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INTELLIGENT BUILDING (COMFORT)

Intelligent building (comfort), This topic refers to a building which integrates environmentally responsible technologies for comfort and energy conservation. The dissertation work will cover a critical review of visual, thermal and acoustic comfort in intelligent buildings.

The aim of the dissertation work is to offer both theoretical concepts for understanding the problems involved and practical suggestions as to how we might make the necessary improvements in visual, thermal and acoustic comfort in intelligent buildings.

An inspiration of this topic was the project by Pearce Partnership a mixed commercial development in Harare, Zimbabwe. It uses the huge thermal mass of the building to maintain an equable internal temperature. The architects said that they borrowed the principle from ants and it reveals that intuitive, vernacular traditions still have much to teach those who will listen.

Present-day intelligent buildings are criticized for the fact that they do not provide or create the required environment, nor do they adopt it to human needs and feelings. Majorities of people using these buildings are complaining of insufficient fresh air circulation, light reduced in the name of energy saving and unwanted noise. Simultaneously the materials in use are of health hazard. For example in New York metropolitan area, 6 percent of residents are said to be afflicted by severe winter depression.¹

From the articles I read, users' perspective, perception of personal control is the single most important factor underlying the comfort. This perception is also linked more indirectly with many other things like productivity, stress, ill health, safety and security. For example French architects, after seven years of designing the European parliament, had the following criticism from the Guardian journalist, 'its plate-glass windows are meant to symbolize a new commitment to transparency and openness, but its 'inmates' meet in the gloom of a windowless beehive. The echoing central courtyard is already being compared with a prison exercise yard and the microphones in the chamber don't work. But don't worry the European

parliament has two other homes.'² This was the building that was finally meant to mark the parliaments coming age.

The idea of high upfront cost in order to save money latter is impossible, since the operational energy is significantly going to be higher than the embodied energy. The costs of renovating these intelligent buildings will be high, because of the existing structure in use. Those framed in steel, for example, are more likely to require an extensive and costly asbestos abatement program than those framed in concrete. A building whose entire curtain wall is falling will demand more work and a greater investment than the one that merely needs new windows. Many of the innovative materials used on intelligent buildings have short life spans.

Currently intelligent building architects tend to support the idea of new technology, yet the benefits of such advances are useless unless applied in an enlightened and socially beneficial manner - 'Technology must be social before it is technical'.³ Some architects are still concerned, that sustainable design will prove too expensive, but judging sustainability based on economics alone may prove self-defeating. Architects need to find architectural solutions to replace mechanical systems.

Topics such as: How places affect people, Building's influence on our mood and performance, and why architects heeded the findings of environmental-Behavioral Science where most helpful in preparation of my dissertation topic. These topics help me to be aware of the problems associated with the users of intelligent buildings and learn to integrate the insights of many disciplines in my dissertation work.

The following three articles illustrate some of the views of people towards intelligent building; „*The effect of places on our mood and performance*“, „*The problem of communication between architects and engineers*“ and the recent project of intelligent building „*The 4 Times Square*“.

„The effect of places on our mood and performance“. Architects were blamed for failing to understand the power of settings, ignoring nature's wonders and how they consider light from the perspective of aesthetic and visibility. It suggests that people feel best in the settings like parks and cars, where they foster a sense of control. Architects must offer multiple options and impose few constraints. From the article it seems that, if architects truly understood the power of settings to help occupants to be the right self at the right time, many design formulas would undergo serious questioning.

„The problem of communication between engineers and architects“. This article reveals that some time ago buildings were designed to stay comfortable passively, but now that there are chillers, ducts, boilers and pipes its easy to rely on artificial means to keep inhabitants comfortable rather than designing the building itself for comfort. Most mechanical engineers are mortally afraid of not providing enough cooling in their designs. Thus, they introduce a safety factor. This safety factor can compound to produce cooling systems that are overdesigned by 100 percent or more, significantly increasing energy usage and equipment cost.

„4 Times Square“, in New York City. The building employed a wide range of materials and methods. It features a veritable catalogue of sustainable technologies, such as low embodied energy, energy efficiency and recyclability. Window heights are also unusually high (1,7 m) to increase the quantity and depth of penetration of daylight. Thermal insulation of the cladding was also increased beyond typical office construction quantities in selected areas. Some 200 photovoltaic (PV) panels incorporated into opaque portions of the facade offer means of using the building envelope not only to control comfort but also generate electricity.

The reduction of operational cost is of course one of the primary motivators for sustainable construction, for even if initial costs are higher than for conventional

construction, the architects do believe that, the operating efficiencies far outweigh them. In addition to the lower operating costs of energy efficient installations, a significant piece of the puzzle in convincing tenants is the positive effect on productivity owing to greater worker satisfaction and less illness which accrues with improvements in such areas as natural lighting and air quality. The project is unlike some comparable European Buildings, it is modestly priced and its creators are confident enough of its performance although this performance remains to be seen.

In seeking to adopt a more holistic approach to design. I would like to proceed my dissertation work by gathering information about people's experience inside intelligent buildings. I will then do a critical review of published and unpublished data about comfort in intelligent buildings analyze information and evaluate the data in relation to existing knowledge. At a latter stage, lay out a precise set of formulations for discussions and possible ways how to improve visual, thermal and acoustic comfort in intelligent buildings at low cost to the environment.

Notes:

- 1) Feb. 1999, p. 75 *Architectural Record*
- 2) Thursday July 22, 1999 *The Guardian*
- 3) Lynn, G.: Anywise, MIT Press 1996, p. 95.

Sources:

Byron, M.: Architecture for people
 Francesco, D.: Figures of architecture and thought
 Progressive architecture, June 1994
 Euro Stav, March 1998
 Architecture Review, Sept. 1997