

Lifespan Sustainability of Building Systems for Apartment Housing

A Performance-Based Assessment

Subject

Change is importune (Duffy, 1987), and over time in the life of a building significant changes do occur, not only in the quality of materials and components but also changes in user needs and requirements.

These creates a performance deficit between desired quality (service performance) and actual physical (technical) building performance. None is indeed the better:

- users suffer the discomfort;
- energy inefficiencies cost the state;
- owners lose value for money; and the
- environmental load created through demolition wastes, etc threatens biodiversity!

The quest is therefore to bridge this gap by optimizing the service life performance of buildings systems (materials and components) as a means of achieving sustainability.

Goal

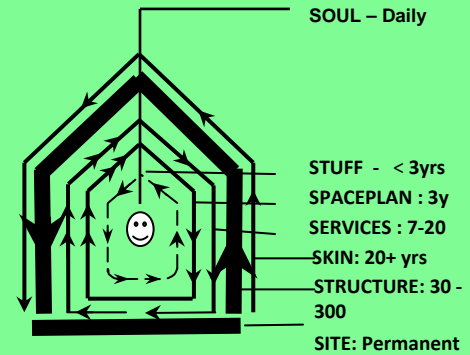
To develop the criteria, principles and strategies based on which building materials and components can be selected with referenced to their:

- service life performance and
- user requirements.

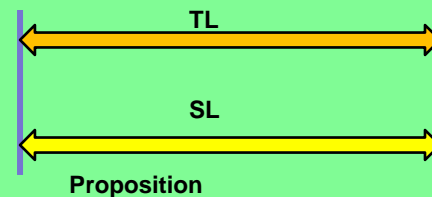
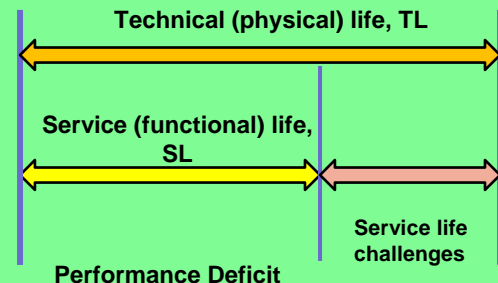
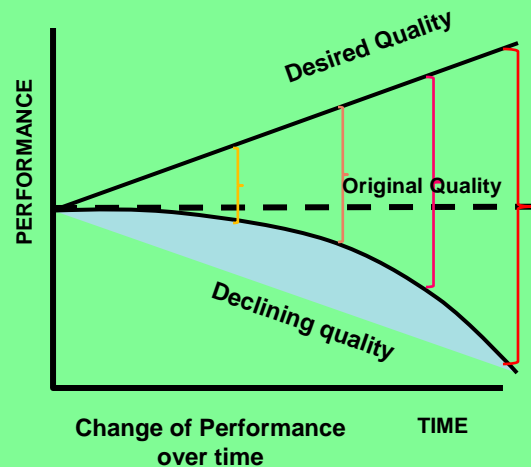
The research focuses on apartment houses in warm humid tropical climates like Ghana

Expected Results

A performance-based decision tool/framework for assessing the sustainability of materials and components for apartment housing in relation to user needs and requirements.



Layers of Change (Brand, 1994)



Lifespan Sustainability of Building Systems for Apartment Housing

A Performance-Based Assessment of Materials and Components in warm humid climates in the case of Ghana

Agyefi-Mensah Stephen, Prof. Jouke M. Post, Dr. Egmond-de Wilde De Ligney, E.L.C van Dr. Peter Erkelens

Technical University of Eindhoven (TU/e), Faculty of Architecture, Building and Planning, Architectural Engineering Design, Eindhoven, The Netherlands, s.agyefimensah@tue.nl



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Subject

Change is importune (Duffy, 1987), and over time in the life of a building significant changes do occur, not only in the quality of materials and components as it affects its structure and fabric but also changes in user needs and requirements in relation. These creates a performance deficit between desired quality (service performance) and actual physical (technical) building performance. None is indeed the better: users suffer the discomfort; energy inefficiencies cost the state; owners lose value for money; and the environmental load created through demolition wastes, etc threatens biodiversity!

The quest is to bridge this gap by optimizing the service life performance (technical and functional) of buildings systems (materials and components) as a means of achieving sustainability.

Goals

To develop the criteria, principles and strategies based on which building materials and components can be selected with reference to their service life performance and in relation to user requirements such that they meet a cradle to cradle (C2C) philosophy. The study focuses on apartment houses in warm humid tropical climates like Ghana

Research Question

To what extent does changes in the performance of building materials and components meet user functional requirements for apartment housing during their lifespan? What accounts for the differences between the service life and technical life of buildings? How can these be modeled and factored for improved assessment of building sustainability?

Strategy

Establish by means of expert opinion and Functional Quality Deployment methods the expected service life of apartment houses, their components and materials in relation to user requirements. This would then be assessed using performance-based assessment tools such as Service Life Planning (ISO 15686).

Expected Results

A performance-based decision tool/framework for assessing the sustainability of materials and components for apartment housing cognizant of user needs and requirements.

Preferred Partners Applications / Sponsors

Building Designers (Engineers and Architects), Builders, Users, Regulators/ NFP-NUFFIC

Prime Publication / Prototyping

Advanced Technologies for Modern Building Construction : The Case of the Lifespan and 'Loose Fit' Building Concepts, W/A Building and Construction Exhibition, 1-3 April, 2009, Accra, Ghana

Research Period

2009-2013