Research options for low-cost rehabilitation

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Introduction

There is a limit to the resources from the earth. If we want to survive we all have to use these resources as intelligently as possible. This is easier said than done. As we are confronted with a heritage of decisions from the past, for example, in the field of housing and infrastructure there was a policy to build for quantity (volume) and not so much for quality. This is one of the reasons why buildings are generally in a bad condition in developing countries.

For Kenya there are reports of cases where the maintenance component takes 50% of the annual revenues (1). Maintenance and rehabilitation should therefore be high on the list. Although some activities are undertaken in this field, it still has no priority. Partly because of the way of thinking, "Today and not tomorrow", but also because of a lack of knowledge into the mechanisms behind the behaviour of buildings.

The design stage is a major point where the measure of maintenance and renovation is already created. In view of the environmental problems maintenance and rehabilitation also need particular attention. Although many of us are aware of the problem, activities up until now, have been limited to particular cases. The goal of this paper is to motivate others to participate.

Theories

The research question for new housing and infrastructure is to find an optimum between new construction, maintenance and rehabilitation where it concerns total saving of resources in quantity of materials, labour and capital. For existing (infra)structures there is need for maintenance/rehabilitation instead of demolition. Where is the optimum? Sometimes the latter is cheaper.

More generally, the problem field can be described as: Can we design, build, maintain, rehabilitate housing and infrastructure in such a way that the use of (material) resources can be reduced?

Before we can develop such a system we have to know more about the relationship between design, maintenance and rehabilitation. We also have to take into account 'external circumstances' which may differ by country, level of development, type of structure.

Research

Research at the Eindhoven University of Technology concerns the prediction of behaviour of buildings. A model will be developed in which the information of the behaviour of building components in terms of durability and changeability can be collected, ordered and interpreted for design, maintenance and rehabilitation of other buildings. The research covers three main topics:

- durability of building components
- influence of materials on durability behaviour of building components
- changeability of building components.

Research is also carried out into older buildings (20th Century monuments): what is their quality etc, how can they be maintained and restored?

Application of the model (which includes all influencing factors) will lead to better detailing, but also to development of new appropriate maintenance and renovation techniques.

Self-help

One of the solutions for Developing Countries may be found in self-help productivity. Figure 1 gives a review of them.

The view is that people who know/make their structures are also more capable of repairing and improving them.

A combination of all the above research topics will lead to a workable approach to the problem.

Action group/working party

I have concluded from, as well as other conferences and interviews that, although lack of knowledge on maintenance and rehabilitation is recognized as a problem, there are only a few people who are actually involved in the topics. In particular there is still a lack of people from developing countries. Therefore I began to stimulate interested people and researchers to start a working party.

The response during the last CIB W70 (Oct 1992) conference was quite promising. Now I am trying to get more people interested. The idea is after an inventorisation of all activities in this field to share experiences/research and to develop a research programme with reports/output/meetings at more or less regular intervals.

References

1. UNCHS The rehabilitation of existing housing stock, 1982, p 15
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**Figure 1.** List of factors influencing self-help building productivity (2).