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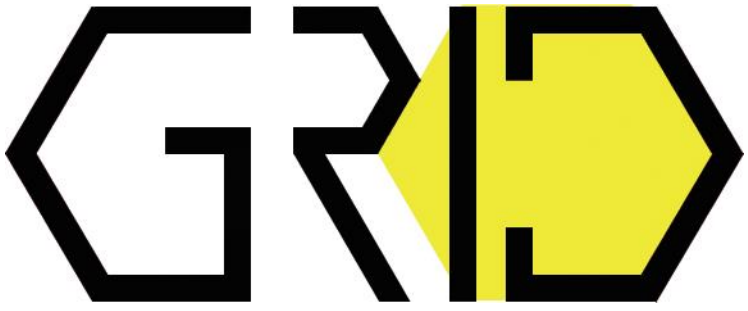

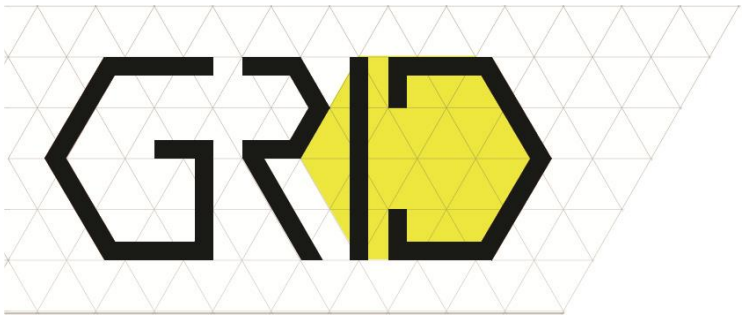

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Getting started…

Thanks to Çankaya University for providing the opportunities and support, GRID, the e-journal of Faculty of Architecture, has begun its publishing life. Our main goal is to be a long-term, up-to-date research journal based on scientific principles. In a short time period, our aim is to make this journal an indispensable internationally indexed journal with continuity of publication. In this context, GRID will be a spokesman of rationalist education which Çankaya University, adopting the leadership of Atatürk's scientific approach as a principle, has been a persistent follower.

I wish success to everyone who contributed to the journal...

Prof. Dr. Harun BATIRBAYGİL

Cankaya University

Dean, Faculty of Architecture

Başlarken….

Çankaya Üniversitesi Mimarlık Fakültesi'nin e-dergisi GRID Üniversitemizin tanıdığı olanaklar ve sağladığı desteğe dayalı olarak yayın hayatına başlamaktadır.

Dergimizin uzun soluklu, her zaman güncel ancak, bilimsel esaslardan ayrılmayan bir araştırma dergisi olması temel hedefimizdir. Amacımız, bu derginin yayın sürekliliğini sağlayarak kısa sürede vazgeçilmez bir uluslararası indeksli dergi olmasıdır. Bu çerçevede Atatürk'ün çizdiği bilimsel düşüncenin öncülüğünü ilke olarak benimseyen Çankaya Üniversitesi'nin, ısrarla takipçisi olduğu akılcı eğitimin de bir sözcüsü olacaktır.

Dergiye katkısı olan herkese başarı dileklerimle…

Prof. Dr. Harun BATIRBAYGİL

Çankaya Üniversitesi

Mimarlık Fakültesi Dekanı

Dear Readers and Authors,

GRID, the e-journal of Çankaya University Faculty of Architecture is now at the starting point of publication after an exciting adventure of preparation. We hope it will be a long- lasting journal combining research articles on subjects concerning urban and regional planning, architecture, interior architecture, landscape architecture, urban design, product design and industrial design. Articles of theoretical bases are welcome as well as the empirical.

For a long time, academicians studying on the above mentioned fields had a great difficulty to find sufficient number of national scientific journals to have their articles published. GRID being a refereed journal from the beginning is expected to be a chance. This bilingual international e-journal aims to be the voice of a wide group of designers, academicians and all the interested who are curious researchers. We believe that very soon it will take place among the internationally indexed e-journals also.

