



Figure 4 Architects' rating of the importance of various attributes of technical information

NETWORK
A new resource on housing and design research

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ABSTRACT

NETWORK is a new international non-profit organization, having as its two primary objectives:
- to support local research initiatives in the related fields of housing and design,

- to improve communication among researchers and research organizations at work in these fields. These activities build on 20 years of research and development by SAR (= Foundation for Architects Research, Eindhoven, The Netherlands) and on the experience of those who have expanded and adopted its basic theories.

The type of research and development that is carried out is illustrated by the Keyenburg project in Rotterdam. This project is characterized by tenant control of the individual dwelling lay-out plans. The processes, products and methods that were used to achieve this goal are described. The Keyenburg experience is relevant to all professionals who consider housing as a highly dynamic and complex process, and who are prepared to adjust their professional roles, activities and methods accordingly. NETWORK hopes to realize a world-wide interchange of such experiences, thus adding to the specific body of knowledge that is at issue.

NETWORK

Une source nouvelle pour la recherche en habitation et architecture

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DOMAINES

Architecture, Planification et Participation de l'Usager, Description de
Projet, Processus et Outils d'Architecture et Construction, Echange
d'Information.

RESUME

NETWORK est une non-profit organization internationale ayant comme ses
objectives principales:
- à supporter des initiatives locales de recherche en les terrains relatés
de habitation et architecture.
- à améliorer la communication entre des chercheurs et des organizations
de recherche travaillant dans ces terrains.

Cettes activités sont basées sur 20 années de recherche et développement
par SAR (=la Fondation de Recherche des Architectes, Eindhoven, Pays Bas).
et sur les expériences de tous qui ont étendus et adaptés ses théories
fondamentales. Le type de recherche et développement qui est réalisé, est
illustré bien par le projet de Keyenburg a Rotterdam.
Ce projet est caractérisé par l'autorité des locateurs sur les plans
individuels de leurs appartements. Les processus, les produits et les
methodes sont décrits, qui sont utilisés pour atteindre ce but.
L'expérience de Keyenburg est rélevant pour tous, qui considerent habitation
comme une processus de stimulation plus q'une processus de procuration.
NETWORK espère de réaliser une échange mondiale sur ce type d'expérience,
ainsi augmenter la connaissance particulière, qui est mis à l'ordre.

INTRODUCTION

The kind of New Resource in Housing and Design Research that is at issue,
can best be illustrated by describing a real-world project, realized on
the basis of this research. The particular nature of the project chosen
for this purpose, is introduced adequately by the following interviews
with two of the tenants.

Interview 1

Mr. and Mrs. C. are 27 and 22 years old respectively, and there is a
little dachshund in the house as well.
Mr. C. works with an insurance company and his wife studies in music.
There is a piano in the house, which leaves not much room for other
hobbies.

The lay-out plan had to fulfil the requirement, for peaceful study. For
this reason, the bedroom cum study has been situated on the quiet back
(the court). This room occupies the full width of the house. Therefore
the livingroom is at the front - and also the sunny side- with a view on
the Keyenburg. The kitchen is open to the dining area, creating
satisfactory spatially effect, but also a disadvantage when receiving
visitors. The kitchen and dining areas receive extra daylight through the
glazed partition of the bedroom, however, this gives some privacy
problems with visitors as well. To reach the bathroom one must pass
through the bedroom, thus, creating a privacy problem. This lay-out was
chosen to provide as much wallspace as possible for bookshelves. In the
sanitary cell, a separate shower was added by the occupants. The sitting
area on the gallery is used frequently. The balcony at the back is used
only for drying clothes. The user consultations went satisfactorily. The
personal lay-out plan, with the kitchen at the back proved to be
impossible, because connection to the duct was necessary. Subsequently a
reasonable solution has been found in consultation with the discussion-
leader. The time that could be spent in the full scale model has been too
short.

