A SHORT STUDY ON IMAGING NEW TOWERS WITHIN THE CITY. STUDENTS PROJECTS

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Abstract. Present article aims to discuss project proposals on the thematic of new towers from the teaching point of view in architecture. The debate regarding high office buildings is released from its financial constrains mainly by the use of a theoretical process focused on conceptual approach regarding the urban integration of the design to better address the concerns of the relation between the new object and the city. Tutoring a complex architecture project involves lectures and interdisciplinary debates on the theme of constituted urban landscape and morphology, culture, identity, history, memory, place and people – all these being important for the project inception. Sustainable urban management and increased density could be very strong arguments in motivating the analysis of city tendencies, its evolution, nature and its structure. All these are only exercises which synthesize a wide range of knowledge from different domains, the lecture of the dedicated site, and the best answer to a specific brief considering a very complex context of future sustainable approach as the suitable attitude regarding the city and its built environment, as well as using the necessary skills and methods to stimulate creativity and research by design.

Key words: architecture, teaching, tall buildings, sustainability, community.

1. Introduction

Building and even imagining new towers within the city is a delicate problem for any European city with 19th century urban patterns (Short, 2007). Even more so the issue is sensitive in the case of a city like Bucharest, with complicated problems and disputes sometimes degenerating into emotional arguments and quarrels at the top of society, between professionals, politicians and local governments.

Nevertheless, there is a need for built space to serve the residential sector as well as spaces for daily activities that are not covered by the existent buildings (Yeung, 1977).

The increasing urban density (Koolhaas *et al.*, 1998; Plouffe and Kalache, 2010) is another input that has to be considered having in mind demographic projections.

And because cities do not provide a real time response to this issue by expanding their limits and infrastructure, the better opportunity is to increase the built density and urban parameters, and to generate additional space for people, activities and urban life. Imagining urban towers in order to add more and more city surfaces is a certain answer which satisfies these important needs (Tavernor and Gassner, 2010).

But *where to build*, *how to build*, or at *what height* are delicate questions in a city with very few free plots, and with many active acute debates on public space heritage and its aggression (Whitehand and Gu, 2010).

Imaging a new tower within any city is a question of specific culture, history and memory, urban morphology and altimetry, the scale of the place and community (Pendlebury *et al.*, 2009), but is also a question regarding specific urban layers that can or cannot accommodate the specific of a new building and its dedicated spaces (Ponzini, 2011).

If this new building could be approached as a *device* which continues the urban layers in a suitable mode, fills a gap or a hole (Mihăilă, 2012) in a concept of spatial layers continuity, this might be an appropriate answer.

Even so, finding an answer is difficult because of different considerations regarding the history and the predefined activities of the space, and last but not least the resulted public space and how the architecture should respond to the problems of community (Grigorescu, 2012).

Beyond the need for an active urban surface, and to preserve the heritage and the value of the space (Mihăilă, 2011) there is also the need for design and sustainability that double the function and functionality of the future city environment. Designing sustainable cities should be a task embedded at any spatial level as "the city has to be designed to adapt to change" (Mihăilescu, 2013).

2. Tutoring and imaging new towers

Because of the major impact on the urban tissue, the tall buildings constitute a topic of interest both in architectural theory and practice (Arnold *et al.*, 2002). The insertion of a tall building in the existing tissue is an opportunity for a multi-criteria analysis and generates interdisciplinary discussions, based on actual data, between different professionals, mostly architects, urban planners and engineers. The added value brought by the involvement of all three professions in discussing an urban insertion of significant dimensions is the weighted balanced result. So, the genesis of a tower bears behind it a laborious process of interdisciplinary analysis.

The academic education in architecture at UAUIM, Faculty of Architecture proposes in the 5th year of study curricula the development of a high rise office building. The project spans over nine weeks and is divided into two phases, the first stage as an urban study, including the site analyzes and mandatory conclusions in order to generate the Master Plan, and a second

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stage dedicated to architectural details. All these informations are the result of integrated research, are public and can be consulted on the UAUIM web.

The project brief, based on which the students begin the study, provides the departure point data for the urban and architectural proposals. The teaching process within the Faculty of Architecture insists on the pragmatic aspects of the problem, functions and areas. Going carefully through the brief with the students is highly indicated since in the case of a large scale project (like an office tower) managing and linking of multiple uses and large surfaces constitutes a challenge and can sometimes lead to blockages or failing the brief. After the first contact with the project brief starts the stage of collecting information, studying, exploring.

