Healthy House Issues and the Development of Low-Cost Housing

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ABSTRACT

The Environmental Protection Agency (EPA) has found that indoor pollution levels can range from 2 to 100 times higher than in outdoor environments. The challenge to home builders and occupants is to greatly reduce or eliminate the conditions that create these high levels of interior pollutions and their associated health hazards. It is also becoming recognized that the lifestyle of occupants and home maintenance practices are equally important in achieving a healthy interior living environment.

The task facing the housing industry is to design and build "healthy homes" that resolve these issues and problems, especially in the case of low-cost housing. Standards are being developed that should result in homes with improved indoor air quality (IAQ) characteristics. Most of the work to date has focused on upscale and high-end housing. The question remains, "Can a healthy home be achieved for very low income levels?"

Using a prototype-housing unit designed and built at Tuskegee University for very low income levels, a study will highlight the most significant IAQ issues and define specific design and construction strategies to reduce or eliminate many of these issues. House furnishings can also assist in the reduction of IAQ problems, and this relationship will be reviewed in this context. Problem areas include excessive moisture, resulting in mold and fungus proliferation, chemicals out-gassing from various materials (VOCs), poor ventilation, and other irritants, such as dust mites, that contribute to an unhealthy home.

As viewed by the researchers, the problem is not a simple one, but it has several important facets. The concern for the production of a generic healthy house is the primary issue. At the same time, affordability is the central issue. Home ownership appears to be out of reach for a significant segment of the population in many regions, especially those living on a very low income. This income level may amount to about half of the median income level for a local community. It is not only the first cost of housing that is a burden but also the continuing costs of operating and maintaining a safe, decent, and healthy house that consumes much of this group's income. An additional concern regards the efficient use of energy in the home. Maintaining a holistic view of these relevant issues was the major objective of this prototype housing unit. Final decisions were based on a combination of these concerns and the varying weights necessary to consider the effects of affordability, energy efficiency, and the provision of a generic healthy house.

This demonstration project addressed the following issues:

- *overview of housing-related hazards and illness,*
- *use of materials and construction techniques to reduce hazards,*
- *selection of mechanical systems and appliances,*
- *appropriate interior finishes and furnishings,*
- *effects of occupant lifestyle, and*
- *building standards related to a hot, humid climate.*

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A presentation of work accomplished on this project will include

- *construction materials and systems,*
- *construction processes,*
- *comparison of other healthy house standards with criteria used in this project,*
- *lessons learned, and*
- *expected results.*