sciendo

ISSN 2729-7640

ALFA
ARCHITECTURE PAPERS
OF THE FACULTY OF ARCHITECTURE AND DESIGN STU
www.alfa.stuba.sk

2/2024 (Vol. 29)

Summaries

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SOCIALIST IN CONTENT, NATIONAL IN FORM: SMALL-SCALE HOUSING ESTATES IN BUDAPEST BETWEEN 1945 AND 1960

Bence Bene

Keywords: post-war, socialist realism, socialist modern, Budapest, housing estate

In the second half of the 20th century, solving the housing crisis became a significant social issue and political task throughout Europe, particularly in the countries of the Eastern Bloc. Although due to its quantity, prefabricated large mass housing estates became overrepresented, dozens of smaller, experimental, and diverse mass housing forms also emerged. It is hypothesized, that due to their scale and quality, these small housing estates are urban planning projects that were realized across political, economic, and architectural changes. To demonstrate their adaptability, this paper presents the small housing estates (HEs) built in one of the capitals of the Eastern Bloc countries— Budapest—during the most turbulent one-and-a-half decades of the socialist era (1945–1960).

The period between 1945 and 1960 is unique because Hungary's housing policy was characterized by immaturity, rough ideas, a lack of resources, and frequent political directive changes (Kocsis, 2009). In this dysfunctional system, alongside reconstructions, new socialist cities, and private family house constructions, only the construction of small HEs can be considered a relevant urban planning project. 60% of the 37 HEs built in Budapest between 1945 and 1960 were small-scale. These smaller interventions were scattered across a wide area of the city, while medium and large HEs served sort of a model, clustered in a few focus areas. This dispersion further emphasizes the uniqueness and independence of small HEs. My hypothesis is that the small housing estate is a persistent urban form that withstands political and architectural changes, adapting to and continuing to meet their requirements.

The research consists of three main parts: (1) Hungarian politics and housing policy, (2) Budapest's urban policy, and (3) a brief presentation of the urban planning and architectural aspects of Budapest's small housing estates. The result of the research is the creation of a complete small housing estates portfolio, illustrated archive articles, archival plans, and photographs. It becomes evident that although the times from World War II to the consolidation of power saw vastly different political eras, directives, and ideals, along with various architectural styles and housing policies, the small housing estate as an urban planning product was able to adapt and survive. Moreover, it is a valuable architectural, housing, and urban planning imprint of the era, the only mass housing form realized in numerous examples in Budapest.

After outlining the housing policy in Hungary and Budapest between 1950 and 1960, the research presents small HEs built in Budapest during this period based on urban planning and architectural considerations. The small-scale housing estates can be divided into three groups, corresponding to political—(1) transition period, (2) Rákosi

dictatorship, (3) consolidation; and architectural—(1) post-war, (2) socialist realism, (3) socialist modern—changes.

During the establishment of state socialism, the post-war small HEs were mostly implemented in the centres of working-class neighbourhoods. The buildings adhered to modern architectural and urban planning principles, but the quality of their construction was poor. During the harshest years of state socialism, the style terror of socialist realism prevailed. The target audience of the small HEs built during this period was, more diverse: along-side elite HEs hiding behind decorative façades with statues and fountains on private plots, there were also barracks-like estates consisting of one-room apartments with reduced comfort. During the years of consolidation, socialist modern small HEs represented consistently high quality, perhaps due to their placement on private plots. They featured diverse architecture and urban forms.

Overall, it can be stated that these small HEs were built in diverse styles, architectural quality, layout, and budget, catering to both the party elite and the working class. Given this universality, they provide an excellent layer of housing and city policy in Budapest of the 1945–1960 period. Over the years, there has been an improvement in the architectural and construction quality of the buildings, with the emphasis shifting from developments floating in public spaces to private plot constructions. Except for the downtown area, small HEs can be found in all areas of Budapest, which demonstrates their success.

Examining the individual small HEs, we can conclude that the research hypothesis has been confirmed, namely that a small housing estate is a persistent urban form that withstands political and architectural changes, adapting to and continuing to meet their requirements. Focusing on the 22 small HEs built in Budapest between 1945 and 1960, the paper highlights the diversity of their inhabitants, the adaptability of their architecture style, and the resilience of their urban form.

