

was an early advocate for participatory design in housing and J.F.C. Turner⁴ attempted to create a humane environment in self-help housing.

The most holistic approach in trying to resolve this housing process is probably put forth by Christopher Alexander.⁵ Through his work he sets forth a building process that attempts to create harmonious buildings responsive to human needs with the participation of the architect and the users in the building process. He supports that "wholeness" and "order" exist in the built environment as a geometric quality and that this quality is dependent upon the building process that generates it. The more integrated the design and construction processes are, and the more involved the architect and the users are in the making process, the higher the building quality will be. Thus, he proposes an integrated building process where the architect and the users are working together in shaping their dwellings.

Alexander's approach of making buildings is not often used in contemporary building and especially in the making of apartment buildings. I applied Alexander's framework on an apartment building case study in Cyprus where most contemporary apartment buildings do not respond well to users needs. This research was needed in an attempt to resolve this problem and help architects and developers in this difficult endeavor. The Korinthos apartment building was designed by myself and built with a small group of subcontractors under my management, while getting the users and myself actively involved in the building process. The building is located in Nicosia and has six three-bedroom apartments with a common entrance court and subterranean parking.

METHODOLOGY

My hypothesis was threefold. First, that the active participation of the architect and the users in the building process has the ability to create a harmonious and humane apartment buildings. The method employed to test the first hypothesis was a research survey.⁶ The owners of the apartments were asked to answer a questionnaire whose purpose it was to assess the quality of the apartment building and whether their participation increased the quality of their dwellings. A verbal interview of the dwelling owners followed the questionnaire.

My second hypothesis was that the architect and user participation in the building process could be implemented without increasing the allocated construction cost and time of the building. The method used for testing this hypothesis is a comparative method

of analysis. The Korinthos apartment building cost and time were compared with those of six other apartment buildings governed with same or very similar parameters.⁷

My third hypothesis was the architect and the developer could financially afford this participatory process. This hypothesis was very relevant to the work and was included as an adjunct hypothesis because it merited some analysis and investigation. I have attempted through calculations and negotiations with the developers to come up with a working plan as to how the implementation of this integrated process can take place.

CASE STUDY- THE KORINTHOS APARTMENT BUILDING

The Cypriot apartment building form was "transplanted" to the island from Europe in the early 1950s and has not changed much since then.⁸ The building is often "sitting" on a pilotis, the dwellings are identical at all levels and the materials used are reinforced concrete, masonry in-fill walls, and aluminum and glass windows (Fig. 1). A big "boom" of this type of building took place on the south side of the island after the 1974 war with Turkey. Almost 40 percent of the island was occupied and approximately 200,000 refugees were displaced from the north side of the island to the south side.⁹ To resolve the housing shortage following the invasion, the government sector and the private sector began producing dwellings in greater numbers to meet the needs of the population.¹⁰ These type of buildings remain mostly unchanged till today.

The building process employed for the production of these buildings is one where the architect and the users are not actively involved in the making process. The developer provides the schematic design or strict design guidelines to the architect who proceeds to design the building in a "mechanical" fashion. The construction documents are then given to the contractor to construct the building. Changes of the building form are avoided because they usually cost money and delay completion time. The supervising architect is merely ensuring that construction is proceeding according to drawings and specifications. Also, the users are absent from the building process. They usually come too late into the process to choose building finishes that they like or need. No one is consciously trying to adjust and modify the rooms, the door or window openings, or details to create a more comfortable environment.

wishes of the users.

B. The users chose material finishes, cabinetry work and interior colors of their dwellings.

The developer had set certain fixed prices for material finishes, cabinetry work and other fixtures. The users used those budgeted amounts to choose items of their liking. Some users requested extra amenities like fireplaces and built-in furniture for which they had to



Fig. 9. Sketch before and sketch after changes.

pay extra money. Furthermore, some users worked with the interior colors of their dwellings. Again, my role was to participate in this process and assist the users to create an environment according to their needs and wishes.

C. Some users provided sweat equity in their dwellings for which they received credit.

Some of the owners provided some physical work themselves in order to save some money. Some of the operations they provided were painting and also landscaping for the entrance level dwellings. Some users opted to hire some subcontractors themselves, like cabinetmakers and pay the difference or receive credit according to the budgeted amount of the operation. This worked very well because they felt pride of ownership and belonging.

POST OCCUPANCY EVALUATION

A research survey¹⁸ was performed to determine whether the participation of the architect and the users in the building process increased the humane quality of the building and succeeded in creating a responsive architecture. The owners¹⁹ were asked on aspects of design and construction, on building quality and identity, and the extent of community and privacy of their apartments. For example, to the question, “Why did you decide to buy this apartment?” the majority said they liked the building and mentioned the architectural design, layout, uniqueness and identity of the building as the major determinant factors. To the question, “Which are the elements that create an identity to the building” all the interviewees confirmed that the handmade details helped to create a feeling

of identity and belonging to the building. The neighbors were very happy with the building and during construction they kept visiting the site. Somehow the building managed to develop a feeling of “community” in the neighborhood. Passers-by stopped their cars to look at the building, giving compliments to the owners. One of the builders brought his family to the site often and kept saying that no other builder works this way. Two prospective clients indicated that they were attracted by the beauty and simplicity of the building and commented that it had attributes found only in the traditional urban architecture of Cyprus. And finally, a little girl whose mother works across the street refers to the building as “the little palace”.

