

# SHELL HOUSE

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## ABSTRACT

Designs are constitution of jumps from experiences to contemporary problems. Perceptions can be individual or social. Architectural education claims on unification, though duality is in pieces.

Differences in quality-quantity expectations, aesthetical levels of limited numbers of individuals living in the interiors, or people perceiving only the outside generate in-out distinction in designing. Exteriors of the buildings should be designed according to environmental demands of the society, but interiors should be individualistic.

Open-closed spaces will create a shelled micro-atmosphere insulated from exterior, an interior space quality serving for multi-dimensioned functional capabilities. Interior spaces of the buildings may have different peculiarities with personal preferences, physical comfort conditions, flexible living demands, and material variations to create solutions for different spiritual or functional colours-textures, technologies, details.

Proposal includes practical, applicable and utopia elements. These contradictions will create original openings and add positive inputs for researchers. There are behavioural deficiencies among rich people, as in poor ones. For instance; they fill spaces with furniture, then spend for heating-cooling and cleaning them. Consciousness standard in applications with related courses in curriculum planning, being successful, starting from freshman, maturing in 2<sup>nd</sup>-3<sup>rd</sup> levels, gaining importance at diploma, ending with utmost quality.

**Key words:** *Perception, Environment, House, Architecture, Design.*

## INTRODUCTION

Permutation (alteration) and development (maturing) dualities form new thoughts and creative approaches, and worthwhile contributions open ways to extraordinary associations for designers. At this contemporary age, besides the energy matter, there is need for sheltering in order to facilitate the intensive use of inventions even for low income groups to easily attain their aspirations. Another inevitable base for design is the economy. In addition to having a shelter with an optimum price, running it at low costs without any problem at all is one of the important problems expected to be approached by architects.

Main approach is designing this shelter system as a unit and applying it on a favourable environment. Organization of the environment should depend on having proper forms, masses, functional relations and having technical substructure (as rational mass transportation, communication possibilities, sun orientation, multi dimensional natural balances with passive heating & cooling, ecology, air conditioning, solved natural dirtiness problems, etc.). Interiors should be completely designed not with permanent values, but with materials having long durations of life, parallel to contemporary scientifically and technical developments. Having mass produced interior spaces placed in an exterior protective shell with easily adaptable environment for any necessities seems as if very original and stirring decision as applied in some caravans' interior designs. (Pict.1-6)



Picture.1 Caravan plans &amp; interiors (Adria action model caravan)

Picture 2

Picture 3



Picture 4



Picture 5



Picture 6

### WHY SHELL HOUSE?

As it is known, nature in its own pattern is a very interesting creation and renovation system: shelled, seeded or having hard and strong surfaces (membrane) maintained with seeds. This decision is expectable with all permutations assuming not to be existent, or never contains the objection in richness of diversity. On the contrary, in certain cases, provides extraordinary additions, and advantages too, for preserving environmental physical and aesthetical balances. (Pict.7-9)



Picture.7 Primitive start of shell design Aesthetic balance (Conics-BurningMan)(G. G.)



Picture.8 Prefabricated house units in Japan, (pop.pcpop.com)



Picture.9 Prefabricated house units in Japan, (pop.pcpop.com)

In spite of this true occurrence of nature, architects, who design artificial environments, are used to struggle with the design of every tiny piece continuously that have no adaptations to natural environments, and whether the qualities of designs are very high or not, through the superimposition of different design decisions in time, very ugly unavoidable congestion of interior-exterior spaces come out. Chief responsible people in environmental pollutions will automatically be the architects by making ways for these results. (Pict.10-12)



Picture.10 More than one building creates chaotic results (honeywell.cz)



Picture.11 Aesthetical combination of housing group. (Victorian House Type)



Picture.12 Low-rise environment is in human scale (Leicester GB.) (G.G.)

Can we create a new designing system by dealing with both the permanent sides and the dynamically changing peculiarities of alteration as two different facts? Basic characteristics of the proposed system depend upon this differentiation. (Fig. 1)



Figure.1

Aesthetical perception levels changed with quality and quantity expectations, differentials of the limited numbers of individuals utilizing the interiors of buildings and the infinite numbers of people utilizing only the outer sides of them altogether bring design difference of in-out as an inevitable entity. Namely, outer sides of the buildings, shells, should be designed parallel to the environmental expectations of the society, but the interior organizations should be designed much more according to individual demands. (Fig.2)