FRAMEWORK FOR OPTIMISING DAYLIGHTING AND PASSIVE INDOOR THERMAL COMFORT IN SINGLE-BANKED OFFICE BUILDINGS IN THE TEMPERATE DRY CLIMATE OF NIGERIA

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Keywords: daylighting, daylight autonomy, operative temperature, parametric analysis, single-banked office building, thermal comfort, validation

Achieving adequate passive indoor environmental comfort determines whether a sustainable building design succeeds or fails. The relationship between daylighting and passive thermal comfort is crucial in tropical countries like Nigeria in order to prevent environmental disorder. Maximisation of sunshine during periods of strong solar radiation, for instance, would result in an increase in indoor temperature and discomfort from heat. This is an example of a single comfort element taken out of context. As observed, comfort increases performance, which is a function of three factors acting together: ability; motivation; and opportunity. Many researchers have differed on the optimum values of Daylighting and Passive Indoor Thermal Comfort (DPITC) determinants in tropical climates. For example, one researcher recommended the best orientation of office spaces in a temperate dry climate with the windows north- and south-oriented, while another proposed a compromise position of 22.5° (south-south-west) for thermal and visual comfort. However, a different researcher proposed 15° west of south and 15° south of west as the compromised value for DPITC. ASHRAE 90.1 recommends a window-to-wall ratio (WWR) of 20% for mid-rise buildings while the International Energy Conservation Code (ICC) recommends a different value of 30%. Another study carried out in the temperate dry climate of Singapore suggested the use of 24% WWR, whereas one scholar found a range of 20% to 30% as the recommended values of WWR in the temperate dry climate of Lahore Pakistan for PITVC. For R-values, ASHRAE 90.1 recommends a minimum range of 1m2K/W to 2.68m2K/W, while International Energy Conservation Code (ICC) suggests 2.64m2K/W to 3.52 m2K/W, and Energy Conservation Building Code (ECBC) recommends a value of 3.7 m2K/W.

The study is aimed at developing a framework for optimising DPITC in singled-banked mid-rise office buildings, during the activity period (8 a.m. to 5 p.m.), in the temperate dry climate of Nigeria. It was achieved by evaluating the effects of Orientation, WWR, R-values, and shading devices on DPITC. A quantitative research design using an explorative design approach was employed in the study as well as an experimental research strategy using a simulation method to enhance DPITC. The study used the Federal Secretariat building as a prototype of a single-banked office building. The criteria used in the selection of this building were based on the building type, number of storeys, access to buildings, and its passive method of achieving indoor comfort. The Google SketchUp 2022, Radiance, and OpenStudio simulation tools were used to evaluate the prototype building of the Federal Secretariat in the temperate dry climate of Nigeria from January to December 2023. Six (6) sets of offices (48) were selected for the simulation and the data generated was analysed using relevant statistical tools (MANOVA, ANOVA, column charts, graphs, and tables).

The findings revealed that the best orientation for daylighting and thermal comfort was found to be 00 and 11.50 respectively, while the compromise value was found to be 11.50. For WWR, the optimum for daylight and thermal comfort were found to be 20% and 15% respectively while the compromise value was 20%. The result has also revealed that 0.6 was the most appropriate projection factor for better operative temperature as well as relative humidity, and 0.35 for daylighting and the compromised value for DPITC was found to be 0.5. It was also noted that the R-value of the external wall insulation material does not affect the daylighting of the office building but affects operative temperature as well as relative humidity; the optimum value was found to be 3.26 m2·K/W. These were all done using parametric optimisation due to its easy use and vivid logical procedure. A framework was developed and used to obtain four more optimised DPITC values for single-banked buildings. The multiple regression was then carried out to investigate whether the optimised values of WWR, projection factor, and R-value of external wall material could significantly predict different enhanced azimuth angles for DPITC in single-banked office buildings in a temperate dry climate of Nigeria. The results of the regression indicated that the model explained 99.9% of the variance and that the model was a significant predictor of azimuths, $F(3,1) = 4700.848$, $p = .010721$.

The WWR, projection factor (PF), and R-value of external wall materials (R) contributed significantly to the model ($B = -1254.84$, $p=0.010872$), ($B = 102.8743$, $p=0.017526$), and ($B = -4.10695$, $p=0.044915$), respectively.