On this long but not ending way, I owe great thanks to referees, field editors and especially to my colleagues taking part with great devotion in this procedure.

In the name of the GRID Preparation Team,

Prof. Dr. Zühal ÖZCAN

Editor

Değerli Okuyucular ve Yazarlar,

Heyecanlı bir hazırlık sürecinin ardından, Çankaya Üniversitesi Mimarlık Fakültesi'nin elektronik dergisi GRID yayın hayatına başlamak üzeredir. Şehir ve Bölge Planlama'dan başlayarak, Mimarlık, İç Mimarlık, Kentsel Tasarım, Peyzaj Tasarımı, Ürün Tasarımı ve Endüstri Ürünleri Tasarımı'na uzanan bir yelpazedeki konuları bünyesinde toplayan uzun soluklu bir dergi olacağını ümit ediyoruz. Teorik temelli makaleler kadar ampirik çalışmalar da kapsamında yer alacaktır.

Uzunca bir süre, bahsi geçen alanlarda çalışan akademisyenler makalelerini yayınlayabilecekleri yeteri sayıda yayın bulmakta büyük güçlük çektiler. GRID başlangıcından itibaren hakemli bir dergi olarak, bu açıdan bir şans olacaktır. Bu iki dilde yayınlanacak olan uluslararası e-dergi, geniş bir tasarımcı grubunun, akademisyenlerin ve meraklı araştırmacılar olan diğer tüm ilgililerin sesi olmayı amaçlamaktadır. En kısa süre içerisinde uluslararası indekslerde taranan e-dergiler arasında da yerini alacağına inanıyoruz.

Bu uzun ancak bitmeyecek yolda, bize katkısı olan hakemlere, alan editörlerine ve özellikle bu süreçte büyük bir özveri ile çalışan meslektaşlarıma teşekkür borçluyum.

GRID Hazırlama Takımı adına,

Prof. Dr. Zühal ÖZCAN

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Acoustics and Speech Privacy in Open-Plan Offices: A Case Study on Computer-Based Task Performance[1]

Kıvanç KİTAPÇI*

Abstract

The aim of this study is to find out the effects of speech and speech intelligibility on computer-based task performance in open-plan offices. The research was conducted in a real open-plan office environment to include the open-office experience of subjects to the analysis. STM Bilkent Office was selected as the case, and 40 available open-office occupants were participated to the study. The experiment consists of two main phases. In the first phase, acoustical simulation of the site was done, to derive distribution graphs for speech related room acoustics parameters. In the second phase, occupants' computer-based task performances were tested under three different sound environments, which are continuous noise, speech and masked speech. According to statistical analysis of the performance test, and the acoustical properties of the case STM, suggestions for renovation were discussed. It was found that effects of intelligible speech on occupants' task performance are only psychological, because it is significant that there is no difference between results of performance test. However, all of the occupants respond to the questionnaires that speech sound environment was the most distracting one. Proposal for renovation was given to minimize the effects of intelligible speech on occupants for preventing the long-term effects on occupants' health.

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[1] This paper is based on the master's thesis 'Effects of Speech Intelligibility on Computer-based Task Performance in Open-Plan Offices'.

Anahtar kelimeler:

Oda akustiği, açık planlı ofis, görev performansı, konuşmanın anlaşılabilirliği, konuşma gizliliği, akustik simülasyon

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Açık Planlı Ofislerde Akustik ve Konuşma Gizliliği: Bilgisayar Tabanlı Görev Performansı Üzerine Bir Vaka Analizi[2]

