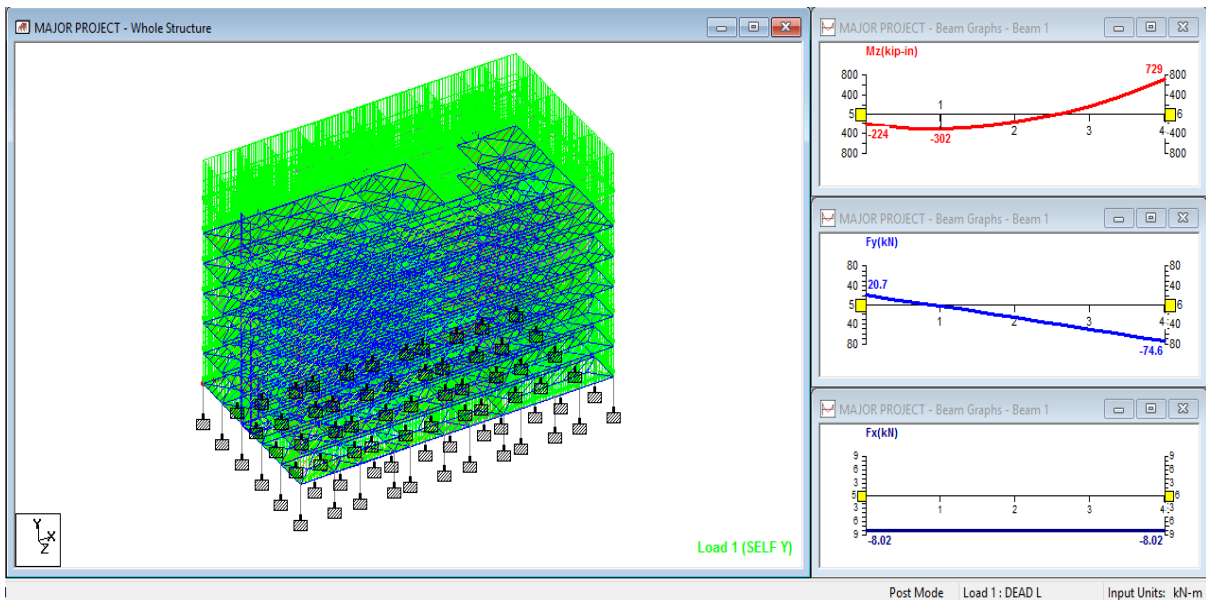


Figure 11 - BEAM STRESS MODEL

CHAPTER 4

COMPARITIVE WORK BETWEEN CONVENTIONAL BUILDING AND GREEN BUILDING

4.1 ORTHODOX BUILDING

Orthodox Building refers back to the regular approach of constructing the area the constructing knowledge is handed from one generation to the distinct Associated to the wet constructing the use of reinforced concrete.

4.1.1 ENERGY

Efficient power use, once in a while honestly called power efficiency, is the reason to restriction the amount of power required to supply products and services. For example, insulating a home approves a building to apply a whole lot much less heating and cooling power to collect and preserve a relaxed temperature .Installing fluorescent lighting, LED lighting or natural skylights reduces the amount of power required to acquire the identical diploma of illumination in evaluation with using usual incandescent moderate bulbs. Improvements in electricity efficiency are commonly completed with the aid of using manner of adopting a extra surroundings pleasant technological expertise or production technique or with the useful resource of software program of in many instances standard techniques to lower power losses.

“There are many motivation to beautify energy efficiency .Reducing energy use reduces energy charges and can additionally cease bring about a economic charge saving to consumers if the energy monetary financial savings offset any greater prices of imposing an energy surroundings pleasant technology. Reducing energy use is moreover considered as a solution to the hassle of reducing greenhouse gas emissions. Energy efficiency and renewable energy are said to be the dual pillars of sustainable energy policy. Energy efficiency has proved to be a less expensive technique for building economies barring constantly developing energy consumption. Thus a balanced approach to energy efficiency in buildings want to be extra whole than really making an try and restrict energy consumed. Issues

consisting of fine of indoor environment and efficiency of region use need to be factored in.

4.1.2 IMPORTANCE OF ENERGY CONSERVATION

Energy conservation refers to decreasing electricity intake through using lots much less of an electricity service. Energy conservation differs from surroundings pleasant electricity use, which refers to using lots much less electricity for a constant service. Energy conservation and efficiency are every electricity cut price techniques. Energy conservation is a segment of the concept of sufficiency. Even even though electricity conservation reduces electricity services, it is able to cease end result advanced environmental quality, countrywide security, non-public economic safety and extra savings. It moreover lowers electricity fees by way of preventing destiny beneficial aid depletion.

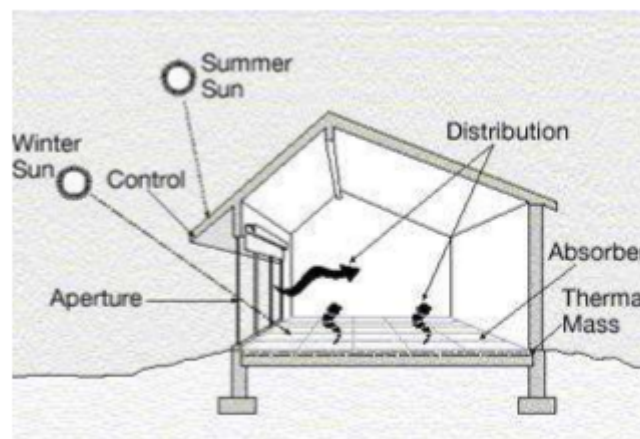


Figure 12 - PASSIVE DESIGN

4.1.3 TEMPRATURE

Temperature is a degree of ways heat or cold a few component is; specifically, a degree of the not unusualplace kinetic energy of the debris in an object, that's a sort of electricity associated with motion. The terms heat and cold are no longer very medical terms Temperature is awesome from heat, despite the fact that the 2 concepts are linked. Temperature is a degree of the internal power of the system, at the same time as heat is a degree of ways electricity is transferred from one device to another.