Y=C+M1X1+M2X2+M3X3……..4.1

The 4.1 formula was used to develop the model from regression results as follows:

Azimuth (A)= 224.5802 + (-1254.84 x WWR) + (102.8743 X Projection Factor) + (-4.10695 x R-Value)

A= 224.58 - 1254.84WWR + 102.87PF - 4.11R…….4.2

SI Units: A= (0); R= (m2.K/W); C= (0); M1= (0); M2= (0); and M3=(0 W/m2.K).

The framework was then validated using the examination of framework output for reasonableness under a variety of settings of the input parameters. The values given by the Building Code of Australia (BCA), Australia's guide to environmentally sustainable homes (AGESH), ASHRAE standards as well as International Energy Conservation Code (IECC) were tested, and the results were complied with A= 224.58 - 1254.84WWR + 102.87PF - 4.11R.

WEIGHT AND STRUCTURAL CONSIDERATIONS OF POTENTIAL GREEN ROOF GROWTH: MEDIA COMPOSITIONS FOR THE NIGERIAN BUILDING INDUSTRY

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Keywords: green roof, growth-media composition, substrate weight, lightweight construction

Green roof technology is still in its incipient and exploratory stage in the Nigerian built environment industry. It is a technology that is yet to be locally embraced due to a lack of adequate awareness of its benefits, limited technical knowledge and high initial and/or maintenance costs of the system. Most importantly, the green roof system is technically associated with problems that are centred on the characteristic weight of its growing media (substrate). This is regarded as the most critical and challenging aspect of a green roof project that must be considered to avoid the ultimate failure of the primary roof system. Although the International Building Code (IBC) has stipulated that green roofs are computed as live loads calculated based on saturation of the soil and shall be within the range of 0.958kN/m2, studies have shown that values and attributes of green roofs are location-specific and each scheme must therefore be considered as a distinct case from one setting to another. This study hence becomes a necessary platform for evaluating the weight implication of the outlined potential green roof growth-media compositions in Nigeria for subsequent reference and possible adoption.

The approach adopted for the study involves laboratory procedures and experimental field observation. Guided by pertinent literature review, the most available and appropriate natural stones in the Nigerian building industry were evaluated, the stones outlined for the study include laterite stones, sandstone, granite, river gravel, pumice, and recycled masonry debris. The geometry selected for this study is a classroom block designed under the MDG (Millennium Development Goals) program for public primary school education in Nigeria. The roof design of the project is a typical reinforced-concrete flat roof which is the most suitable for use in green roof systems due to the large load-bearing capacity it can withstand. To avoid a cumbersome presentation of the load analysis for every extensive green roof model, relevant load calculations were limited to the heaviest and the lightest green roof alternatives to represent the embodiment of the best- and worst-case scenarios to guarantee adequate and efficient sampling steps required to reach any theoretical saturation. Using BS8110, the study was focused on determining the compressive strength (fcu), minimum yield strength (fy), depth (d) and the resultant design load of the primary roof structure against the density of the composite nature of the Green roof materials. The general green roof evaluation was finally tested for compliance with the IBC (2018).

The laboratory analysis revealed that the granite-based blend is the heaviest sample with 1,713.30 kg/m3 in its saturated state. River gravel blend and the laterite stones followed closely with 1,264.50 kg/m3 and 1052.20 kg/m3 respectively. The lightest in weight is the pumice blend with 869.30 kg/m3 which is a difference of 942.90 kg/m3 from the heaviest granite blend, implying that it is 50.7% lighter in weight; followed by the masonry debris blend with 1,115.90 kg/m3. A successive conversion was conducted to estimate the weight of the 50 mm, 100 mm, 150 mm, 200 mm, 250 mm and 300 mm-thick models in kg/m2. The granite blend medium recorded the heaviest values at 85.65 kg/m2 for the 50 mm and 513.90 kg/m2 for the 300 mm model, while the lightest in weight is the pumice with 43.50 kg/m2 for the 50 mm and 261.00 kg/m2 for the 300 mm. The masonry debris also recorded an encouraging figure at 55.80 kg/m2 for the 50 mm and 334.80 kg/m2 for the 300 mm model. The results show that most of the substrate blends satisfy the stipulations of both the FLL (2008) and the ASTM International (2014). Results from the structural analysis conducted on the heaviest sample (Granite substrate) and the lightest sample (Pumice substrate) showed that the saturated Granite substrate having a 0.951 kN/m2 design load falls within the stipulated range of the IBC, and can therefore be used in any extensive green roof project. On the other hand, the pumice blend, being the lightest substrate had a design load of 0.576 kN/m2. It therefore stands to offer an optimum alternative in green roof retrofitting projects for existing flat-roofed buildings.