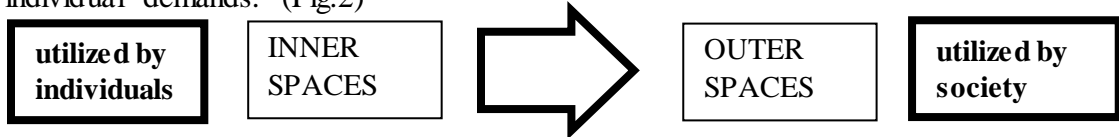


Figure.2

Another subject is that; outer side of the building (shell), answering various climatic or cultural characteristics, usually must occur with nearly the same basic peculiarities. For instance; shells should be designed for minimizing heat loss/gain, against exterior impacts, earthquakes, shocking impacts, with stabilized structural coherence, creating confidence feeling and carrying capacities for dead and live loads. Thus, open-closed spaces will create a shelled micro-atmosphere insulated from exterior and interior space qualities serving for multi-dimensioned functional capabilities. Interior spaces of the buildings may have different peculiarities with personal preferences as physical comfort conditions, flexible living demands, and material variations to create solutions of different spiritual or functional colours, textures, technologies, details, etc. (Pict.13-15)



Picture.13 Prefabrication technology of shelter creation (flickr.com) urban abstracts



Picture.14 Prefabrication technology creates formal unity. (flickr.com)



Picture.15 Formal aesthetic of shell organization. (enlaihooi.com.) (G.G.)

Overall aesthetic with form-mass and solid-void proportions in exterior spaces should be considered as well. (Pict.16-18)



Picture.16 Design of factory produced Shell Unit. (cityinspace)



Picture.17 Structural forms for shelled spaces. (frei otto)



Picture.18 Solid-void organization create form. (Arkitron)

Up to now, besides being unable to load enough functional meanings on transitional spaces located in between open-closed spaces, the surfaces creating in-out

differentiation always used to be considered as two dimensional surfaces. But in reality, shell should gain different and three dimensional utility and functionality. For instance; in creation of in-out micro acclimatization, more thick shell design, with considering the significance of third dimension, aesthetic formal unity besides insulation, participation and installation for spatial quality, and multi-directed functionalities, such as storage vacuum, may be emphasized. Thus, buffer spaces can be adapted to general environment by socio-cultural meaning. Desirable positive transitivity can be taken to a higher level. (Fig. 3)

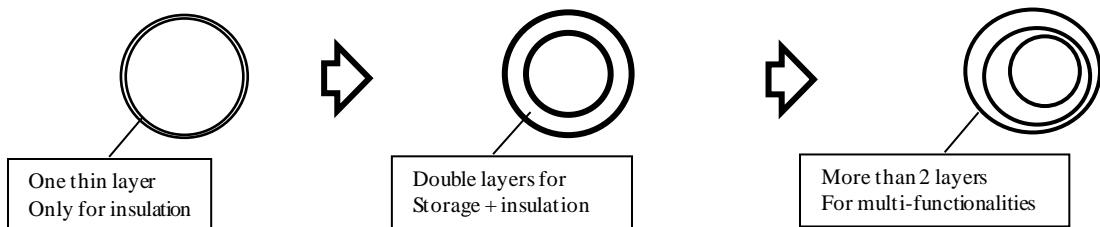


Figure.3

In spite of these newly designed narrations, and due to the fact that the lifetime of in-out complementariness is so different and longer from expected, individuals, in short periods and due to uneconomic changes in place and structure, as well as carrying exhorting qualities for different ways, jointly bring very negative influences in socio-cultural evolution. But in the proposed system, life duration of the shell can be optimized as 50 years, but interior spaces can be designed and produced with adaptable parts for less than 1 year or for 2-3 years. Thus, the poor having no dream in achieving the contemporary standards may catch up with original spatial opportunities. This is because; while avoiding from heavy and fixed building components, and with mass production technologies, more furniture/installation components can be designed and owned very cheaply.

### CREATION OF NATURAL TEXTURE

It is not rational to form an environment out from many different and artificial textures, and then paying efforts to give them harmony with the natural environment. Instead of this, sufficiently researched inputs and essence depending upon basic properties of natural systems, and three dimensionally textured and organized organisms can be handled as more rational approaches. (Pict.19-20) Thus, human beings as truly the miracle machines of nature and presenting a simple basic peculiarity as being an individual, with this artificial environment permanence of longer durations, can easily achieve the new society realization.