4.2.2 REDUCED WASTE

Green shape moreover seeks to lower waste of energy, water and materials used throughout construction. Well-designed buildings moreover help lower the amount of waste generated via the occupants as well, through imparting on-web website online alternatives which includes compost boxes to reduce rely going to landfills. Deconstruction is a technique of harvesting what's regularly viewed "waste" and reclaiming it into useful building material. Extending the useful existence of a form moreover reduces waste – building materials which includes wood which might be slight and handy to paintings with make renovations easier. To reduce the have an effect on on wells or water treatment plants, numerous options exist. "Grey water", wastewater from reassets which includes dishwashing or washing machines, may be used for subsurface irrigation, or if treated, for non-potable purposes, e.g., to flush lavatories and wash cars. Rainwater creditors are used for similar purposes.

4.2.3 COST AND PAYOFF

The maximum criticized issue approximately organising environmentally exceptional structures is the fee. Photo-voltaic, new appliances, and contemporary implemented sciences will be predisposed to fee greater money. Most green systems fee a pinnacle charge of <2%, but yield 10 times as a good buy over the whole life of the building. In regards to the monetary blessings of green building, over 22 years, the financial payback usually exceeds the greater fee of greening thru a element of 4-five times. And broader benefits, including charge discounts in greenhouse gases and distinctive pollutants have large exquisite impacts on surrounding groups and at the planet. The economic financial savings in coins come from more surroundings pleasant use of utilities which stop bring about reduced strength bills.

4.2.4 THREE SYSTEMS FOR RATING GREEN BUILDINGS IN INDIA

The phrase 'Green Buildings' is continuously hogging limelight withinside the media. Some people could probable have regarded the Confederation of Indian Industry (CII) – Green Business Centre building in Hyderabad that's one of the green systems in India. We can define Green Buildings as buildings that ensure surroundings pleasant use of natural reassets like building materials, water, power and unique property with minimum generation of non degradable waste.

Technologies like surroundings pleasant cooling systems have sensors that may revel in the warm temperature generated from human body and automatically alter the room temperature, saving energy. It applies to lighting systems too. Green systems have a wiser lighting system that routinely switches off whilst nobody is present day indoors the rooms. Simple carried out sciences like air primarily based totally absolutely flushing system in loos that avoids water use via 100%, Use of electricity surroundings pleasant LED's and CFL's as an alternative of conventional incandescent lamp, new generation domestic device that consume a good deal much less energy, and plenty of unique alternatives help in making the buildings green and lead them to awesome from conventional ones.

There are three primary Rating systems in India

1. GRIHA
2. IGBC
3. BEE

Green Rating for Integrated Habitat Assessment (GRIHA)

Green Rating for Integrated Habitat Assessment (GRIHA) is India's very own ranking machine at the same time developed through TERI and the Ministry of New and Renewable Energy, Government of India. It is a inexperienced constructing graph assessment machine the place structures are rated in a three-tier process. The manner initiates with the on line submission of archives as per the prescribed standards observed via on website online go to and comparison of the constructing through a crew of gurus and professionals from GRIHA Secretariat. GRIHA ranking gadget consists of 34 standards labeled in 4 specific sections. Some of them are:

1. Site resolution and web site planning.
2. Conservation and environment friendly utilization of resources.
3. Building operation and maintenance, and four Innovation.

Indian Green Building Council (IGBC)

The Leadership in Energy & Environmental Design (LEED) is the ranking machine developed for certifying Green Buildings. LEED is developed with the aid of the U.S. Green Building Council (USGBC), the business enterprise promotion sustainability via Green Buildings. LEED is a framework for assessing constructing overall performance towards set standards and well known factors of references. The benchmarks for the LEED Green Building Rating System had been developed in year 2000 and are presently accessible for new and present constructions. Confederation of Indian Industry (CII) fashioned the Indian Green Building Council (IGBC) in year 2001.

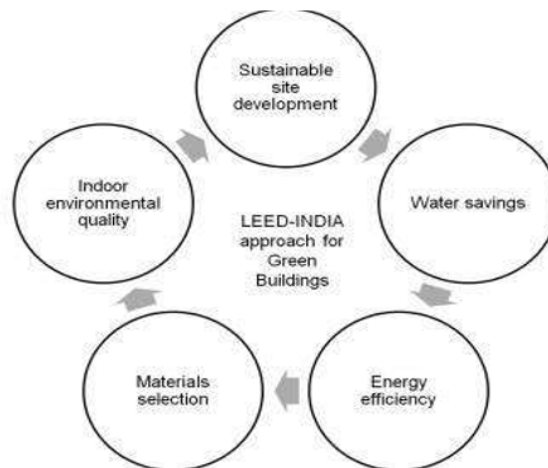


Figure 13 LEED - INDIA APPROACH

Bureau of Energy Efficiency (BEE)

BEE evolved its very very own rating tool for the systems primarily based totally mostly on a 1 to five star scale. More stars propose more electricity efficiency. BEE has evolved the Energy Performance Index (EPI). The unit of Kilo watt hours in step with square meter in step with one year is seemed for rating the building and mainly targets air conditioned and non-air conditioned place of job homes. The Reserve Bank of India's structures in Delhi and Bhubaneshwar, the CII Sohrabji Godrej Green Business Centre and lots of one of a kind systems have obtained BEE five large call scores .Indians have been aware of Green Building ideas from the beginning. Conventional houses with baked crimson color roof tiles and clay made walls is a truly pinnacle example of power surroundings pleasant homes which might be used to hold cool in some unspecified time in the

