ASSESMENT OF EMBODIED ENERGY FOR A TYPICAL COMMERCIAL BUILDING IN KOLKATA INDIA

DEPARTMENT OF CIVIL ENGINEERING, HERITAGE INSTITUTE OF TECHNOLOGY, KOLKATA

Name of Author : - Binit Kumar Mondal
Co Author : - Prof. Bedshruti Sen

RESEARCH HYPOTHESIS:

The Energy requirement of the building can be reduced considerably by using alternative Eco-friendly materials.

BUILDING DESCRIPTION:

A commercial building consisting of 16 Floors (G+15) is considered for this project. The building is proposed to a bank, and it is located in Newtown, Kolkata.

REFERENCES:

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ABSTRACT:

Globally, the building sector is a principal consumer of energy and as per the studies it amounts to be around 40% of the total primary energy consumption.
It also accounts for contributing 38% of the total global energy related CO_2 emissions.
Initially, the quantity estimation of the building was calculated using Estimator 2.0 software. The quantity of each construction material was multiplied with the EE co-efficient to obtain the total EE.
The total EE of the conventional building was compared with that of the conceptualized building (i.e., using eco-friendly construction material), and the total amount of energy savings was found out.

Name of the Material	Embodied Energy Co - efficient	Total EE of each construction material	Alternate Eco-friendly material	Embodied Energy Co - efficient	Total EE of each eco-friendly material	Difference (%)
Brick	4700 (MJ/m^3)	1218361.26 MJ	Fly Ash Bricks	1200 (MJ/m^3)	311070.96 MJ	74.468
Steel	42 (MJ/kg)	6935632.2 MJ	Green Steel	10.1 (MJ/kg)	1667854.41 MJ	75.95
Cement	4.50 (MJ/kg)	74844 MJ	Pozzolana Cement	0.68 (MJ/kg)	17998.2 MJ	84.88
Wood	1550 (MJ/m^3)	-	Glass	25.80 (MJ/kg)	-	98.33
Tiles	5250 (MJ/m^3)	-	Marble	2030 (MJ/kg)	-	61.33
TOTAL:-		8228837.2 MJ	TOTAL:-		1996925.57 MJ	75.73

CONCLUSION:-

Our research hypothesis was proved to be right. Total energy initially was 8228837.2 MJ and the total energy saving by just altering the steel, brick and cement was 1996925.57 MJ. Hence the energy saving was around 75.43%.

The energy saving can be enhanced again by choosing other eco friendly instead of the conventional ones.

However the literature suggests that the decrease in EE would increase the OE (Operational Energy) and this needs to be account