Picture.19 Design of a housing unit creates direct exterior spatial relations. (Turgutreis Nağme Housing)



Picture.20 Design of a group creates an over all aesthetic environmental quality or monotony. (Turgutreis Hurriyet Housing)

## POSITIVE SIDES OF THE PROPOSED SYSTEM

From designer to the user, there are very important and multi-directional social, psychological, and economical benefits. To present some clearly visible ones as groups;

- A. From the designer side:** In the production of the living units, besides the architectural design, relation with other designers in different scales and inputs of other technical subjects are important too. With the cross impact ness, the responsibility, as a chief, is on the architects for hearing a harmonic sound, as a team leader, can be realized very differently from existing approaches. For instance; aesthetical solution in structures can be abstracted from interior occurrences too. Interior architects and industrial designers have much more variations and being in freedom for creating factors having direct additions to their very productive design activities.
- B. From the producer side:** In the existing system, contractor, sub-contractor, foremen and workers are seen as if having effective duties undertaken. That is why, because of this false perception, there are problems in cost-control of quality related to these individuals. In proposed operation due to more scientific team and factory produced production, by minimizing the material lost, much more cleanly and perfect finishing can be aimed. Production and marketing stages can be shortened economically. Struggle among parties can be minimized too. Because users won't be oriented to choose and buy a product that they have not seen before production stages.
- C. From the consumer side:** Users, within their own cultural economical standard alternatives, besides interior organization, gradual possessing and easy change, renovation and maintenance opportunities can be expected too. Extraordinary recoveries in physical environment and comfort conditions can be achieved in a very rationalist economical reprisal catching a better healthy and happy life. Owning a house counted as life's main goal, but it will be much easier within the conditions of the new proposal, waste time for the process can be regained. Actual important thing is that; due to gained spatial total energy need is minimized. With better details, technology and soundness relations, total strength in life relations depending upon scientifically exploitation process supported with sufficient warranty systems minimize economical lost at corresponding points.
- D. From country side:** Because the consumption amount of energy will be minimum and much cleaner, environments created by this system, the outward dependent characteristic of the country and economical lost will be minimized. Preserving city aesthetic within total environment and infrastructure expenditures, create maximum convenience for local and central authorities. Because all of the environments will be born and dead altogether at same durations. Negative impacts of unhealthy continuous construction and maintenance processes in immediate environments will be ended.

Due to very cheap unit costs, the important uneconomical investment model of housing will be eliminated, people, even with very limited incomes, may own properly designed shells instead of shanties, may improve inside gradually and overflow of dirtiness to outsides, can be easily prevented. It can be defended that; a house is always being an important tool for a production. Living in healthy environments directly influence individual's multi-dimensional economical, cultural productivities. Moreover, this can be considered as a

desire for an interesting start of a special rational approach for much more participant and democratic structural system, instead of political behaviour not depending on scientifically and technically based roots .

In addition to above peculiarities, regional substructure, transportation, communication, etc. outside many improvements, construction sector as a locomotive sector of country will gain a new identity, people may change wailings towards buying houses instead of buying cars, automotive industries change their patterns of production towards housing due to economical negativity in petroleum, instead of the investment leakage and staff employment problems, they are going to catch new opportunities. Additional positive sources to country can be created by these new statuses; overall development speed will be influenced very positively too.

### **NEGATIVE SIDES OF THE PROPOSED SYSTEM**

There may be some negative results of this new system. During different stages of decision making process (collection of or enriching data in design stages, etc.) overall progress may lead to misdirection, and then the products may have certain deficiencies occurring as a result of wrong accumulations. Some interesting points can be underlined within groups;

- Some aesthetical boundaries can be utilized for obstruction of creative thought.

Creation of aesthetical boundaries as in detail or as an overall approach may bring locking effects in mental blocks. Thus the dynamic creative thought may be influenced negatively. Especially in having a meaning, in creation of masses, finding right relations in solid-void balances, etc. some steps may carry unexpected natural or artificial boundaries.

Living in units with similar environments may bring positive impacts as for environmental adaptation. However, after certain duration, it may create monotony and become injured as to be aesthetic. So it can be questioned as negativity. In order to be able to prevent this fact, creating and arranging dynamic exterior spaces, orientation of acquired tranquillity value towards distressed perceptions may be necessary.

- Due to uneducated users and not conforming regulations, environmental pollution may start again.

Designing for a certain criterion such as function, activity or life pattern always force us to live with some regulations. Education and training standards of the users will be directly affected by the capacity of perception in obeying these limitations automatically or not. In case of not acting properly, any types of pollutions (dirty air, garbage accumulation, noisy traffic or activities, etc.) may start again.

- We may confront with distorters due to misunderstanding the constraints of ownership of unit modulus.