Interview 2

Mr. B. is 37 years old and he is an artist -a painter- by profession. His
work is his hobby as well and is carried out at home. Mr. B. landed up in
the project by coincidence, but became interested in determining the lay-
out himself because of his specific requirements.
The dwelling had to accommodate a studio, which has been situated on the
balcony side, looking out on the Britsenburg. Otherwise, the starting
point was to provide an open lay-out, with the only subdivided area being
the sanitary cell. The sitting area with bed-sofa is located in the
centre of the dwelling. The dining table is at the gallery side and
is separated from the front door by a 1.5 m long partitioning. There is
no hall. The balcony is used frequently. The sitting area on the gallery
is not useful, because it is located opposite the staircase. The user
consultation has been satisfactorily and also the full-scale model has
been very useful.
Because the number of elements used is minimal, the lowest possible rent
is paid as well.

Mr. B. has wanted to add an extra wall to the studio to create more wall space for hanging paintings, but this idea was dropped.. A definite wish that remains is for a separate storeroom.

These two interviews were held with tenants, living in the Keyenburg project in Rotterdam, in aid of a project documentation (1), brought out recently by NETWORK-SAR (2). The goal of the project was to achieve maximum user control for tenants of social housing.

The interviews bring up a few of the many innovations in process, product and use of methods, that this project has contributed to social housing in general and Dutch Social Housing in particular. These innovations will be described in this paper.

That this project has been possible in the Netherlands can be qualified as a small miracle. It should be realized that such a large degree of tenant control is by no means the regular thing. Dutch social housing is not only characterized by the highest percentage of public financing in the world: 95% of all housing is in some way or other receiving subsidy. It is also very traditional in concept, based on normative starting points rather than real world market requirements.

The significance of the Keyenburg project is, that it took place within the normal social housing context. No special conditions were created. This means that the results of the experiment can be used by others straight away. The only necessary requirement is a good deal of tenacity and convincing power - and last but not least - a real consensus in the planning team, enabling to present the social housing bureaucracy with a united front. The latter was ensured by the fact that architect: Working Group Kokon, Builder: J.P. van Eesteren and client: Housing Association Tuinstad Zuidwijk were all members of NETWORK-SAR.

Therefore the Keyenburg project is a pilot project in many respects. It has a lot to tell about innovative processes products and methods, but it also shows what kind of organization is useful for reaching practical application. This paper will focus on both aspects with special emphasis on the fact that both the innovations themselves and the organization carrying these new approaches have recently moved to the international level by the establishment of NETWORK. This will be discussed later, but first the conceptual part will be introduced.

KEYENBURG, A NETWORK PROJECT

The Keyenburg project is characterized by the so-called support-infill approach, first introduced by John Habraken in his book "supports, an alternative to mass housing" 3) developed further by the research and development activities of NETWORK-SAR (4). This concept proposes to break up the housing process in two independent processes; the support representing all communal decisions -and the infill all individual decisions. This idea may be elaborated in many different ways, but a common feature will be that the infill always lies within the individual dwelling territories, whereas the support consists of everything that serves and delineates these territories. The concept is not limited to the physical elements. The break-up into two spheres

should be considered in financing, housing management, plan-approval, building organization, tendering, etc. etc. It affects all aspects of housing and all disciplines involved.

THE PROCESS

In the Keyenburg project the distinction was used first of all to structure the relationship between housing association and tenants. As has become apparent from the two interviews, the tenants have determined their own dwelling lay-out plans. The main motive for the association was that this would give the tenants a personal interest in the project, which would reduce the operation costs. Based on this assumption the association was prepared to bear the extra costs of the user participation. Post occupancy evaluation has justified this decision: vacancy and tenant mobility are significantly below the usual figures. How was the process organized? The first step consisted of inviting prospective tenants on the basis of a general description of the project aims. This produced a great number of applicants, from which 500 candidates were selected, a number that was narrowed down to 152 final candidates. These received a complete information package on the support, its location, orientation and infrastructure, as well as an invitation to the ballot evening. On this evening a preference for a "lot" in the support could be indicated. If there were more than one candidate, the ballot would decide.