Kıvanç KİTAPÇI*

Öz

Bu çalışmanın amacı, anlaşılabilir konuşmanın açık ofis çalışanlarının bilgisayar tabanlı iş verimi üzerindeki etkilerini incelemektir. Araştırma, çalışanların açık ofise alışkanlık etkisini de göz önüne almak amacı ile gerçek bir ofis ortamında gerçekleştirilmiştir. STM Bilkent ofisinde gerçekleştirilen çalışmaya, bu ofisi kullanan 40 kişilik bir grup katılmıştır. Araştırma iki ana aşamadan oluşmaktadır. İlk aşamada STM Bilkent binasından seçilen açık ofis alanının yerinde akustik ölçümleri, bölücü panoların ofis alanının akustik özellikleri üzerindeki etkisini anlamak ve akustik benzetimin güvenilirliğini sağlamak amacıyla gerçekleştirilmiştir. İkinci aşamada katılımcılara konuşma, maskelenmiş konuşma ve sabit gürültü olmak üzere üç farklı ses ortamı altında bilgisayar tabanlı çalışma verimi testi uygulanmıştır. Test sonuçlarının istatistiksel çözümlemesi ve akustik ölçümlerden alınan sonuçların ışığı altında, STM açık ofis alanı için çözüm önerileri sunulmuştur. Verim testinin sonuçlarına gore, konuşmanın açık ofis çalışanları üzerindeki etkisi sadece psikolojiktir. Fakat, test sonrasında verilen anketlere gore, katılımcılar en çok rahatsız oldukları ses ortamını konuşma olarak belirtmişlerdir. İç mekandaki değişiklik önerileri, stresin çalışanlar üzerinde yaratabileceği uzun vadeli etkileri düşünülerek sunulmuştur.

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[2] Bu makale 'Konuşma Anlaşılabilirliğinin Açık Ofislerde Bilgisayar Tabanlı İş Verimine Etkisi' adlı yüksek lisans tezinden üretilmiştir.

Introduction

Today, open-plan offices are one of the most popular office types, mostly because of organizational and economic reasons. Open-plan offices generally consist of workstations, which can be separated by screens or divider panels. Eventually, the required area per occupant decrease, leading to economical savings, and changing the layout of the space is easy to carry out. Organizations usually cover the economic reasons by emphasizing the other features of open-plan offices, for instance spaciousness, refreshing and modern architectural design, improved communication and relationships, better flow of information, greater sense of work involvement, and shorter distances to common spaces (Hongisto, 2005).

There are three key elements that affect occupant satisfaction in office environments: thermal comfort, lighting and acoustics (Wang & Bradley, 2002b). According to Venetjoki, Kaarlela-Tuomaala, Keskinen and Hongisto (2006), work performance can decrease because of various office noises. Environmental effects on work performance caused by poor acoustical conditions, poor speech privacy, and difficulties in concentration caused by unwanted speech are not taken seriously because the expected economic and organizational benefits are so evident in open-plan offices (Desarnaulds, 2007).

Coexistence of activities with various noise emission, and need for quietness or privacy in the same area heavily distracts open-plan office occupants. Dividers in an open-plan office contribute to an improved acoustical comfort and high speech privacy. Additionally, by using an absorbent ceiling, the noise between two adjacent working places can considerably be reduced and shorter reverberation times (Desarnaulds, 2007) can be obtained. Various studies investigated the relationships between open-office design, work performance, and occupant satisfaction (Hongisto, Haapakangas, Varjo, Helenius, & Koskela, 2016)(Sarwono, Larasati, Novianto, Sihar, & Utami, 2015) (Passero & Zannin, 2012). The studies revealed that the acoustical condition of open-office spaces, and consequently, the occupant satisfaction can be increased by implementing appropriate design solutions, such as layout design, workstation design, and partition design.

Salter, Powell, Begault and Alvarado (2003) supported the idea of electro-acoustical solutions for sound masking, which is placing loudspeakers in the ceiling. The masking noise in office environments is called ‘white noise’, and it covers all frequencies in the sound spectrum, which overrides disturbing components of office noise. It should be noted that the white noise used for masking becomes an additional sound stimulus, which increases sound pressure level of the ambient noise (Loewen, 1992), leading to less intelligible conversations.

