

number of activated elevators may also be reduced on the basis of time of day schedules, week or weekend days and statutory holidays.

18.2.6 Security system

Security system may include simple systems like automatic access monitoring, card access control, guard tour monitoring or motion detectors. More elaborate security systems involving intensive human intervention from guard stations and closed circuit TV and recording should be sourced from specialized security system manufacturers. The card access security program may be interfaced with the lighting and HVAC subsystems to activate necessary lighting paths and the specific room occupancy mode. Similarly the Life Safety Fire Alarm program may be interfaced with security to release specific locked doors under alarm conditions

18.2.7 Life safety system

This sub-system deals with the Fire Alarms, the Emergency Lighting, Egress lighting system and the Smoke Evacuation system. Interfacing of the Life Safety system with other systems is very important to eliminate nuisance alarms or to start the smoke evacuation system. Interfacing may also allow temporary transfer of spare emergency power not required at the time to other non-critical areas until such time as it is required.

18.3 Green Buildings

Right from the pre historic man who constructed the hut for the first time to the great builders of modern world have exploited the nature and its resources and disturbed the natural habits of other birds and animals. Now tremendous damages have been inflicted on our planet by the construction of various types of buildings using sand and water from the rivers, stones from the mountains, cement manufactured from the ingredients dug from the land etc. Also carbon emission from the buildings and due to manufacture of construction materials warm up the air and space. This global warming leads to changes in climate, changes in rain fall pattern, rise of sea level, acid rain, ozone layer depletion etc. On realizing the environmental responsibilities many efforts were put forth and one such intelligent initiative is the concept of "Green Buildings".

"A green building is one which uses less water, optimises energy efficiency, conserves natural resources, generates less waste and provides healthier spaces for occupants, as compared to a conventional building"

Green Buildings have a new approach to save water, energy and material resources in the construction and maintenance of the buildings and can reduce or eliminate the adverse impact of buildings on the environment and occupants. *Green Buildings are Eco Friendly Structures. This helps the earth and people to retain nature to a maximum extent possible in three ways with reference to the location of the buildings as below.*

1. Retain the external environment at the location of the building.
2. Improve internal environment for the inhabitants.
3. Preserve the environment at places far away from the building

18.3 Green Buildings Retain the Environment at the location of the Building.

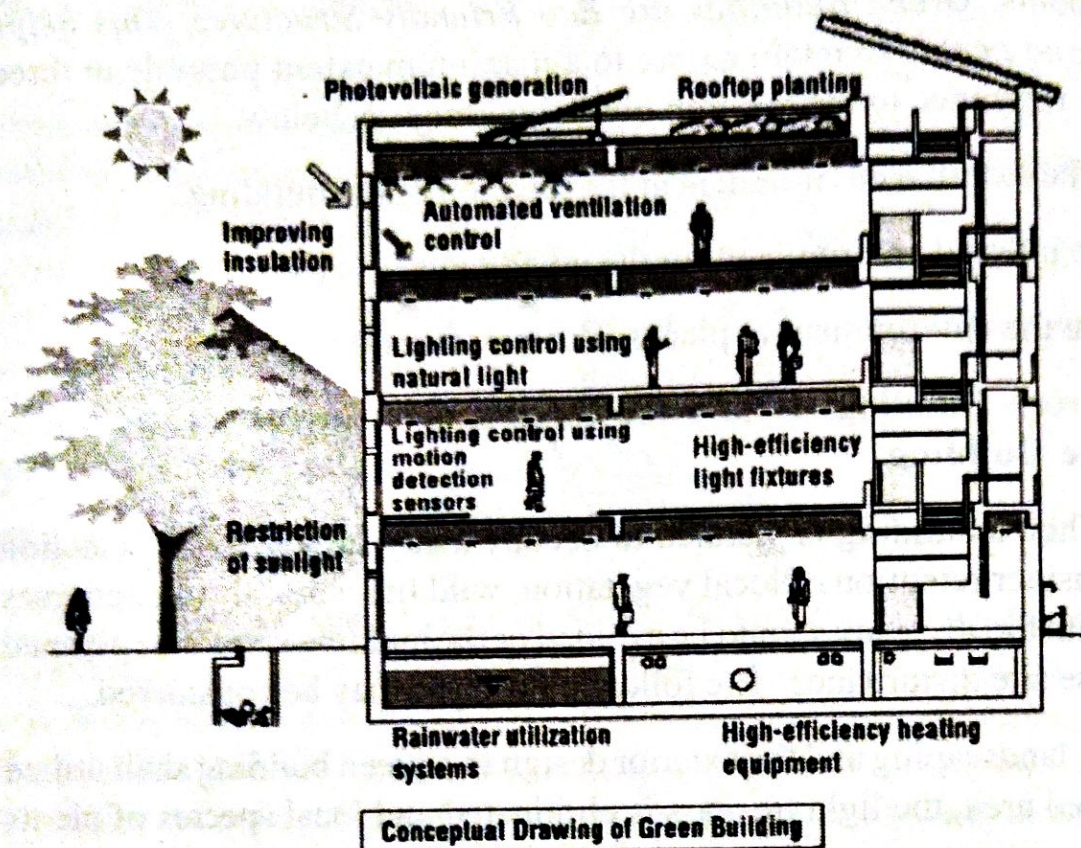
When a building is planned to occupy a vast area, the site selection should consider retention of local vegetation, wild life, natural water courses etc. Site with bio diversity should be avoided or the building should be planned to minimise site disturbance. The following aspects may be considered.

