PROJECT No. 01

Cost Efficient Solution for Housing in Pakistan

They worked on Ashiana housing scheme and found out different ways to save cost in the project. These solutions shall not be applicable to Ashiana housing scheme only but can be implemented to all of the housing projects in Pakistan and can make them cost effective as well as energy efficient. These students have used different construction techniques as well as different construction materials to get the maximum output and have given the best optimal solution by using Rat-Trap bond in construction with bricks.

PROJECT No. 02

Reclamation of Mehmood Booty Dumping Site and Compatible Construction

The project is based upon the reclamation of mahmood booty site for construction of community center, which consist of 620 canals areas which is equal to 32 hectares, exiting on the industrial road of Lahore, ring road. The technology which have we applied for the reclamation is bio fill technology, which is a mixture of two bacteria's Bacillus and Pseudomonas. When the mixture of these two strains is sprayed upon the garbage it decomposes the organic garbage with 100 days and converts it into black soil. This method is inexpensive as it required 110000 RS per hectour and our site consists 32 hectour, which will require 3520,000 RS. For construction of community center the foundation that we use will be raft foundation as it distribute the load evenly in case of any settlement. The community center is designed after conducted a survey around this site and according to the national reference manual.
PROJECT No. 03

Seismic Analysis of various Building Shapes for Zone 2A

The main objective of project is to perform dynamic analysis on ETABS to obtain seismic performance of different shapes of structures located in earthquake zone 2A of Pakistan. The most suitable shape is identified on the basis of lateral displacement and base shear. The students have suggested that triangle shape is more vulnerable to earthquake as compared to other regular building shapes. Octagonal is more suitable shape as compared to other regular building shapes. Circle has the maximum while octagonal has the minimum base shear as compared to other regular building shapes.

Nida Aslam  Aniqa Sharafat  Memoona Raees

PROJECT No. 04

Minimizing Indoor Temperature during Summers Using Earth Air Tubes

Energy demand is increasing day by day in Pakistan. Keeping this factor in mind the objective of this project is to utilize alternative approaches for energy generation and conservation. Ground heat source came out to be one such promising technique for space conditioning. The students have implemented this technique on faculty room of AED department and achieved a maximum level of comfort of 26OC using 50 m long and 6” GI pipe loop at 10' depth. Cost reduction achieved is up to 60%. This technique can be implemented to any building to increase its indoor comfort.

Jaweria Mushtaq  Zoya Khaliq  Aqeel Abid
PROJECT No. 05

Sustainable Design of a Cultural Heritage Center

Key objective of this project is to cope with the increasing levels of energy consumption in buildings and responding to the problem proactively. This is done by taking measures during the planning phase by studying sustainability in building design. Later on the structural and architectural analysis is done and a thermal analysis is conducted to support the findings from the traditional architecture and combining it with LEED Certification. When the similar building is subjected to modern building materials, it was concluded that if the measures are taken at initial stages, it helps in achieving a more efficient building as an end product.

PROJECT No. 06

Adaptive Reuse of Heritage Buildings

In this project, the adaptive reuse of heritage buildings is linked to the broader question of how the conservation of valued built form can increase social and cultural benefits to communities. The research problems have provided an opportunity for analysis of the adaptive reuse of heritage buildings and the role that the planning system plays. By introducing this concept in our construction industry, the conclusion is extracted that profit of 82% can be earned.
PROJECT No. 07

Comparative Analysis of LDA and DHA Houses on Ecotect for Energy Consumption with and without Courtyard

Rapid construction of domestic buildings and rising living standards are considered to be the main causes of augmented energy demands. A number of passive strategies have been implemented at residential level all around the world including traditional houses of Lahore. The basic objective of this research is to revive the importance of traditional passive techniques by incorporating them into the in modern houses of Lahore (Pakistan). The research was focused on providing a standardized courtyard into 1 kanal residential unit of the LDA and DHA to increase the ventilation and reduce thermal load, ultimately decreasing the operational cost of the building. A ventilation gain of 8.9% was achieved in case of LDA while 6.67% increase in ventilation was observed for DHA.

Ma'edah Ilyas  Samar Shaheen  Ishrat Hameed Alvi

PROJECT No. 08

Managing Construction Procedures and Design through Building Information Modeling.

This project studies implementation of BIM tools on a live project from local construction industry, “University of Education, Multan”. It identifies the challenges in transition from traditional CAD tools to BIM tools. The project also includes comparative analysis of current construction trends with BIM trends in Pakistan. For this purpose, a questionnaire survey was conducted in local construction industry for the preliminary investigation. 3D model of the building was made using Autodesk Revit 2014. 4D scheduling and clash detection was carried out on Microsoft Project Professional and Navisworks Manage 2014. At the end two frameworks were developed for the implementation of Building Information Modeling in construction industry and on a project life cycle. These students selected a case study, an academic building with area exceeding 32000 sft. They established that Project was delayed by 6 months due to change orders and its cost escalated by an amount of 15 million rupees.

Muhammad Bilal Ahsan  Zohaib Ahmed Anjum  Naveen Zahra Qazalbash
PROJECT No. 09

Design and Efficiency Analysis of a District Cooling System by Using Ground Water for Institutional Buildings in Punjab, Pakistan

Considering the economic issues and power crisis the country has been facing lately, the need for energy efficient systems has increased. Using a deductive approach, the students have designed a system for three institutional buildings in Pakistan using ground water, and have been further compared it with the conventional rooftop units.