People's behavioural structures create interesting tensions for adapting themselves to their overall life modes. The identical characteristics change the understanding the constraints in ownership of anything. For this case, the feeling of owning one

unit of shell is important for each individual or for each group as a family. According to this system inner spaces belong to the owner, but exterior spaces belong to others. But transitional spaces such as semi-closed terraces, corridors, etc. may belong to everyone. So the designers' concepts should be clearly transferred, evenly distributed to the owners and users.

**OTHER MULTI-SIDED GOALS OF SYSTEM**

After Shell House System is started, extraordinary deformations in professional formations can be expected too. For instance; instead of architecture, besides engineering or other known professional areas, “public relations, need or requirement analysis, marketing, insurance, etc.” and new specialization areas can be expected. Architects, having not enough potential to introduce, present, advertise, or publicize their professions' peculiarities until now, may utilize this opportunity positively if they think about their negative identical characteristics.

A new jump to more just, good running economical era can be realized, because in this system the components having unjust earnings will be eliminated automatically. For instance; contractors without any professional background, broker cooperation (real estate or property firms with uneducated staffs), should perform better services towards much more conscious people. For being successful; perceiving requirements clearly, scientifically designing according to total value system, there should be basic reforms in whole existing education and training system. For instance; consciousness become standard in applications with related courses in curriculum planning starting from freshman year and maturing in 2<sup>nd</sup>-3<sup>rd</sup> levels, gaining importance at diploma, and then ending with utmost quality.

**CASE STUDIES FOR THE NEW PROPOSAL**

According to different approaches, the products may differ. But the basic principles of the main characteristics of the proposed idea should be underlined. These are grouped as; exterior and interior.

**A. Exterior;**

1. Solid void balances in environmental organizations, (Fig.4)

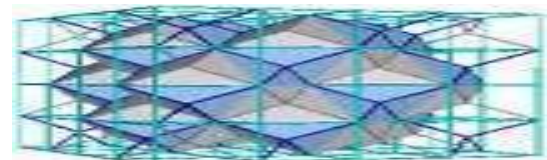


Figure.4 (verbchu.com/crystals/patterns3) (Google Graphics)

2. Axial system approaches as vehicular-pedestrian circulation or service elements, (Fig. 5-6)

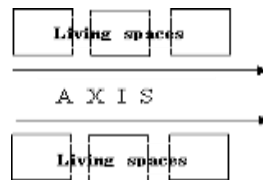


Figure.5  
Axial System Understanding

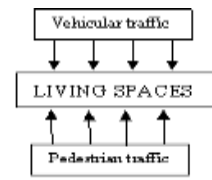


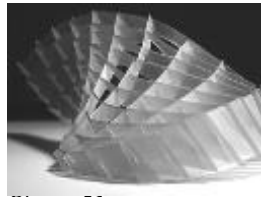
Figure.6

3. Meaningful superimposition of different zones, such as green buffer, recreation, sport or shopping zones, etc., (Fig.7)



Figure.7

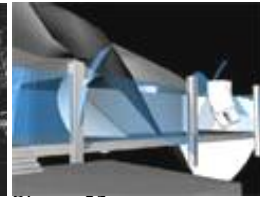
4..Creative aesthetical dynamism and modular coordination, (Pict.21-23)



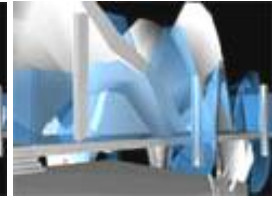
Picture.21 Form + structure creates masses. (aainter3-form.net)



Picture.22 Water element in an environment(h.isler-.candeh)



Picture.23 Digital virtualization creates new strategies for shell organizations (arch.viyd.edu.an)(variation of form & material)



5. Multi-structural characteristics, (Pict.24-27)

Picture.24 Forms adds all of aesthetic value (aainter3.net)

Picture.25 Types of structure add masses.(arch.kmitl.ac.th)

Picture.26 Structural richness is important. (aiomes.com)

Picture.27 Structure-cover differentiation for shells.O.Thea.Arch.Cox Richardson

6. Well-adapted natural-artificial material utilizations in choosing technologies and detailing, (Pict.28-29)



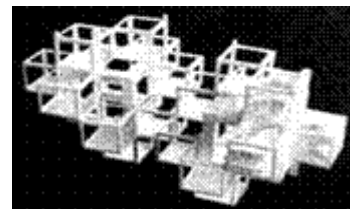
Picture.28 Material (monitoring program)(Google Graphics)