Wang and Bradley (2002a) (2002b) conducted extended researches, to predict speech intelligibility in open-plan offices. The first study investigated single screen dividers and the

second study analyzed speech privacy between two adjacent rectangular workstations. They presented a mathematical model between two adjacent workstations by using image source technique. Problem was divided into two parts: a single screen model and a side-back panel model. These models were investigated in three varying workstation orientations; however, the effects of furnishing were not taken into account. The second study of Wang and Bradley (2002b) suggested a method for predicting the speech intelligibility index behind single screen in an open-plan office. A sound source and a receiver were used for calculating speech intelligibility index (SII). The effects of wall, ceiling and floor reflections on SII were discussed. Similar to the previous study, the mathematical model suggested was not tested in physical environments.

In a more recent study, work performance in open-plan offices was investigated in relation to speech transmission index (STI), which is another speech intelligibility measure (Ebissou, Parizet, & Chevret, 2015). 57 participants were tested under 4 different STI conditions, varying between 0.25 and 0.65. The study showed that under the effects of intelligible speech (STI>0.45), work performance of half of the participants were decreased. The other half of the participants were more resilient to intelligible speech. The results revealed that the effects of intelligible speech are mostly subjective.

Jones, Miles and Page(1990) found out that irrelevant speech restricts lower level of analysis performance such as detection of contextual errors in proofreading tasks were not affected by speech; however, detecting non-contextual errors are impaired. A longitudinal field study of Brennan, Chugh and Kline (2002) revealed that the major problems stated by employees were the lack of privacy and increased noise levels. Hongisto(2005) listed various tasks of work performance such as proofreading, short-term memory, and reading comprehension. In most of those cases, subjects were affected by intelligible speech. Banbury and Berry's (1998) experiment analyzed memory and arithmetic tasks, which were called 'office-related' tasks. The results showed that the irrelevant speech reduces memory for prose and mental arithmetic task performance impressively. In the second experiment, performance reduced about one-third of the quite environment. Another sequence of five experiments were presented by Salame(1982), which were dealing with phonological similarity effects of irrelevant speech on short-term memory of visually represented digits. However, there was no evidence of testing various task performances in real open-plan office environments that all of the participants are experienced and familiar with the environment.

Hongisto (2005) developed a model using the results of the existing literature for predicting the effect of speech on work performance. The model predicted that, the complex task performance could be reduced by 7% when the STI was higher than 0.60, but direct speech did not affect work performance when STI is below 0.2. Three factors should be considered

according to Hongisto's predicting model: high room absorption, high screens, and appropriate speech masking. Same rules are used for avoiding noisy activities and achieve speech privacy in open-plan offices. More recently, a model to predict speech decay in open-office environment was suggested (Keränen & Hongisto, 2013). The regression model uses ceiling absorption, furnishing absorption, screen height, masking sound level, speech effort and room dimensions, measured in 16 different open-plan offices, in order to predict speech decay curves. The model than converted into a free software, which can be used as an open-office design tool.

As Hongisto (2005) stated, both in open-plan offices and in conventional offices, designers should aim at lower speech intelligibility levels to improve work performance. Additionally, due to psychological reasons such as 'privacy', design of the open-office layouts gains great importance. Open-plan office occupants have a potential to initiate and maintain private conversations and chat between workstations. Salter, Powell, Begault and Alvarado (2003) stated that the streets in between open office cubicles become a natural conversation area. Additionally, a recent study investigated the effects of irrelevant speech on mental workloads in open-plan offices (Smith-Jackson & Klein, 2009). It was stated that the perceived privacy created by partitions dividing the cubicles, irrelevant speech still increases mental workloads, eventually decreasing overall work performance. Furthermore, Kim and Dear investigated the issues of privacy and proxemics in relation to communication needs. The results point out that occupants prefer private offices to open-office layout in various aspects of indoor environmental quality. Therefore, it can be stated that both spatial and acoustical requirements have to be considered in the design process, in order to protect the open-plan office occupants from impaired short-term task performance and long-term health problems. The spatial requirements also provide room acoustics parameters to match the ideal levels of acoustic comfort.