The students selected three buildings on the basis of functionality, i.e., Automotive Centre, IBM and Students Service Centre and considering them in design phase, their peak cooling loads are calculated manually and cross-checked using the software Hourly Analysis Program (HAP). The proposed system is finally compared with the traditional rooftop units on the basis of total energy consumed and the results are analyzed. The results show that District Cooling Systems saves a minimum of 30-40% energy as compared to traditional rooftop units that saves approximately 1,263,000 kWh of energy annually as compared to the traditional rooftop units. It can be used with ground water to reduce the energy consumption using the concept of free cooling.

Ammarah Javed
Ramsha Aasim
Talia Rashid

PROJECT No. 10

Smart Building Design

Since people spend 80% of their lifetime in buildings, so a healthy and comfortable environment is important for occupant's well-being. Also the life style in the modern society along with human behavior & thinking is changing dramatically with the advancement of technology, that's why the concept of a simple building is changing into a smart building. This provides the use of latest technologies for human comfort through the energy efficient techniques. The objectives of this project include: To look at the new technologies & application areas related to the operation of healthy & efficient buildings. Development of integrated building control systems for energy & comfort management in smart building (residential apartments). To offer a luxurious environment for residents by conserving water usage, electrical energy and reduction in maintenance.

The project concluded that, after designing a smart building energy is being conserved this is need of future. Multi objective optimization is important for energy and comfort management in smart buildings. 51.5% of electrical energy is conserved by using LEDs, sensors & efficient VRF system in HVAC. 90% of water is conserved in vacuum flushing.

Aqsa Jamil
Arooba Rauf
Nimra Tahir
PROJECT No. 11

Cost Optimization of RC Members

Cost is the most important factor in any project. It is extensively discussed and tried to save the cost at execution stage. But: “What if the structure designers put some of their technical expertise at the design stage to minimize the cost of structure?” At the design stage the designer is to decide about the cross-sectional dimensions and the appropriate amount of steel accordingly and he has more than one options of cross sections. Every cross-section would certainly cost different from each other but which cross section would be the most economical one? This is very difficult and nearly seems impossible for the structure designers to design the best cross-section by considering all the factors that are responsible for the cost of RCC members as cost of RCC members is very much affected by the labor cost, machinery cost, formwork costs, other than the material costs (cement cost, sand cost, aggregate cost and steel cost). The basic idea behind intuitive or traditional design method is the memory of past experiences, subconscious motives, incomplete logical processes, random selections or sometimes mere superstition. This, optimized design, in general will lead to the best and optimal design. At smaller spans and lower loadings, where Applied Moment was less, most economical section was found at minimum specified value of b & h. At larger spans and at higher loadings, where Moment was higher most economical section was found at $\phi = 0.012 \text{ to } 0.013$ (the 80% to 83% of $\phi_{\max}$) The average optimization percentage observed in RCC beams was 12% to 19%. When optimization was done for the selected building 15% to 19% optimization was effectively achieved.

Nasarullah Bhutto
M. Naqash Chaudary
M. Zeeshan Tahir Qureshi

PROJECT No. 12

Study & Design of Underground Nuclear Fallout shelter

With the increasing threat of nuclear war, nuclear bunkers have gained an unfathomable popularity and attention within the recent years among many issues. It has been established in many studies that underground bunkers are the most effective constitution to secure living and performance rank from chemical, a core or biological hazard. The aim of the project is to study and design an underground nuclear fallout bunker in University of Engineering & Technology, Lahore offers a blast protection of more than 45 psi blast level and can protect occupants to within 1/2 mile from ground zero of a 1-megaton weapon. The entrances are engineered with both the proper geometry and appropriate shielding materials. It protects the occupants against the thermal pulse, initial radiation, fallout, blast and electromagnetic pulse (EMP). The proposed hexagonal structure offers a blast protection of more than 45 psi blast level. In order to protect the people from nuclear attack, blast or all natural and manmade disasters it is the need of hour to protect the lives of civilians by constructing such structures. For external overpressure greater than 25-35 psi range it becomes more economical to place structure below ground & eliminate large lateral loads. In Pakistan such projects must be incorporated in public sectors as well as "residential schemes.

This project was displayed at Thermocon event held at GIKI, Pakistan and won 1st prize among many prestigious institutes.

Barirah Tahir
Huma Saleem
Irsa Tahir
PROJECT No. 13

An Assessment of Residential Envelope According To Building Code of Pakistan

Presently demand for energy has significantly increased in all sectors of Pakistan whereas, 46% energy is consumed by residential sector only which is the highest among all other sectors. Our main objectives was to limit thermal losses during winter and thermal gains during summer by using Building Code of Pakistan (Energy Provision-2011) and in this way reduction in heating and cooling costs was achieved.

Ayesha Akhtar  Ifrah Khalid  Ammara Basharat

PROJECT No. 14

Amphibious Housing: Flood Mitigation Strategy in Kot Addu

This project reconnoiters the thought of constructing a property living atmosphere for riverside population in Kot-Addu town by generating a flood-resilient house that is capable of rising and falling with the water. This provides a substitute to permanent construction on land. Variety of case studies was analyzed for the aim of distinctive key themes that may facilitate the development of a single-family amphibious residence in Kot Addu. For this, the structure was designed to achieve the raised height of the maximum flood level i.e. 6'as of 2010 in respective location and analyzed on STAAD Pro.

Ayesha Irshad  Wardah Akhtar
PROJECT No. 15

Study of Blast Effects on Structure And Mitigation Strategies

The project will benefit building designers to understand the blast loading, its effects on building, possible hazards and damages and propose different proactive mitigation techniques to effectively diminish the blast loading. The mitigation strategies suggested are preferably functional for the newly intended building but the project encompasses the retrofit methods to the establishment as well.