In summary, the study concludes that all of the substrate compositions covered in the study involve materials that are readily available in the studied area and can be used with respect to their characteristic properties as presented in this study. The study therefore serves as a reference point for all stakeholders in the research and building construction industry in Nigeria and places with similar bearing in the need to develop and promote the use of green roofs as a mainstream feature of the built environment.

ENHANCING VISUAL COMFORT IN STAIRCASES: A COMPREHENSIVE ANALYSIS AND DESIGN RECOMMENDATIONS

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Keywords: visual comfort, transitional space, adaptation, staircase, design, illuminance, changes, occupants, performance

People should be walking towards the inside of dwelling through an appropriate visual environment in transitional spaces. In these spaces, the occupants are able to experience the dynamic effects of the external climatic changes. The ability of users to adapt to changing dynamic conditions of the environment around them is very important. It is crucial to consider how the user will feel in the light conditions. Luminous conditions can change drastically as users transit from indoor to outdoor spaces or vice versa. A study by Mohamed et al. (2007) identified changes in lighting conditions in architectural transition spaces as one of the main factors in altering human eye adaptation, and identified this problem as a possible cause of “visual shock”. Therefore, in these transitional spaces, people might not have enough time to reach a stable state of visual adaptation to ensure the best response needed to perform a task. At the same time, the people could suffer some kind of visual discomfort. The proper understanding of visual adaptation parameters helps architects provide a suitable environment for inhabitants. Most studies were related to thermal comfort in transitional spaces. A few discussed the problem of visual comfort in transitional spaces, and examined eye adaptation and how users perform in these spaces.

This paper studies the effect of staircase design on the visual comfort of users and how they perform and adapt in this transitional space; it aims to specify design elements of the staircase in collective housing, to achieve a visual comfort in this transitional space. This research employs a two-pronged approach field measurements and a visual comfort survey conducted using a questionnaire; 144 questionnaires were collected, in four buildings with different staircases treatment in the city of Arris. Field measurements were conducted in winter 2021 and in summer 2021. The quality of day lighting was evaluated by measuring horizontal illuminance levels at the height of 1.5 m from the ground. 172 measurements were taken from the exterior of the buildings to the interior of the houses passing through each landing in the staircase. Illuminances were measured by Delta OHM LP 471 PHOTO. Illuminance and its distribution across the task area and its surroundings have a major impact on how quickly, safely and comfortably a person perceives and performs a visual task. Excessive variations of horizontal illuminance must be avoided; the diversity of illuminance expressed as the ratio of the maximum illuminance to the minimum illuminance.

The current method compares measured data to the CIBSE recommendations. Illuminance ratios were computed and then matched on a four-point scale ranging from "subtle" to "dramatic", expressing the variations in illuminance ratios between various points of measurements. To determine how the residents felt and performed inside the staircases, a visual comfort questionnaire was designed. The questionnaire consisted of three sections: physiological symptoms, visual task performance and user preferences. The questionnaire responses were processed using Microsoft Excel, which produced graphs and charts to illustrate the survey results. The results show that at the entrance of Building 3, the solid overhang (with a depth of 2 m) permit "subtle" and "moderate" visual shock providing adequate transition leading to reasonable visual comfort and prepare the eye for the changes in the illuminance. The absence of solid overhang at the entrances to buildings 2 and 4, means that there is no area that allows for the gradation of illuminance values, making the eye experience a sudden change between the outside and inside of the building, which makes entering and exiting the building visually uncomfortable. In addition to that, in part 3, question 4 of the questionnaire, when residents were asked what place caused them visual discomfort, most of those who answered: the entrance to the building, were from buildings 2 and 4.

In a staircase with the percentage of opening of 88% indicated "strong" and "dramatic" visual shock in many points and as this staircase is open, it is exposed to light conditions so it does not ensure the necessary transition which leads to advise against the open staircase. In the staircase treated with transoms of clear glass with the percentage of opening of 11%, these transoms direct the light to specific areas creating "strong" visual shock in many points of the stair landings which leads to advise against that. The staircases treated with vertical bays throughout the facade presenting a percentage of opening between 19% and 22%, these treatments allow the penetration of daylight in a diffused way which ensures a balanced distribution of daylight inside the staircases, indicating "subtle" in most points and "moderate" in some points provides adequate transition leading to reasonable visual comfort in the stair landings. In part 3, question 4 of the questionnaire, when residents were asked what place caused them visual discomfort, for those who answered: between level and another, low percentages (0%, 9%) were from buildings 2 and 4. The study suggests design elements that support the visual adaptation in the staircase: the existence of a solid overhang at the entrance; the façade treated with vertical bays, where the percentage of opening of the façade is between 19% and 22%, provide adequate transition leading to reasonable visual comfort and adaptation.

