

Every exit door is to have an exit sign placed over or adjacent to it. Every exit sign is to be visible on approach to the exit, located and arranged so that it is clearly visible or its location is clearly indicated. Exit signs should be in conformance with ISO 3684-1 and ISO 7010. If no exit is visible from a corridor used by the occupants, an exit sign with an arrow or pointer indicating the direction of egress is to be provided.

An exit-enclosure and an exit route must be equipped with emergency lighting to provide illumination to an average level of at least 10 lx during all conditions including loss of regular power. Each building must be provided with emergency power supply to maintain emergency lighting/power from a power source such as a generator or batteries or a combination thereof that will continue to supply power automatically for a period of not less than one hour in the event regular power supply to the building is interrupted.

Increasing the performance level of fire and life safety in a building to a level that would be acceptable in North America would require significant capital expenditure. Keeping this in mind, short term measures have been recommended with the goal of eventually upgrading the building practices in India.

The life safety and evacuation of occupants from a building in case of a fire emergency is a complex subject and it is not possible to compress all of the aspects related to them in one article. If the above-suggested options are followed as short-term measures, it would be reasonable to conclude that the number of fatalities would likely be reduced. Based on our experience as skilled fire protection professionals, the above cost-effective alternative measures are the best options as of now. For new building, perhaps, more onerous measures could be incorporated into the design and construction of buildings.

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The authors, Avinash Gupta and Dominic Esposito, are practicing professional fire protection engineers. They are currently working in North America for the building code industry. Both have made presentations on matters related to building code all across Canada. In addition, they have written several articles for professional magazines. Avinash Gupta is currently State/Territory head for building and fire codes and is one of the 13 members of the Provincial-Territorial Policy Advisory Committee on Codes (PTPACC).

Disclaimer: In North America, engineering is a self-disciplined and self-regulated profession ensuring that designs conform to generally recognized norms and practices. The authors have modified the information from the general practices of North America, without compromising the performance level, to suit the prevailing conditions in India. The above views are for educating the local municipalities, local leaders, owners, residents, trades, students, educators, and professionals.

Sustainable Materials & Green Buildings- A Review

Global population and consumption are increasing very fast. According to "World Resource Institute", in the last 15 years, production wastes are increasing inspite of the increasing knowledge. According to "The Living Planet" report, humanity is now consuming over 20% of resources than the earth can produce.

The ecological footprint has emerged as the world's premier measure of humanity's demand on nature. This accounting system tracks on the demand side, how much land and water area a human population uses to provide all it takes from nature. This includes the area for producing the resource it consumes the space for accommodation, roads and other infrastructure and the ecosystem for absorbing its waste emissions such as carbon dioxide. Ecological footprint is a measure of how much area of biologically productive land and water an individual population or activity requires to produce all the resources it consumes and to absorb the waste it generates using prevailing technology and resource management practices.

Our current globe situation, since the 1920s is that humanity has been in ecological overshoot with annual demand on resources exceeding what earth can regenerate each year. It now takes the earth one year to regenerate what we use in a year. We maintain this overshoot by liquidating the earth's resources. Overshoot is actually threat to human well-being and the health of the planet particularly for India with the population of over 130 crores and such important subject is not being adequately addressed.

The earth planet has well connected natural system and the earth system science involves:
- Explaining interactions among the major components of earth's system e.g. the biosphere, atmosphere, energy system, etc., distinguishing nature from human induced cause of change, understanding and predicting the consequences of change.

The main flows of nature are carbon and oxygen flow. Oxygen is necessary for breathing & carbon is the most important part of molecules. Carbon flow is known as "carbon cycle". Carbon is a major courier of energy. The carbon cycle is out of balance and as concentration of CO₂ and greenhouse gases increases, the earth is undergoing "Global warming and climate change". The impact of present environment can be considered in two ways; 1st we use resources, 2nd we dump wastes (waste in the liquid, solid or gas forms. Both of the things harm environment). The Impacts: shortage of clean and accessible fresh water, degradation of terrestrial and aquatic ecosystems increase in the soil erosion, loss of biodiversity, change in the chemistry of atmosphere, possibility of significant change in climate.

The biggest challenge is not only shortage of resources for the future but also protecting ourselves from environmental hazards. Global warming and climate change are the biggest problem and its major contribution comes from the burning of fossil fuels and cement manufacture as both processes involve major emission of CO₂.

Process of change: Important threads for change.....

Reducing, reusing, recycling and recovering.

Re-engineering the material we use by recycling and use of construction demolition waste

Use of energy, materials and water with increased efficiency for its production and induction while reducing for impact on human health and environment during the life cycle; up to demolition, recycle and reuse.

Understanding and managing the raw materials available, minimize the embodied energy and CO₂ emissions, lowering cement consumption through mechanization and admixtures, water efficiency.

Water efficiency:

Efficient use of water by use of recycled waste water instead of potable or irrigation

Water efficiency in air conditioning system

Innovative waste water technologies

Establish performance goals for energy.

Water, materials and indoor environmental quality along with other sustainable design tools

Role of engineers in achieving sustainable development goals is significant and relevant in today's context.

The engineering profession today needs to explore, develop, adopt use of new and emerging technologies which are not only cost effective but are also sustainable and support inclusive growth that integrates the common man and at the same time maintains environment balance for better quality of life of people.

We need to bring out the changes in design and construction practices with greater emphasis on protection of the environment, reduce consumption of natural resource, and avoid large scale excavations for earth work by using soil stabilization technique and stabilization of hilly slopes without disturbing the ecology of different regions in the North eastern region (mountainous strata). Country as India has varying climate, varying geology and natural resources giving unique challenges which is specific to a particular region requiring specific solutions for achieving the construction cost optimization and reduction in construction period.

The new technology and the knowledge gained by engineers shall enable them to provide safe, durable, cost effective and sustainable construction.

By adopting sustainability, reduce human exposure to hazardous material, maximize use of renewable energy, conserve non-renewable energy and scarce materials, efficient use of water, energy, protect and restore local air, water, soil, flora and fauna, minimize materials impact by employing green products, use of construction and demolition waste by recycling and reuse.



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IAStructE student chapter activities

The IAStructE student chapter at CEPT University organizes events to provide a window of exposure and professional discussions for like-minded structural engineering students and fresh graduates (less than 2 years of experience).

Upcoming event(s): **Structural needs of heritage structures**

More details of upcoming events and workshops by IAStructE student chapter at CEPT University will be posted by the student committee on their facebook page, <https://www.facebook.com/iastructecept/>. For personal enquiry, contact padia.jaimin.bt15@cept.ac.in (committee member of student chapter)