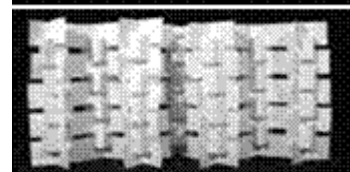
Picture.29 Detail (icf.stack)(Google Graphics)

**B. Interior;**

1. Functional and aesthetical dimensioning of open, semi-open, closed spaces or interior exterior courts organizations, (Pict.30-31)



Picture.30 (H.Yurtsever)



Picture.31 (anastasios sioukas) (Google Graphics)

2. Social contact standards, neighbourhood understanding grouping cultural heritages,

3. Finding meaningful life modes for botanical or zoological symbiosis, creation of botanical gardens, agro-production, micro-climatic mediums or other original understandings,(Pict.32)



Picture.32 (meenar71)(Google Graphic)



4. Designing interiors to have maximum adaptive fitness creation within space-furniture relations (Pict.33-38)



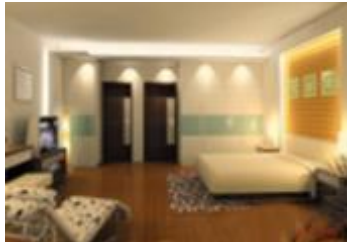
Picture.33 (www.jovanovi.com)



Picture.34 (www.jovanovi.com)



Picture.35 (www.jovanovi.com)



Picture.36 (www.jovanovi.com)



Picture.37 www.jovanovi.com)



Picture.38 (www.jovanovi.com)

In a family life, the process of living is for instance at the beginning as a couple, then having a baby or second or third, continuous growing process, education process, then leaving home for higher education, working or wedding reasons. At the end, death of one partner. Finally having only one or no human body in a residence. During a day, week, month, year any defined or undefined time interval, there may be a guest or guests for being together for a short or long periods. So a house and life is a very dynamic entity and should have an extreme flexibility in growing or extracting at a time interval or duration of a whole life. The need of maximum spatial or furnishing flexibility is clearly understandable.

#### **NEW CURRICULUM DESIGN PARALLEL TO SHELLED ENVIRONMENT**

Any design stage and scale, except basic design, should be redesigned for the aimed shelled environment. For instance; problem definition or research on structure - structural unity will be totally different than ordinary apartment house or villa designs. Understanding an overall textural characteristic of a cover, material specifications or stress distributions on membrane skins are not traditional any more. Instead of having classical types of windows designing openings graphically, having no complex foundations, but only touching points or regions on natural earth, having no cables, pipes, etc. but having only some mechanical modules or layers will be basis for a new creativity. Traditional construction principles as post & lintel or detailing for connecting two pieces will be also totally different. So we should first understand the new professions which are very different from architecture.

At this stage, responsibilities of architects should be re-defined, they should know engineering to choose proper materials for any part of their creation, but responsibilities can be also grouped as social and individual perception characteristics of human brain, mutual interaction among society, individuals and any scale of the environmental qualities and quantities.

One side of the education should cover the new understandings on multi-dimensional comfort conditions of the total humanity. This may also cover the dimensional risk

limitations of natural relations in whole life. Students gain an interesting consciousness on the meaning of human needs and spatial organization at the end of basic design courses, but they immediately lose this potential at future steps. In order to gain the beneficial aspects, designing process should be treated accordingly.

Another important side of curriculum planning is to create maximum flexibility by having maximum numbers of elective courses to bring special new perspectives in perceiving different knowledge accumulations and practical-theoretical application peculiarities. Main goal of curriculum planning should be the minimization of the contents by enhancing the context of each with methodological improvements.

## CONCLUSION

Proposal includes some practical, applicable proposals and some utopia elements. This contradiction will create original openings and will add positive inputs for researchers. There are behavioural deficiencies among rich people, as in poor ones. For instance; some of the rich fill spaces with furniture, and then spend for heating-cooling or cleaning them.

Creative approaches like this carry positive influences to architecture profession's active and dynamic characteristics. Especially with design culture, process knowledge and its consciousness can gain inclination towards longer and deeper peculiarities synchronized with architectural design.

This process may minimize or even eliminate the mistakes in approaching to basic design matters. The consciousness may start from freshman year and continue to improve during the 2<sup>nd</sup>-3<sup>rd</sup> years, and then change into application in diploma project. Creation of a new curriculum is also very important. In order to be successful in progress and continuity in education and training, optimum transitivity between research and application components should be realized. For instance; new graduated young people should have support for scientific adaptations to new jobs, and success supporting systems should be encouraged for creative and productive improvements. Thus, the system may gain self-sufficient and self-renovated, dynamism to have a systematic structure which should have socio-economic and psychological sides as well.

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