4.3 COVERSION OF CONVENTIONAL BUILDING TO GREEN BULDING

4.3.1 RAIN WATER HARVESTING

It is the collection and distribution of rainwater for the usage of in each day life, instead than allowing it to run off. Rainwater is generally accrued from roof tops. Then it's far deposited in a reservoir with percolation. It is used for gardening, cultivation and domestic uses. The harvested water can moreover be used as ground water recharge. Water shortage is brought on thru nearby climate change, loss of making plans of water uses, all of sudden developing water air pollutants and developing population. So, underneath such conditions a few severe steps closer to conservation of water need to be taken. Rain is a natural deliver of water. So, if it could be collected and treated, it could be used as potable water. It is a cheaper and smooth technology, so it could be with out issue installation in everyday families and lots of water may be saved.

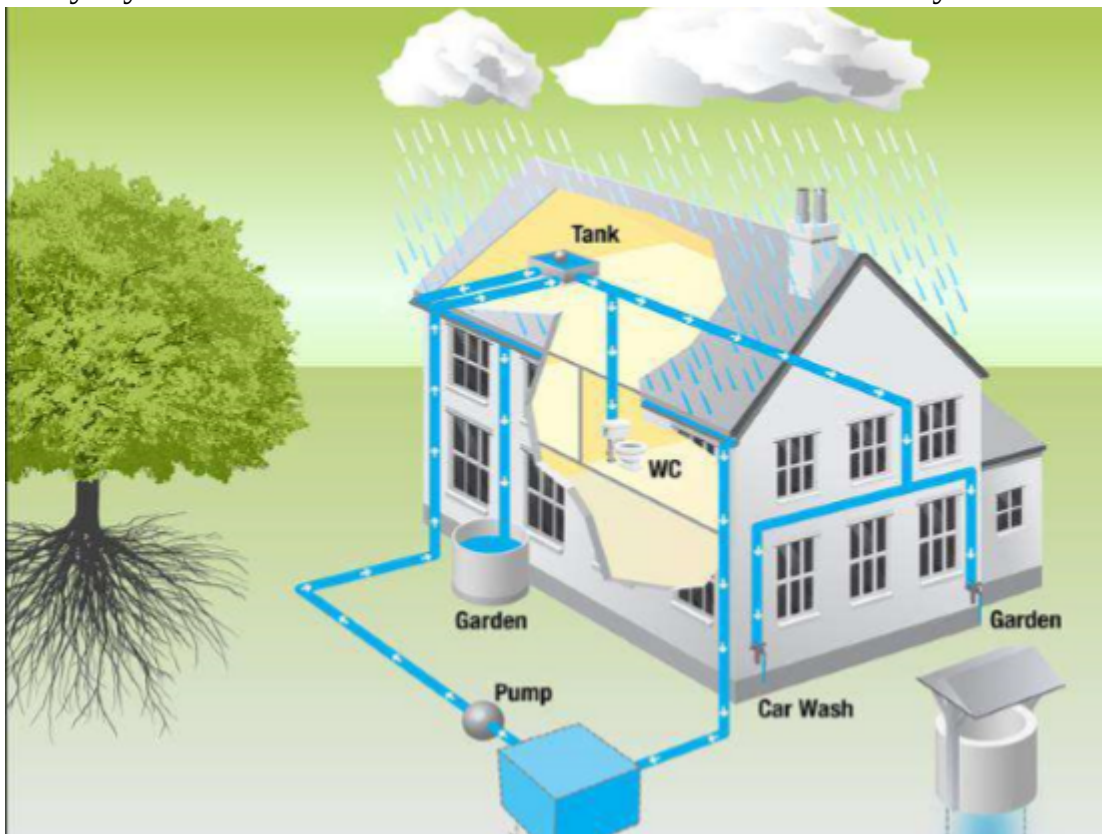


Figure 14 - RAINWATER HARVESTING

4.3.2 RAINWATER ESTIMATE

The annual rainfall(R) in is approx. 726 mm. Considering a roof top area (A) of 796.18 square meter and Runoff coefficient (C) of 0.87, the rain water harvesting potential from roof top is, = $A \times R \times C = 796.18 \times 0.726 \times 0.87$
= 490.64 cum or 490640 liters/ Year

Water required per person per day = 30 liters Approx. So for 54 members.
Hence for 365 days, required amount of water is,
= $365 \times 54 \times 30$
= 591300 liters.

4.3.3 SOLAR PANEL ESTIMATE

In this, Total Energy costs required for 25 years are calculated for Conventional as well as Green building

Calculations for Conventional Building:-

Here for our Building let say 32 KW system required. 1 KW generates 4 units per day.

Hence for 32 KW= $32 \times 4 = 128$ units per day

Electricity Cost for per day = 128 unit's X 10 Rs. Per unit = 1280 Rs. per Day.

Electricity Cost for a month will be = $30 \times 1280 = 38400$ Rs. per Month.

Electricity Cost for a year will be = $12 \times 38400 = 460800$ Rs. per Year .