SOCIAL HOUSING - BETWEEN DESIGN AND SOCIAL PRACTICES: THE CASE OF THE 670 SOCIAL HOUSING UNITS IN ORAN

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Keywords: social housing, occupants, needs, preferences, housing designed, occupant expectations

Habitable architecture, intrinsically linked to its user, has an essential social dimension that finds its meaning in a specific context. This context defines space as both a physical and a cultural entity, which raises the fundamental question of the spatial organisation of housing, particularly from the modern era to the present day. This spatial organisation is based on the idea of harmony between the designed space and the values of the society that generates it. The dialectical relationship between the intimacy of private space and the collective aspect of housing in relation to its immediate environment is analysed from a social perspective, taking into account family dynamics and everyday practices.

With this in mind, the interior of the housing and its external environment form a spatial whole that responds to the needs and expectations of the occupants, materialised in the plans and façades. Aesthetic and decorative choices, such as the paintings and photographs adorning the walls, bear witness to the culture and lifestyle of the inhabitants, reflecting the objects and values of contemporary civilisation. However, several factors can create a gap between the space designed and the space lived in, including the layout of rooms, their relationship with the outside world, access to the home, proximity to neighbours, and many others.

Collective housing policy varies between socialist and capitalist regimes, with significant differences from one country to another. Its implementation depends largely on government action. In Algeria, the collective housing strategy has been a means by which the relevant institutions have been able to guarantee the right of homeownership for Algerian families, an achievement stemming from the housing policy put in place by the authorities since the 1980s. However, the mass construction of social housing has put considerable financial pressure on state resources, with difficulties in making a profit. From the 1970s onwards, the demand for housing urgently intensified, prompting the state to resort to the industrialisation of the construction sector. This led to the import of various construction technologies and methods to meet the growing demand.

Despite these efforts, the social housing built in Algerian cities does not always correspond to the needs and expectations of local families. Programs such as the ZHUN formula, designed within the framework of urban planning, often without taking into account the socio-cultural realities of the inhabitants, have been criticised from their inception to the present day. The cramped nature of housing and the high number of people per household remain among the main obstacles to their adaptation to the real needs of Algerian families.

Residents tried to adapt to these housing units by making modifications to gain more space, both inside and out. While these adjustments benefited occupants in terms of interior comfort, they also hurt the overall appearance of the city. Indeed, these redesigns have often deteriorated the urban aesthetic. The compromise between quantity and quality was not fully taken into account, despite the initial objective of rapid construction to relieve pressure on the real estate market. The aim of this article is to explore residents' practices in order to establish a connection between the housing designed and built on the one hand, and residents' expectations on the other. Indeed, the question that concerns us is this: how do Algerian households approach redeveloping housing that was initially designed without taking their needs and preferences into account?

This article presents the initial results of a study of social rental housing (LPL) in Oran, Algeria, a city that has benefited from large-scale social housing programs since the 1970s. From 1980 onwards, it was widely recognised that a reallocation of resources was needed to guarantee access to housing for low-income groups. At the December 1979 meeting of the Central Committee of the National Liberation Front, clear resolutions were made concerning housing, as part of the preparation of the new national development plan.

The study involves collecting data on the housing, as well as interviewing residents to compare the initial state of the dwellings with their subsequent evolution. The aim is to evaluate the ability of users to adapt and personalise their housing to improve their quality of life according to their needs and preferences. The study object is the 670 housing estate (LPL) at Hai El Sabah. The analytical method used is the Post Occupancy Evaluation (POE) approach, a multi-method approach to data collection that includes direct observation, plan analysis and questionnaire. The housing units studied were not selected according to any particular method, but rather chosen on the basis of the residents who agreed to answer the questions and share their lifestyle and expectations regarding their housing. By comparing the initial plan drawn up by the designer with the current plan modified by the inhabitant, we were able to deduce the differences between the two plans and understand the ways in which the housing interior is appropriated.