**Towards Green Building**

Case study: Fine Arts Building( at An Najah national University)

**The Project Idea:**

**Modify Certain aspects to make the Building more environmentally friendly (green).**

**Architectural Design:**

**A (48x41) m building consist of a basement with an area of (1003.5 m2),(1668.9m2)for the ground floor, (139.89m2) for the roof and (1571m2) for the rest floors.**
**The Faculty was designed in the latest specifications and standards, and provide 19 classroom and 28 studios designed specifically to meet the purpose for which it was designed for.**

**Element for green design:**

1. **Thermal.**
2. **Acoustic.**
3. **Handicap.**
4. **Safety.**
5. **Lighting.**
6. **Water management.**
7. **Also, Structural design.**

**1-How to increase Thermal efficiency of a building::**

**Thermal problem solved by:**

**Insulation.**

**Shading.**

**Skylight.**

**2-Noise Reduction:**

**Noise Reduction from outside:**

**Using polyurethane in outside wall.**

**For Noise room in First floor:**

**Using egg craft insulation in walls, and acoustical tiles.**

 **in structural Borne (Drums room) use PVC or rubber Tiles.**

**Architectural and Environmental Modification:**

**Adding Handicaps Ramp.**

**Adding another Emergency Exit.**

**Adding Shutters for the north and south Windows.**

**Adding a Shutters(Solar chimney)for the void.**

**Using Polyurethane and egg craft.**

**Using Rubber Tiles in music room.**

**Using acoustical Tiles.**

**Project design data**

* **The American Concrete Institute code ACI 318-05 .**
* **The seismic design according to UBC-97.**
* **Then the analysis and design are done using 3D model using SAP2000 program.**

**Material used:**

**B350 concrete is used→f'c=300Kg/cm²**

**Unit weights of materials:**

**Reinforced concrete = 2500 kg/m3.**

**Hollow block = 1000 kg/m3.**

**Eaton blocks =470 kg/m3.**

**The yield strength of steel for flexure equal fy = 4200 kg/cm2 and for shear reinforcement equal fys = 4200 kg/cm2.**

**bearing capacity of soil = 4 Kg/cm2.**

**Soil density 19.2 KN/m3**

**Structural system:**
**In this block we use two way ribbed slab with 40 cm depth.**

**LL=0.5 ton/m².**

**SID=.35t/m²**

**Wu= 1.85ton/m².**

**Main beams is assumes**

**to be 70\*60cm (drop beam)**

**Secondary beams (above shear walls) assumes to be 40\*30**

**Water Management:**

**Separate grey water from black water**.

**Recycling grey water and reuse it in supplying W.c’s or in irrigation**.

**Use of storm water in irrigation or in W.c**

**Recycling Gray Water:**

**Ultraviolet germicidal irradiation (UVGI).**

**Electrical System :**

**Using DIALux program for lighting and for calculate the intensity and the distribution  for Regular light units.**

**The company that was dealing with,
Thorn global company, to provide dramatically and spread in most countries of the world .**

**15 % saving in lighting.**