The aim of the study is to understand the effects of speech and speech intelligibility on computer based task performance in open-plan offices and to examine the work performance of open-office workers under variable room acoustic conditions (i.e. speech, masked speech, and continuous noise) It is expected that the results will reveal ideal acoustical conditions of an open-plan office in terms of speech and speech intelligibility. Additionally, current acoustical situation of the site STM Bilkent Headquarters is analyzed and possible solutions are discussed under the guidance of the computer simulations and the task performance test results.

Methodology

In this section, the methodology used in the study is presented. The case study consists of two main phases; the computer simulation of the site, and the computer-based task performance test. In the first phase of the study, the room acoustics parameters of the selected open-plan

office area (i.e. reverberation time (T_{30}), clarity (C_{80}), definition (D_{50}) and Speech Transmission Index (STI)) were analyzed. The aim of the computer simulations was plotting the distribution graphs of the room acoustics parameters mentioned above.

The computer-based task performance test evaluates the open-plan office occupants under three sound environments by using both subjective and objective methods, to understand the effects of speech and speech intelligibility on computer based task performance. Results of the three phases are used to propose a better acoustical design for the STM Bilkent Office, in order to improve the performance of the open-plan office occupants, and to improve the quality of the work environment.

Test Site

STM Bilkent University Cyberpark building consists of three floors; ground floor, first floor and second floor. The entrance and lobby areas, security, meeting room, human relations office, dining area and one large open-office area is located on the ground floor, which has a L-Shaped plan. The long arm of the L-Shape leads to technical offices and the dining area. In addition, an unsecured entrance is located on the ground floor, which is used for service purposes. First and second floors are identical, consisting of three small and one large open-plan office areas and administrative offices. The circulation areas are located around the atrium defined by the central staircase in a rectangular form, leading to office entrances. The first and second floors are different from the ground floor by their rectangular floor plan.

The building has a total of nine open-plan offices, which has varying occupant capacities of four to forty office personnel. The software development department uses the largest two offices, which are located on the ground floor and the first floor. The one on the ground floor level has a capacity of forty-five software developers. It also has a separate private office that is located near of the entrance of the open-office area for the administrative personnel. The dividers used in the open-plan office area are 167cm in height and allow visual and acoustical contact while standing at any point of the office. The other open-plan office is located on the first floor, and has thirty-two personnel capacity. The space dividers used in that open-plan office has a height of 190cm that does not allow any visual contact while standing in the open-office area.

For the present study, the open-plan office on the ground floor was selected. The first reason for selecting this office is the larger personnel capacity. Although the experiment was not applied to the residents of that office solely, the open-office capacity has a major effect on the background noise levels. The second reason is the type of dividers used. Openness is the key element of an open-plan office area, and the ground floor open-plan office has a better visual contact compared to the open-plan office on the first floor.

Acoustical Simulation of the Site

The room acoustics simulations of the site were carried out by using Odeon 8.5 Room Acoustics Software. The software uses prediction algorithms (image-source method combined with ray tracing) to simulate the interior acoustics of buildings. Odeon is mainly used for analyzing room acoustics parameters and for evaluating and recommending solutions for large rooms such as concert halls, opera halls, auditoria, foyers, underground stations, airport terminals, and industrial workrooms (Brüel & Kjaer, 2007).

The initial step of the computer simulation was modeling the geometry of the space in AutoCAD 2007 Software by using face modeling technique. After modeling the space, the 3D model was imported to Odeon 8.5 Room Acoustics Software. The next step was defining source types and positions. A point source was defined by defining the directivity pattern, gain, equalization and delay, eventually allowing the software to simulate a natural sound source or a loudspeaker system. Additionally, the receiver type and position were defined as a surface receiver. The surface receiver was divided into grids of 0.50 m. to perceive detailed distribution graphs of variable room acoustics parameters for the site simulated.