Hence, for the Life of 25 years Energy cost for conventional building will be, = $25 \times 460800 = \text{Rs } 11520000 / 25 \text{ Years}$

To install 32 KW solar system, plant Initial cost will be

For 1 KW approx. 75,000 Rs. Costs required

Hence for 32 KW = $32 \times 75000 = \text{Rs. } 2400000 \text{ /-}$

From Government side there is subsidy for this. It is approx. 30 % of their benchmark cost, i.e. around Rs. 22500 for 1 KW plant

Hence for 32 KW = $32 \times 22500 = \text{Rs. } 720000 \text{ /-}$ subsidy will be credited by Government in your account

So, the amount will be now = $2400000 - 720000 \text{ Rs.} = 1680000 \text{ /-}$

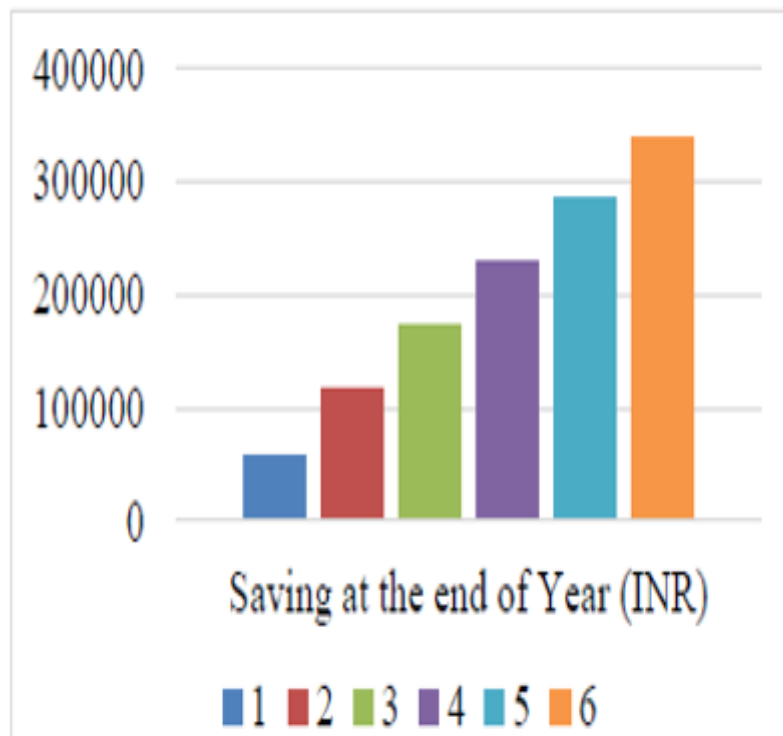


Figure 15 SAVINGS GRAPH

CHAPTER 5

SCHEDULING

Schedule management consists of the strategies required to make sure well timed completion of the project. But earlier than a mission agenda is created, a venture supervisor need to normally have a work breakdown shape (WBS), the time estimate for every task, and a useful resource list with availabilities for every resource. A Schedule is created the usage of a consensus-driven estimation method; the motive for this is that a schedule itself is an estimate: every date in the time table is estimated, and if these dates do now not have the buy-in of the humans who are going to do the work, the time table will be inaccurate.

Setting average completion dates must be performed by using the assignment crew and key stakeholders. The assignment supervisor assists with the aid of assimilating information about scope, budget, resources, and estimating instances for completion of mission tasks. Once an ordinary agenda is set, the assignment supervisor is accountable for monitoring the growth of the project and revising the agenda if needed. This need to be executed in cons with venture crew members who are doing the work. There will normally be give-and-take as a assignment proceeds amongst budget, features, and schedule. It is indispensable for the venture supervisor to preserve all participants knowledgeable as to contemporary time table repute.

5.1 ACTIVITY

The first step in the introduction of the challenge time table is to outline the sequence of the things to do on a list; this sequence follows the herbal development the assignment will observe in the mission cycle. The act of figuring out which exercise comes earlier than or after every other is the system of figuring out dependency relationships between the activities.

There are three kinds of pastime dependencies. Technical or obligatory dependency is described via the kind of work or activity, for instance constructing the foundations earlier than constructing the partitions of a school. Discretionary dependencies are chosen with the aid of the assignment supervisor to accommodate organizational or useful resource constraints, these are additionally primarily based on instruct guesses the assignment makes in order to stay clear of different constraints. The final come from exterior elements imposed to the project, for instance the challenge beneficiaries finishing harvesting of their crop s. The give up end result is a listing of activities in a sequence that will enable the improvement of relationships.

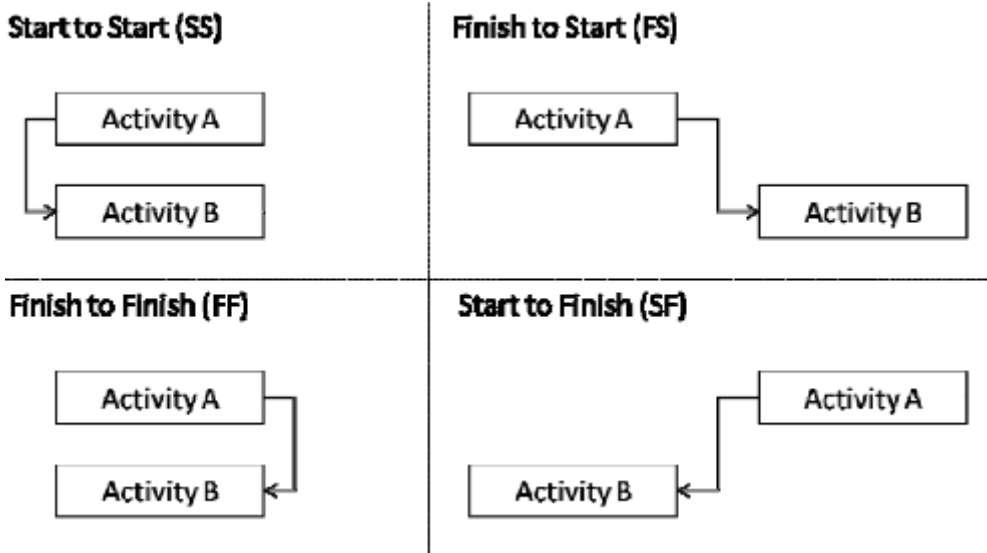


Figure 16 ACTIVITY DEPENDENCIES

5.2 ACTIVITY DURATION

The group will assemble a listing of all things to do and assign an estimate of the length of every activity; it will use historic records from comparable initiatives and seek advice from with experts. Duration consists of the genuine quantity of time labored on an activity. If an exercise takes one week by way of one person, the estimate might also end up two weeks if the individual works solely half of time. This records is essential at the second of finding out the whole time of the task and the sources handy for a project. That is why it is essential that the human beings clearly accountable for doing the work ought to have a say in the choice of the estimates. The standard unit for measuring the period of an recreation is days or weeks.