The presentations made in every studio have an important role within the teaching framework. These presentations suggest to the students that in the case of the high building project, from an architectural and urban point of view, it is important to adapt to the city both the proposal and how it interacts with the urban life. Along with the functional complexity, areas, square meters, the office tower will represent a symbol, a landmark for the city, a signal to the people who interact with it in different ways.

Most of the times, the students are captured by the project of a high building, proving it to be one of the most preferred. The students have the opportunity to design a building with very complex functions, which can relate with the city on several levels, constantly adjusting to the needs. The sources of inspiration are varied and most of the time the students are tempted to exceed the height provided by the brief, which is about 100-120m, GF+22/25 floors. Thus, during design preparation, the silhouette of the future building is significantly amplified. At this point the tutors communicate with the students in order to maintain the project in the required limits. The role of the tutor is to catalyze the mediation between the parameters provided by the design brief and the desired architectural expression of each project. The functions and areas, the proper relations established between them, the Romanian seismic conditions are parameters involved in generating the future high rise building. These data overlap with the conclusions resulting from the multi-criteria urban analysis.

3. Towards a more integrated teaching process

The professor has an important role in catalyzing the process of design genesis of a high rise building. The question raised in this context is whether one should consider a single professional in coordinating such projects. One option would be to apply the real life model, respectively to use an interdisciplinary team to intervene in the key phases of the project: concept, urban analysis and proposal of a structural system and technical details. In this context, we propose to reshape the concept of design workshop in the spirit of an integrated approach. Two of the major learning outcomes are experimenting the formative values of the integrated project system between architecture, urbanism, restorations, interiors, technical sciences, architectural technology and understanding the formative values of the integrated project model. During the project, the professor will manage the teaching-learning process periodically joined by specialists from related disciplines. Thus, the tutoring process can be more varied and with more interesting results.

Stimulating student's imagination is one of the goals of any faculty project. The workshop hours are trying to make students to realize the impact of a large office building in the city and how the design process can be professionally supported. While he building silhouette will be influenced by a careful multi-criteria urban study, but the student's imagination remains essential. Finally, the proposed architecture is distinguished by its volume, its outline, so stimulating each student imagination is essential even if a tall building is eventually to an investor euro/m².

4. No project without conceptual approach

Lacking a subjectively developed concept or the theoretical support approaching the design is a major risk for the students, since it leaves them without means of filtering visual information that surrounds their field of research. Initially the research is either web-based or using printed media, and there is a large amount of visual information and technology that has to be assimilated and correlated in project.

This large images base can be found in students projects in new configurations due to personal interpretation (Fig. 1) or sometimes in copy/paste situations.
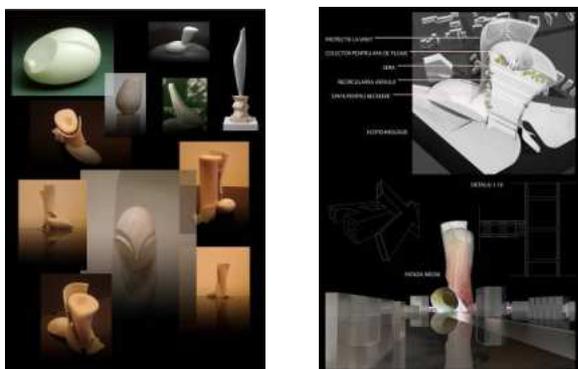
Fig.1. No project without conceptual approach, St. Arch. S. A. Preda, Coord. Prof. PhD. Arch. R. Tănăsoiu, Prof. Assist. PhD. St. Arch. M. Zamfir, Prof. Assist. PhD. St. Arch. P. Vencu (UAUIM, 2013)