TIME AND COST

Six other contemporary apartment buildings in Nicosia, with similar variables²⁰ to the Korinthos apartment building were selected to perform a cost and time comparison.²¹ Four apartment buildings had a cost higher than the Korinthos apartment building and two had a cost lower. The average cost of the six apartment buildings was three percent higher than the cost of the Korinthos apartment building.²² Therefore, the new process was implemented within the cost of contemporary apartment buildings. The same buildings used for cost comparison were also used for time comparison. The Korinthos apartment building took ²⁰ months to be constructed while the average construction time of the other six buildings was 16 months. The building subcontractors caused the four months delay. Even though they were promptly notified to resume construction they showed up on the site very late. For example, the formwork and steel reinforcement subcontractors delayed construction by ten weeks. This problem can be resolved if the developing company is building more projects simultaneously. This way most subcontractors will be working almost exclusively for the developer, thus it will be easier to manage them and resolve scheduling problems and delays. Therefore, if we subtract four months of delays caused by the subcontractors then the construction time of the Korinthos apartment building is the same as the other buildings. This could lead one to interpret that the new process can be implemented within contemporary time constraints. But if one attributes the delays to the new building process then it could lead one to believe that this process cannot be implemented within contemporary time constraints.

FINANCIAL FEASIBILITY OF THE PROCESS

In Cyprus the majority of developers do not allocate much money for the construction management of their

¹¹ The author has investigated apartment building processes for his Ph.D. studies at the University of California, Berkeley. His dissertation is title: Apartment Building Process: The Design and Construction of the Korinthos Apartment Building in Cyprus. University of California, Berkeley, 1998. His Ph.D. advisor was Professor Christopher Alexander.

¹² Sinos S., Vernacular Architecture of Cyprus, Athens, 1976.

¹³ G. Papacharalambous gives a detailed account of the making of a traditional dwelling in his book, The Cypriot Residence, Nicosia, 1968, p.7-21.

¹⁴ For example, in Cyprus an architect can not be a licensed contractor due to legal restrictions. One way of working around this problem is for the architect to partner with a licensed contractor and retain the management of building construction.

¹⁵ The construction budget of the project was set at CYP£200.000 (Cyprus pounds two hundred thousand) and the construction time was set at 16 months. The total building area is 844 m2.

¹⁶ The developer was “Pontikis and Christophorou Developers Ltd.”, a company which belonged to the author’s family.

¹⁷ The daisy has been widely used in traditional Cypriot arts and crafts.

¹⁸ The detailed questionnaire and answers of the survey can be provided upon request. The questionnaire was prepared by the author and approved by his Ph.D. advisor.

¹⁹ The owners of the apartments looked at other contemporary apartments before deciding on the Korinthos building. For this reason they were good candidates for assessing the humane quality of this building.

²⁰The apartment building variables, which were use to choose the six apartment buildings for comparison, were the following:

- a. Location- all buildings were located in Nicosia
- b. Time- the buildings were constructed at the same time period
- c. Plot area- they were constructed in a plot area of 550 m2 to 600 m2
- d. Size- they were of similar building area (830 m2 to 880 m2)
- e. Floors- they have three floors, two dwellings at each floor.
- f. Parking- entrance level (pilotis) or subterranean parking (six cars)
- g. Construction system- they used the same construction system (reinforced concrete frame, in-fill block walls, stucco and plaster)
- h. Specification finishes- they had same or similar specifications finishes and items.
- i. Develop/design/build- that they were designed and

constructed by an individual entity for developing purposes.

²¹Comparison of apartment building Construction Cost (£/m2) and Construction Time (months)

Apartment	Actual Cost	Factored Cost	Actual Time	Factored Time
Korinthos	245	245	20	20
CyField	190	235	12	12
Pelekanos	230	260	18	19
Barbas	245	260	14	15
Lemka	260	270	18	18
Meletiou	245	255	16	17
Miliotis	205	235	15	16

The Korinthos apartment building has used the most expensive finishes of all the buildings compared. The factored cost is the adjusted one, made after the cost difference of the specification finishes is taken into account. The Korinthos apartment building has a subterranean parking, which has added approximately six weeks to the duration of construction. The factored time is the adjusted one, made after the construction duration of the parking structure was taken into account.

²² The average construction cost of the six apartment buildings was 253 £/m2 and the construction cost of the Korinthos apartment building was 245 £/m2.

²³ Small-scale developers build two or three small projects a year. To keep their expenses to a minimum they hire one construction supervisor who manages all projects and in addition this person works on sales, finance, and other aspects of the business.

²⁴ The construction management fee for the Korinthos apartment building was five percent of the construction cost. The fee used in countries like America, England or Japan ranges from 18% to 22% of the construction budget depending on the scale of the project (information was provided by the Center for Environmental Structure, Berkeley). In Cyprus, the management fee for construction ranges from 12% to 15%, depending on the scale of the project (information provided by Cybarco Ltd., Chapo Constructions Ltd. and Atlas Pantou Ltd.).

²⁵ I proposed a financial viability plan to the developers, which leads me to believe that when employed, will resolve the financial problem of the process (the plan can be provided upon request).