5.3 NETWORK DIAGRAM

Once all the data on the sequence and length of the undertaking things to do has been completed, the subsequent step is to advance a community diagram. A community design is a graphical illustration of the sequence of mission things to do and the dependencies amongst them. The community format is examined from left to proper or pinnacle to bottom. The community graph makes use of a plan approach in which containers characterize activities, used by means of assignment scheduling software. The complicated and dynamic nature of improvement initiatives make this toll specifically treasured due to the fact it forces the assignment group to tackle the practicable interactions of mission things to do that can be effortlessly overlooked otherwise.

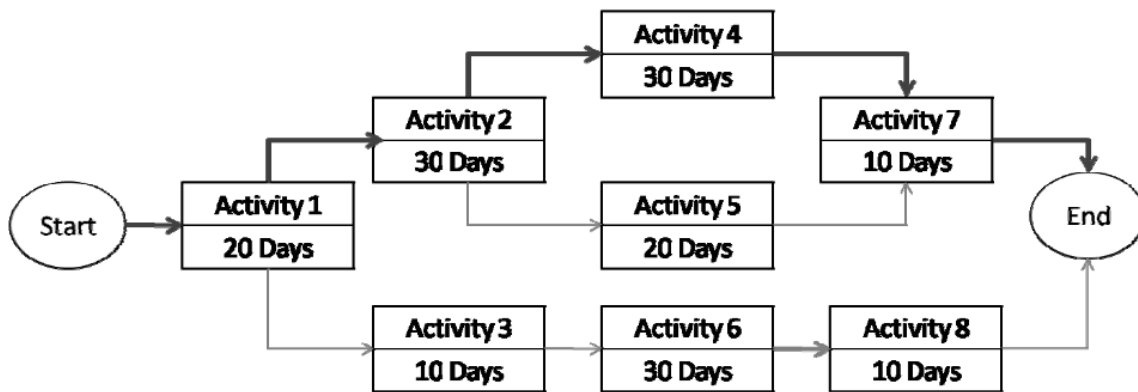


Figure 17 NETWORK DIAGRAM

5.4 CRITICAL PATH

The Critical Path is the longest complete duration. Activities on the necessary route can't be delayed or the complete mission will be delayed, except the loss of time can be offset someplace else later on the quintessential path. To discover the fundamental direction add up the length of the things to do for every feasible direction trough the network, to decide which has the longest whole duration. The distinction between the longest complete period and the shortest path(s) is the complete quantity of drift or slack for the non-critical direction activities. The essential direction is in essence the shortest time a mission can be completed, even difficult the fundamental route is the longest direction on the project. It is no longer the course with the most quintessential things to do it is solely involved with the time dimension; it is now not both the shortest direction on a challenge community diagram. There are instances in which a community layout may additionally have two imperative paths that have the equal whole duration.

5.5 GANTT CHART

Another approach to show task agenda is comprehend as the Gantt chart, it has come to be a famous technique in task administration for its use in the most frequent challenge scheduling software. It used to be developed by way of Henry Gantt in 1911 and due to the fact then has been incorporated, with some improvements, to the subject of challenge management.