A second meeting was called for giving more information on the proposed procedure and the nature of the project. The prospective tenants received a second information package in preparation of the user consultation meeting they were going to have. The package contained an empty support plan with information on the use of the M-2M modular grid and on the rules for drawing lay-out plans on this grid. They were invited to give it a try at home.

The aim of the first user consultation, lasting about one hour, was to determine the provisional dwelling lay-out: the number, location and dimensions of the rooms as well as the location and turning-direction of doors, location, dimensions and subdivisions of interior window frames, kitchen units, sanitary cells and cupboards. The discussion leader would guide the users in drawing up the optimal solution for their specific requirements. The designs would then be checked by the architects office for possible technical and functional difficulties and, where necessary, adjusted. The office also made an element estimate and a rent calculation of every floor plan, using a microcomputer program, specially developed for this purpose by NETWORK-SAR in co-operation with the architects office (5).

The future occupants received the feedback before the second user consultation which occurred only 2 to 3 weeks later. The session started by building up the lay-out plan with a full scale modelling system developed by NETWORK-SAR and Eindhoven Technical University (6). The system was set up in a Nissenhut, close to the site, and enabled the model to be built up in 10 to 15 minutes, giving a realistic idea of its functional and spatial characteristics. After the lay-out plan had been finally approved, the discussion leader would go into a number of details

concerning the finishings and fixtures, with the electricity plan as the most important subject. The computer program calculated the consequences of all these further elaborations and a final rent was produced. Many of the electricity plans proved disproportionately expensive, and were therefore adjusted.

The big differentiation in lay-out plans and accompanying rents, posed some severe problems for official plan approval and operative procedures. The solution to these problems consisted of submission of a support plan, furnished with a "reference lay-out plan" that complied with all standards and cost yardsticks, thus proving that the support would meet all official requirements. Subsequently it was permitted to deviate from the standards on the level of the infill. This is an important precedent that enables the plan approval to withdraw to a more general level.

An important result of the study is that the average user was prepared to pay 20% more for his control on the infill, relative to the reference lay-out plan. Therefore the support-infill distinction in fact mobilizes extra financial contributions as compared to the current normative approach of Dutch housing - a very significant conclusion.

THE PRODUCT

The process described above, would not have been possible without an appropriate product. The systems used were based on a long development by NETWORK-SAR and especially by its sponsors from Dutch building industry. Basically it consists of a uniform support structure with walls, openings, facades, services, heating elements, etc. designed in such a way that they offer maximum freedom to the infill at the minimum cost. The infill consists of a package of standard elements that can be arranged and assembled in different ways because of their co-ordinated interfaces.

An important feature of the support is that it can be parcellated in different ways, allowing dwellings of different sizes to be realized. For this purpose the reinforced concrete crosswalls were realized as "fontanel walls", i.e. walls with sections free of reinforcement that can be opened up to combine adjacent bays. Different (re)parcellations mean that the services should be redistributed as well. To enable this, the service ducts are inter-connected by horizontal piping-troughs incorporated in the screed on the concrete floor.

After the mix of dwelling sizes has been determined each dwelling receives its specific lay-out plan with the aid of the infill elements. The first decision concerns the type of sanitary cells. Different types of cells could be chosen depending on the required program of sanitary elements. Each type has its standard floor element containing the sewer pipes. This floor element should be placed against the service duct so that the pipes can be connected without forming an obstacle. The consequence is a raised bathroom floor. Then the partition elements, doors and internal window frames are placed and the bathroom and kitchen receive their waterproof finishings, all infill piping and electricity is connected and finally the kitchen block, sanitary elements and cabinets are placed.