The way in which the images are inserted into the project depends on the student's control, because sometimes the image is the form and the resulted object "feels" disconnected from the place or the local pattern. The office tower project is an important test, both for students and professors, because it involves a large urban insertion, with high visibility and impact for the studied area. In the first stage of the design, the student should be supported to understand the local characteristics of the urban pattern, and then based on these parameters he/she has to define the intervention.
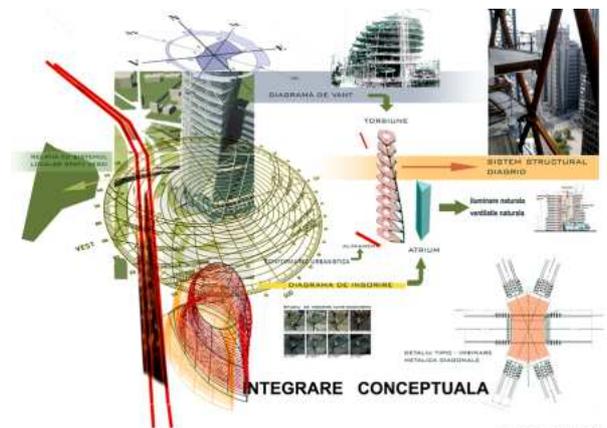
Fig. 2. No project without conceptual approach, St. Arch. R. Tivu, 2013, Coord. Prof. Ph.D. Arch. D. Radulescu-Andronic, Lect. Ph.D. Arch. M. Mihăilă, Prof. Assist. Ph.D. St. Arch. Ş. Mihăilescu (UAUIM, 2013)

The complexity and value of the concept is given by the ability to precisely understand and superimpose those factors that influence the studied area (entrances, front building, roads, functions, fronts, accessibility, height, perspective, perception studies). Taking into consideration the majority of the site parameters can greatly influence how the building is shaped, leaving a minimal margin for subjective or demiurgical initiatives by the architect as shown in Fig. 2. The role of studio guidance is to ensure that behind a design decision or a creative gesture, there is a sound analysis, and the right set of conclusions motivated

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by issues related to the site study. The project must be able "to reconnect issues of technological change with the social and cultural contexts within which change occurs" (Moore, 2007).

5. Community, sustainability, technology in tandem with the office tower

5.1. Vertical community, horizontal connections

Now, the discourses on architecture generally start from the *premises of contemporary society*. These are speaking about the *society where we live*, the *consumption society* (Baudrillard, 1970), about the *communicational society* (Georgiu, 2004), about the architecture that has to meet the *society's requests*, but more rarely there are discussions about *community* (Cohen, 1985; Bartle, 2010) or *community architecture*.

Ashton and Thorns propose three key elements for defining a community:
"To give, to receive and to care are some of the most important elements of worthwhile community […]" (Ashton *et al.*, 2007).

The sociologists use two German terms for community and society: *Gemeinschaft* and *Gesellschaft* (Tönnies, 2002). *Gemeinschaft* means in German *community* but in sociology is used in order to name the esssential features of the community, and *Gesellschaft* means *society*, in sociology the noun is transformed into adjective, describing coldness, formality. *Gemeinschaft* and *Gesellschaft* are described as opposites two terms.

In the case of the office building, the relationships established between the individuals that occupy it are mainly professional. The office building

responds to the based on profit modern society. The human component is very important (Worpole and Knox, 2007) in the business profitability and therefore the way of designing an *open-space* office can foster the establishing of collegial relationships which might shape a professional community, enabling an environment for the development, of creativity, interpersonal relationships and consequently of the profit.

Fig. 3. Vertical community_horizontal connections, St. Arch. D. Pepelea, Coord. Prof. Ph.D. Arch. R. Tănăsoiu, Prof. Assist. Ph.D. St. Arch. M. Zamfir, Prof. Assist. Ph.D. St. Arch. P. Vencu, (UAUIM, 2013)

Fig. 4. Vertical community_horizontal connections, St. Arch. S. A. Preda, Coord. Prof. Ph.D. Arch. R. Tănăsoiu, Prof. Assist. Ph.D. St. Arch. M. Zamfir, Prof. Assist. Ph.D. St. Arch. P. Vencu, (UAUIM, 2013)

The office building can be also an important node for the community and for the city with its offer of public spaces (Fig. 3, Fig. 4). So, the office building resonates to the city life and

the community approaches in architecture.

5.2. The office - sustainable ambient

The concept of sustainable architecture is progressively integrated in the workshop design because of a high degree of complexity. The architectural project can integrate sustainable features that are presented in different theoretical courses, in practical manner because it is a synthetic process. The tower project can be a green project from its first concept to the final detail. In order to interconnect the theoretical issues with practice issues, our workshop presentations are made about the most important developing of tall buildings and sustainable development methods and concepts that are connected with vertical developments.