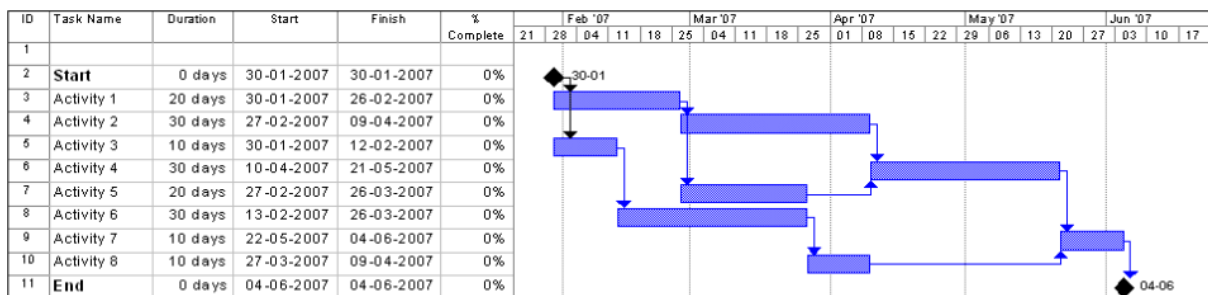


Figure 18 GANTT CHART

5.6 PROJECT SCHEDULE

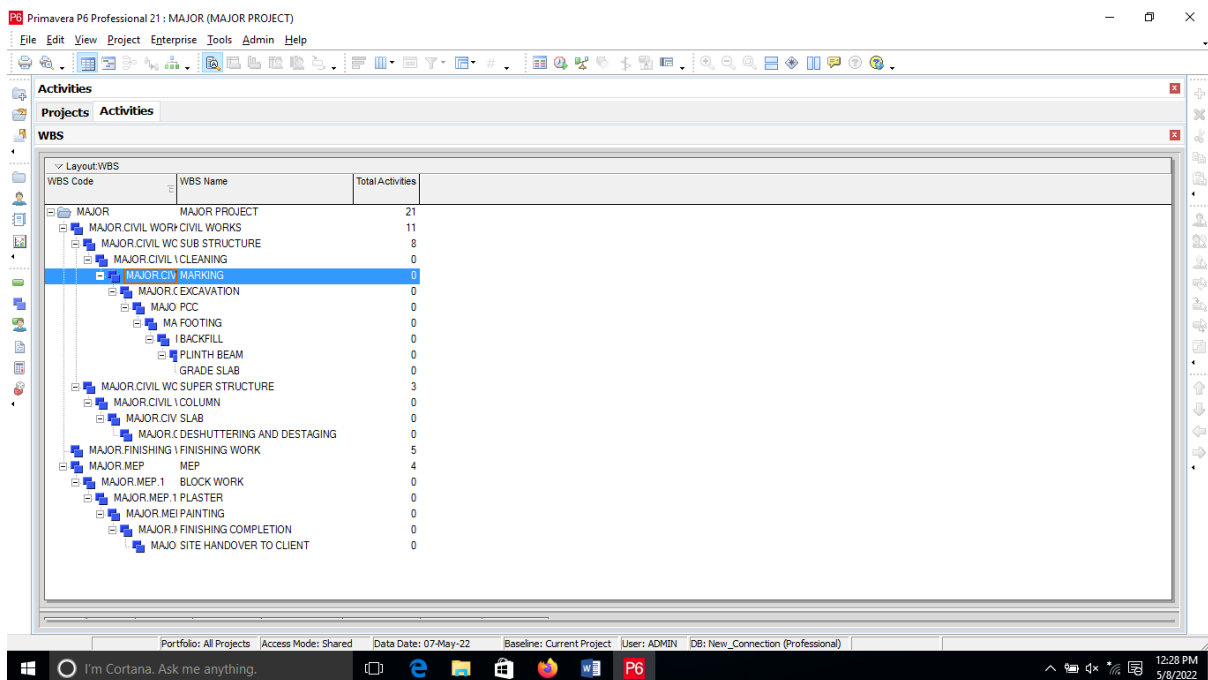


Figure 19 WBS OF PROJECT

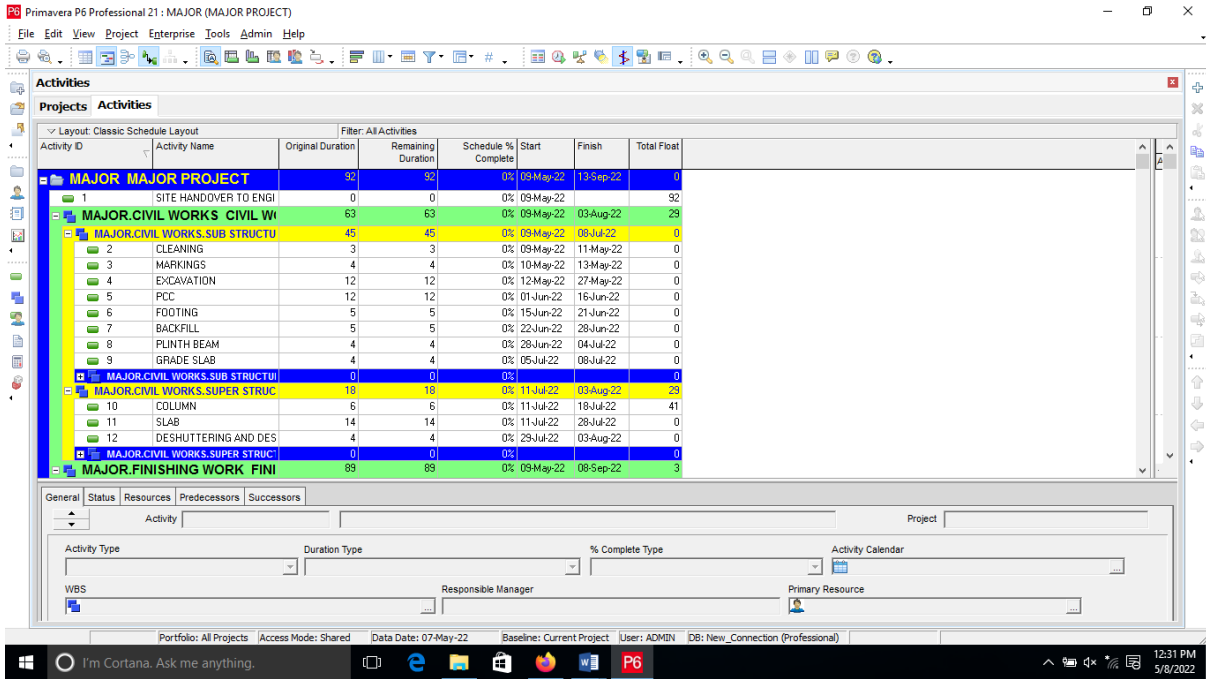


Figure 20 ACTIVITIES RELATIONSHIP

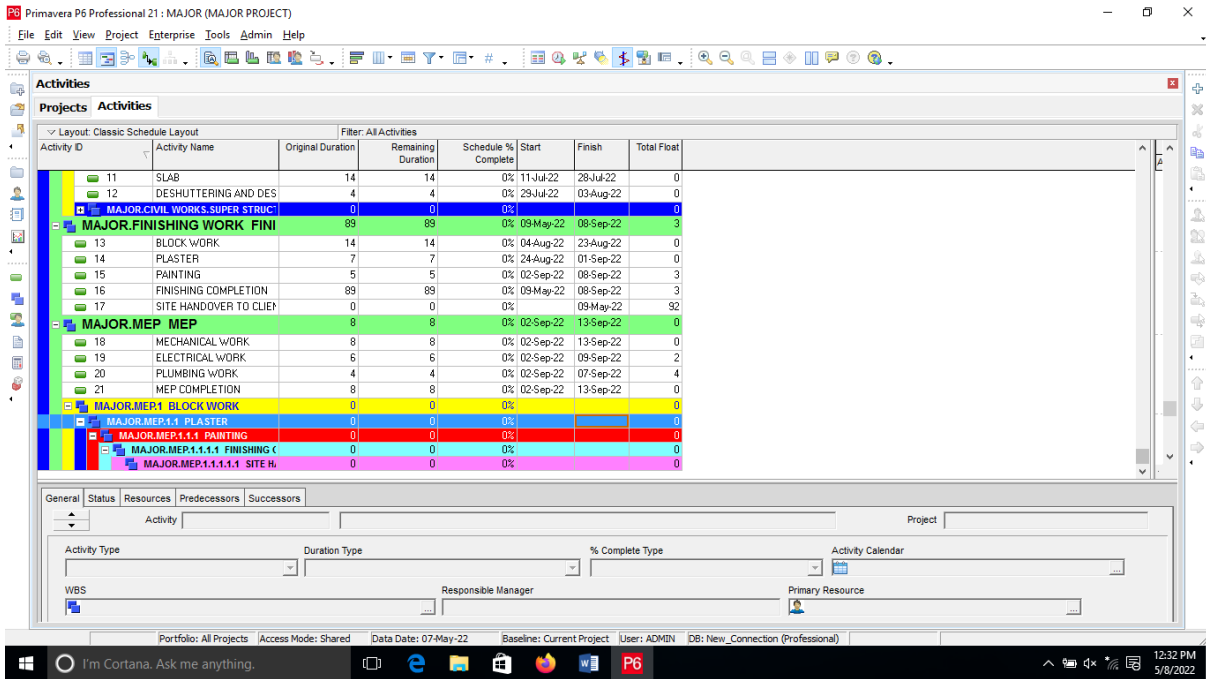


Figure 21 ACTIVITIES RELATIONSHIP

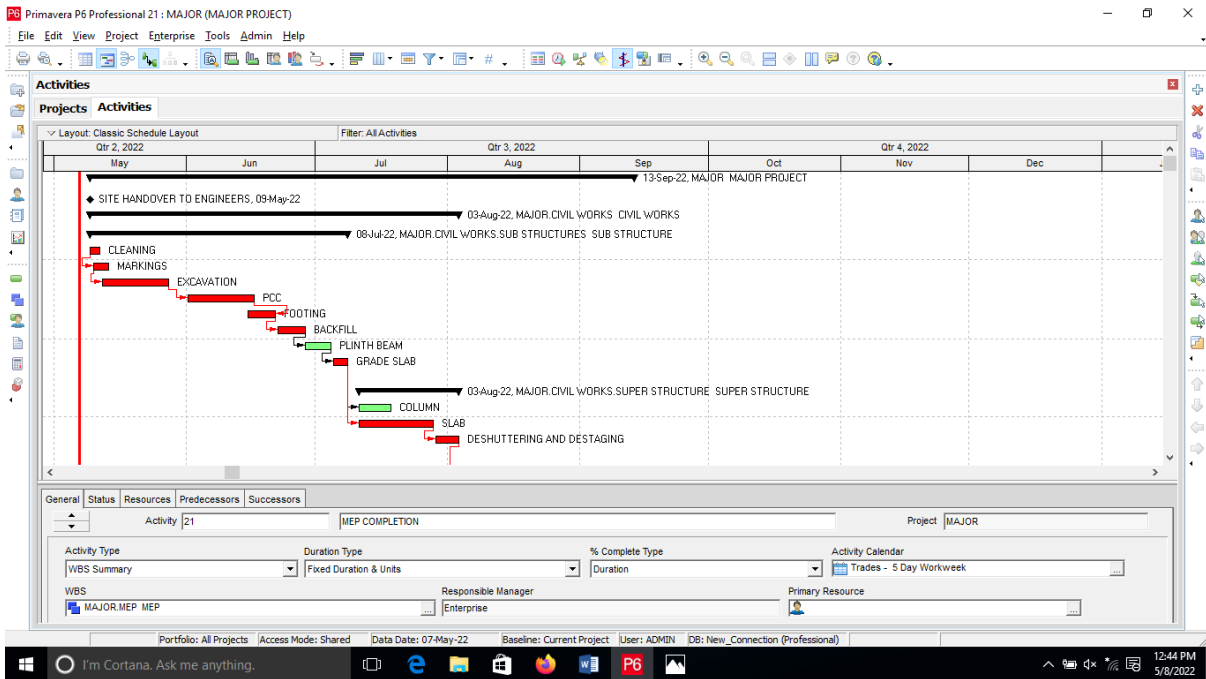


Figure 22 PROJECT GANTT CHART

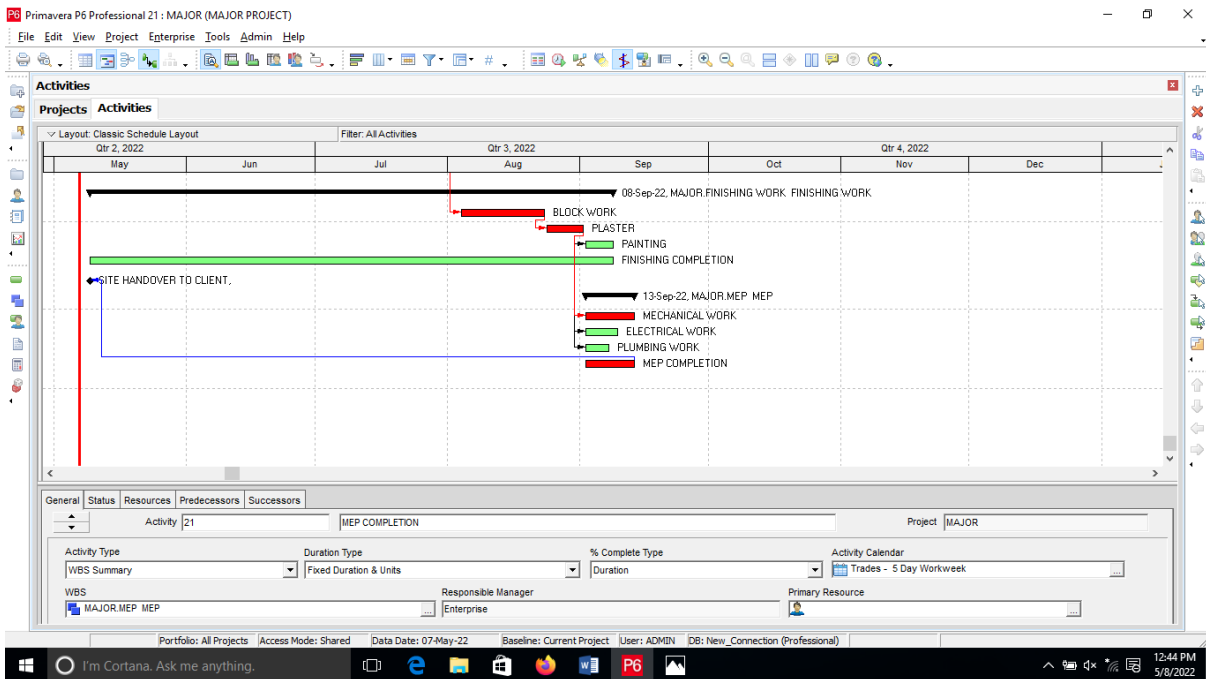


Figure 23 PROJECT GANTT CHART

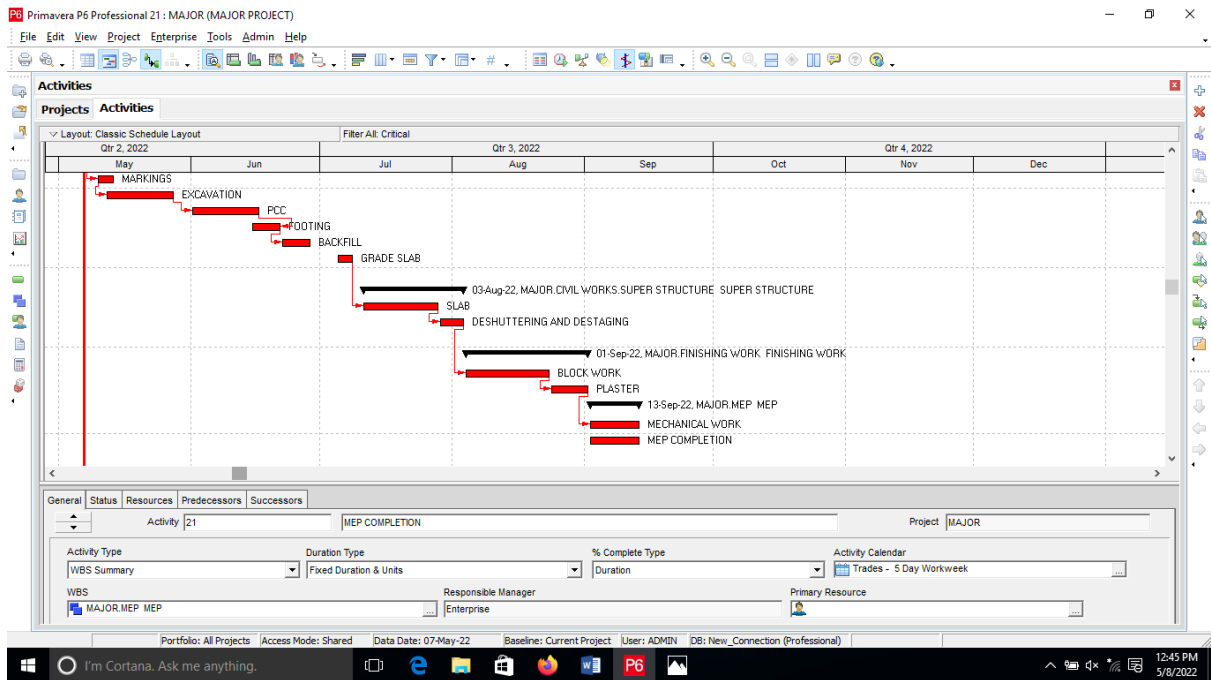


Figure 24 CRITICAL PATH OF PROJECT

CHAPER 6

CONCLUSION

The results of our study grant clean assist of the affordability of Green constructing. From the LCCA of every the buildings, it's miles clean that the whole charge desired for a Green building for 25 years is an lousy lot an awful lot much less than that of a conventional constructing. In the case of common renovation cost and environmental impact, Green building is showing immoderate universal overall performance in comparison to the conventional constructing. Hence this study proves that Green Building Technology can effectively adapt to all building sector to preserve the sustainability of the surroundings. Green Building questioning gives Tangible and non-tangible blessings from the level of conceptualization of the venture till the total useful life of the constructing, through initially in few duties the constructing charge is extra than the bottom cost through approximately 16%, but this may be recovered interior 2-three years of lifecycle of the building with the useful resource of the manner of saving withinside the operation of the green constructing. The number one drawback of this technological knowledge is its immoderate initial investment. To decrease the initial investment large scale structures should start withinside the subject of Green constructing, it may restriction the price of power surroundings pleasant technologies. For that from government level cognizance need to take delivery of to constructors approximately the blessings of Green Building Technology, to be able to help to attraction to extra people to turn to sustainable implemented sciences and may preserve our surroundings.

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