Land: The landscaping and the exterior design in a green building shall utilize more shaded area, the light trespass is eliminated and local species of plants are grown.

Water: The green building by its design and layout shall not disrupt the natural water flows, it should orient and stands just like a tree. Rain falling over the whole area of the building shall be harvested in full either to replenish the ground water table or to be utilized in the services of the building. The toilets shall be fitted with low water consuming flushes. The plumbing system should have separate lines for drinking and flushing. Grey water from kitchenette, bath and laundry shall be treated and reused for irrigation or in cooling towers of air conditioning.

Energy: The solar energy on a green building is trapped to supplement the conventional energy. The natural light is allowed to enter in the intermediate floors to minimize the usage of electricity. Sunlight is restricted by the high grown trees outside the lower floors of the building. High efficiency light fixtures like LED lamps make a pleasant lighting apart from saving the energy. High-efficiency windows and insulation in walls, ceilings, and floors are used for the benefit of better temperature control.

A concept cross section of a green building is shown in the figure 19.1.



18.3.1 Green buildings improve internal environment for the occupants

Light: In a designed green building the occupants shall feel as if they are in outdoor location. The interior and exterior designs shall integrate blending the natural and artificial lighting.

Air: In the air conditioned environment, a green building shall be specially equipped to ensure the indoor air quality for a healthy atmosphere. Even the nasal feelings shall be pleasant free from the odour of paints and furnishings. This keeps people to be more productive.

18.3.2 Green buildings preserve the environment at places far away from the buildings.

Building materials like cement, sand, steel, stones, bricks, and a lot of finishing materials are responsible for about 20 percent of the greenhouse gasses emitted by a building during its lifetime. Green buildings shall use the

products that are non-toxic, reusable, renewable, and/or recyclable wherever possible. Locally manufactured products are preferred so that the collective material environment of the locality remains a constant. This also saves fuel for the transport of materials

As in the case of food and domestic products are tagged with green as a fashion of eco friendly practices; building materials are also going green. Here are some examples of futuristic green building materials which are in research stage now.

Green wood: A Stanford team has found that Hemp fibers and biodegradable plastic when pressed together and heated form layers and this material is as strong as wood. Also it degrades faster. This wood creates more raw materials when it breaks down. Microbes produce methane gas when they decompose this wood substitute and other debris thrown into landfills. Another type of bacteria absorbs this gas and turns it into plastic that can be used to create a new wooden plank. By this cycle, continuous source of raw material for this wood shall be ensured. Usage of this material may help to control deforestation.

Green Cement: Bruce Constantz at Calera, based in Los Gatos, has developed a green method to produce both cement and aggregate. This method removes CO_2 from power plant flues and mixes the gas with sea water to produce the mineral raw materials of concrete. For every ton of green cement Calera manufactures half a ton of fly ash from coal plants is used apart from preventing production and emission of CO_2 .

Other Green Building materials: Renewable plant materials like bamboo (because bamboo grows quickly) and straw, lumber from forests ecology blocks, dimension stone, recycled stone, recycled metal are some of the other materials used in a Green Building. confiscate