The sustainable concepts are very present in our society, as Harry Gordon argues, "after decades of intense effort by designers, architects, individuals, and organizations, a tectonic shift in design thinking has occurred: sustainability is now becoming mainstream. Some might even say it has become a societal design norm." (Gordon, 2000). The tower project, which is actually a vertical urban densification, includes a seed based in sustainability because the tower must serve a large number of people with a clear focus on local resources. In the "Age of Awareness" (Beedle, 1977), the tower represents a social response to intense densification. Additional design features included in the project brief, bring a number of non-office related uses , so the tower becomes a focal point for the existing neighborhoods and, with the gain in complexity, the tower is an invitation to designing for urban life and its insertion allows for several type of approaches (Guy, 2011).

Starting from the interconnection between vertical development and sustainability, students can apply green principles both deriving from the concept and along the functional levels.

In Fig. 5 the building is crossed on different levels by green corridors for a better and a natural ventilation.
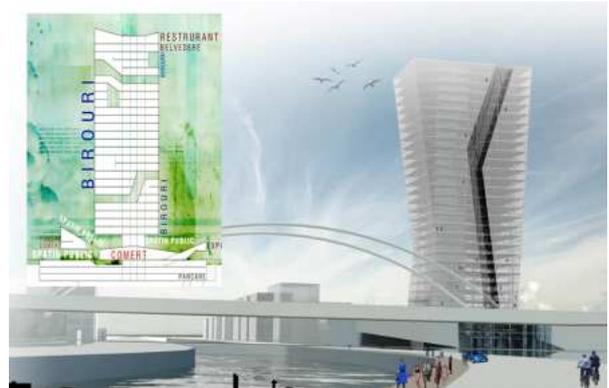
Fig. 5. The office - sustainable ambient, St. Arch. O. Abalaru, 2013, Coord. Prof. Ph.D. Arch. D. Radulescu-Andronic, Lect. Ph.D. Arch. M. Mihăilă, Prof. Assist. Ph.D. St. Arch. Ş. Mihăilescu (UAUIM, 2013)

There are cases in which the students are applying sustainable features simply by using a technology which enables the use of renewable energies. In other projects, the main concept is to create a space open for public use, serving and connecting a large number of people at its first floors, linking the building with the city. In the case of towers, some sustainability concepts are focused on facilitating the exchange of air between inside and outside, through controlled glazed areas (Moon *et al.*, 2011) and large and green courtyards, allowing windows to open towards multi-level atrium.

For the facade design, we observed an inclination towards balconies with vegetation (Fig. 6) or double facades in some areas, use of intelligent sunshades and extensive use of green terraces. Student's projects are proposing spaces with different

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degrees of permeability, and the authors show interest for the design of the public – semi-public space, with a gradual connection between the inside and the outside areas (Fig. 7). Creating open spaces within the building is an approach we are trying to connect with the tendency to introduce green spaces inside it and to make glass walls and roofs in order to allow natural light from multiple directions.

Fig. 6. The office - sustainable ambient, St. Arch. S. Deak, Coord. Prof. Ph.D. Arch. D. Radulescu-Andronic, Lect. Ph.D. Arch. M. Mihăilă, Prof. Assist. Ph.D. St. Arch. Ș. Mihăilescu (UAUIM, 2013)

Fig. 7. Design & technology, St. Arch. A. Dumitrescu, Coord. Prof. Ph.D. Arch. D. Radulescu-Andronic, Lect. Ph.D. Arch. M. Mihăilă, Prof. Assist. Ph.D. St. Arch. Ș. Mihăilescu (UAUIM, 2013)

Another concept that can be used in design is transformability (Asefi, 2012), as an open possibility of response to continuous demand of change from users.

Thorough studies can define and explain the space from multiple points of view, from concept to detailed design, from the outside conditions to the inside design (Jamison, 2001).

5.3. Design & technology

Architectural design is strongly connected with the technology now indispensable to contemporary architecture.

In terms of urban design there is a first technological need the whole volume should express, as a vertical landmark, generally visible from a great distance (Fig. 8); this significant presence in the urban image is a result of the height and mass, but it could be also a measure of the brand identity or iconicity (Mihăilă and Bănică, 2013).

Fig. 8. Design & technology, St. Arch. D. Pandelea, Coord. Prof. Ph.D. Arch. D. Radulescu-Andronic, Lect. Ph.D. Arch. M. Mihăilă, Prof. Assist. Ph.D. St. Arch. Ș. Mihăilescu (UAUIM, 2013)

In an overly densified area there is a contemporary pressing need for icons, fashions and urban heroes (Gräwe *et al.*, 2006). Beyond the urban authenticity of the building design, there is a necessity for the sustainable autonomy of the body of design related to concept model (Guy, 2011), in which architecture should have the same inception shape as the structure and the envelope, forming a unit of notions, shapes and functionality.