METHODS

It is needless to say that the product described above can only be realized efficiently if its subsystems are well co-ordinated. This is inconceivable without rules for modular co-ordination. For this purpose the NETWORK-SAR concept has been applied. It is characterized by a combination of 3M and M modules, making 3M the basic increment for all subsystems (7).

These rules ensure first of all that the infill is co-ordinated with the support, secondly that the element groups that form part of the support and of the infill are co-ordinated, and, thirdly, that the elements within the element groups are co-ordinated.

The co-ordination is aimed at simplicity of assemblage rather than at industrialization, but it is obvious that this more conventional motive receives attention as well. The two factors together have a very positive effect on construction costs, and in this respect the project has exceeded all expectations. The client estimates that the construction costs have been 10% less than would have been the case with traditional building techniques. It is a very significant conclusion that a higher complexity has the effect of reducing costs!

Another method that has been used is the functional analysis technique for the design of supports. This method originates from NETWORK-SAR as well (8). Its main characteristic is that variants are studied in a number of subsequent steps, in order to optimize functional capacity with technical-, cost-, and other considerations. A similar method has been devised for the direct dwelling environment, but, because of the relatively small size of the complex, 152 dwellings, this method was used only superficially. At this level, more use has been made of the "Pattern Language" method of Christopher Alexander (9). This method has proved very effective for discussing certain desired spatial typologies. In the realm of the user participation, the computer program for translating lay-out plans into costs implementation and rent, as well as the full scale modelling system should once again be mentioned. Without these tools the very complex process would neither have been feasible nor realistic.

INTERNATIONAL SIGNIFICANCE

Even though the Keyenburg project addresses housing needs that are entirely determined by the Dutch context, the starting points, the solutions that were found and the methods used reach far beyond the national frontiers.

That certain parts of a housing complex are of a general, infrastructural nature is a notion that is applicable world-wide. For instance, all sites-and-services, core-house and shell-house projects are based on the same assumption. The notion that the users should play an active part and be responsible for the individual sphere has long been apparent, for economic reasons, in the developing nations. But it now gains acceptance in the developed part of the world as well, as part of the redefinition of the role of the authorities, and of the drive to opening up building trade to market forces. Even though the degree of industrial

manufacturing will differ greatly from context to context, the need for the distinction of building subsystems, and consequently for co-ordinating rules will be universal as well. The real motive is not industrialization, but the necessity of standard procedures in very complex decision processes. A good illustration of this is formed by the computer program used to assist the user consultation. Such a program would be inconceivable, in the absence of distinguished and co-ordinated subsystems. And then there is the application of design methods. In all cases, where only part of the dwelling is provided there will be the need for evaluative techniques that enable to prove the efficiency of the provision. E.g. even if only a serviced site is provided, its potential for accommodating a dwelling of quality depends to a large degree on the spatial characteristics of the site and the services. These should be analysed, studying their consequences on possible lay-outs, uses and incremental growth patterns. And the same applies to all non-project specific building produce. It will also be necessary to supply rules and guidelines for further completion of the provision.

The awareness of the universal nature of these starting points and tools has led to the founding of an international organization called NETWORK. This organization aims at realizing the exchange of information on research and practical experience in managing a dynamic built environment, such as is represented by the Keyenburg project. The conviction is that this exchange will be crucial for developing the specific body of knowledge that is felt to be at issue. The realization that many professionals around the world are struggling with similar problems and are coming up with parallel solutions has led to a concept of NETWORK as a polycentral organization, an association of Local Centres. A first group of Local Centres has now crystallized, with seats in Austria, the Netherlands, Sweden, the United Kingdom, Israel, Saudi Arabia, Japan, the United States and Mexico. The Secretariat is located at the SAR office in the Netherlands and the directorate resides at MIT in the United States. This young organization is currently considering its program and its modes of operation. People and organizations that feel related to these ideas and also feel the need for exchange are invited to participate in NETWORK, building it into an organization consonant with the name.

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