There are some technological rules to be considered as necessary in this body of the building design: a specific conformation of the structural type as a double frame tube ensuring the interlocking, and the high building structural principle as vertical beam encased in the ground; the interior tube is a concrete core with rigid reinforcement, and the exterior shell is a frame tube, a truss beam designed as a steel diagrid insuring rigidity of the ensemble. The architectural design of the diagrid (Moon *et al.*, 2011) is part of the conceptual approach, but it is also a visible part of the building: it structures the interior image, and in most cases also the exterior one (Fig. 9).

The double structural tube design is a license of the 60's, and belongs to the innovative engineer Fazlur Khan and to the first significant improvement in the field experimented by the architectural bureau SOM – Skidmore, Owings and Merrill. Still, a more advanced structural technological design is reserved for the projects with bigger ground occupancy; the module developed tall buildings, hardly suitable with the standard model used in the architectural school.

Fig. 9. Design and technology, St. Arch. R. Corban, Coord. Prof. Ph.D. Arch. R. Tănăsoiu, Prof. Assist. Ph.D. St. Arch. M. Zamfir, Prof. Assist. Ph.D. St. Arch. P. Vencu (UAUIM, 2013)

The history (Halis Gunel and Emre Ilgin, 2007) of design technology for tall buildings still evolves after 2000 (Frankfurt Main, 2004), when an explosion of new uninhibited forms and shapes of the main volumes began to be experimented and realized.

This new designs kept to the old habit of the double frame tube, and combined it with different variations of the outside frame tube, in order to make it adaptable with the city environment, economically efficient (Tzikopoulos *et al.*, 2005), greener (Ken, 1991), brighter, in fact becoming the skin of the architectural body, or an imposed double (Moon, 2011) or multilayered skin (Diprose and Robertson, 1996) for ecological reasons –both interior and exterior.

In the context of the global threats, risks and hazards, the tall buildings became green as label and design, with several imposed standards (Mahgoub and Abbara, 2012), rules and recommendations: the envelope has to ensure a certain degree of energy efficiency or at least some sources for renewable energy, specific shapes of the volume (Busenkell *et al.*, 2010) in order to make it less heavy while improving the bearing capacity, aerodynamic design better adapted to wind loads (Chong *et al.*, 2012) and generating less climate change in the city (Bradshaw and Bradshaw, 2006); the interior climate should be deliberate in the project, expressed directly through interior architecture mood and statement: atria for the proper transmission of natural light, intelligent holes through the building section for air transfer and climate, pipes for water circulation and cooling applications.

Also mixed functions thinking is required by technology of the configuration of huge vertical overlapping surfaces (Nash and McGrath, 2010), in order to ensure the complementary activities, lounge and even needed cultural insertions. In fact, design and technology are coming together to

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establish a sum of surfaces, as a city extension with all its features in a shape of a tall building (Aiello, 2008).

6. Conclusions – several considerations on the subject

Main thematic of setting a tall building design is a difficult issue if considered within a constituted urban tissue and sometimes a much debated one. Even more it is a difficult subject to be learned in the school of architecture considering all the history behind, all technological approaches, present considerations and future tendencies.

No doubt, the first issue in designing a tall building is the decision on its place, both in practice and also in school. The proper site should consider the altimetry and city neighborhood, and the architectural design should express a shape as a city landmark, visible, but also properly connected with the public space, the urban traffic and infrastructure (because it supposes a plus of 3000 -5000 people in the area, starting and finishing daily work at about same hours, agglomerating the limited urban place).

Students' exercises are based on a specific brief provided by the Department Synthesis of Architectural Design (Integrated Master level). Tutoring involves discussion on notions, rules, prescriptions, constrains and interdictions regarding urban insertion, correlation of different layers of activity between the city and the new building. It is important for the students to be supported by tutors in the process of design through documentations and criticism of built examples, and involving them in taking attitudes on different issues in every stage of the project. Designing a complex building has to reach multi criteria approaches, interdisciplinary views of the future insertion, but also integrated

features in setting the shape and the body of the building.

Achieving sustainability of vertical community and horizontal connections, sustainable environment for office programme and complementary activities, as well as the settings of integrated design and technology are important directives of the tutoring.

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