Attention was given to select and assign the surface materials from Odeon's in-built material library that reflects the current finishing materials in the test site. The materials were assigned to surfaces that are already layered accordingly in the AutoCAD software.

Last step was the calculation of the results. Two methods are available in Odeon software. The Global Estimate based on ray tracing, which is taking room shape, source position, and the position of absorbing materials into account. It uses an infinite number of points to simulate reverberation decay in the model. The other method, Quick Estimate is based on statistical formulae. For evaluation of STM open-plan office, the results of quick estimation and global estimation were compared to obtain the results of different acoustical parameters and their distribution throughout the office.

Computer-Based Task Performance Test

The aim of the computer-based task performance test was to analyze the basic information processing abilities of the open-office occupants under three sound environments; 'speech', 'masked speech' and 'continuous noise'. The difference between the results of three sound environments will reveal the relationship between the intelligible speech and the work performance of open-plan office occupants.

The experiment was composed of two questionnaires and a computer based task performance test. Each subject was required to answer two questionnaires, one before and one after the task

performance test. The test was repeated three times (speech, masked speech and continuous noise sound environments) for each subject. Prior to the experiment, each subject attended an introductory session on the task performance test. The subjects are allowed to practice the test to familiarize with the experimental procedure.

The first questionnaire consisted of three questions to evaluate subjects' basic physical conditions (i.e. sleep deprivation; basic physical problems, and hunger). The subjects were asked to mark a number on a five-point scale. The second questionnaire investigates the participants' self-evaluation of their performance during the task performance test.

Sound Environments

Three sound environments were used for the experiment. Every subject was exposed to three sound environments in the sequence of 'continuous noise' environment, 'masked speech' environment and 'speech' environment. To achieve more realistic results, both realistic office noises and white noise was mixed with the speech sample. Equivalent sound pressure level of the final sound signal was 60 dB(A).

Audacity 1.2.6 free software was used for mixing audio samples. Samples used for 'continues noise' composition were derived from both live recordings via Shure Beta 58A microphone connected to Apple iMac G5 personal computer via M-Audio Audiophile soundcard, and office-related sound samples found on the internet. Final compositions were ten minutes long, which was enough for very long test sessions. An average person completes the test between forty seconds, and one and a half minute. Normalization was not applied to final recording, because of the risk of distracting the high and low frequencies. The context of the speech sample used for the 'speech' environment was health issues. The male sound was calm and stable; therefore, there were no distracting variations in the speech sample. Subjects listened to the final sound environment mixes through the headphones in the real open-plan office environment, to benefit from other environmental parameters such as thermal conditions and lighting as it is in STM Bilkent Headquarters open-plan office area.

The first sound environment was the 'continuous noise' environment. This sample was composed by mixing recorded office sounds (i.e. computer typing sounds, chair sounds, footsteps, and white noise). Speech cannot be heard at this sound environment because the speech to noise ratio was -23dB, which lead to STI=0.00 (Venetjoki, Kaarlela-Tuomaala, Keskinen, & Hongisto, 2006).

The second sound environment was the 'masked speech' environment. It was composed by digitally mixing the 'continuous noise' sound sample and a ten-minute speech sample derived from a Turkish TV news program. The equivalent sound pressure level of the speech sample was

40 dB(A), and it was mixed with the 'continuous noise' sound sample. The sound level difference between the samples was -8 dB(A), which lead to STI=0.30, simulating adjacent workstations in an open-plan office. Although the speech could be heard, the context of the speech could not be understood clearly.

The third and last sound environment was the 'speech' sound environment. The same 'continuous noise' sample was mixed with the same 'speech' sample; however, this time the sound pressure level difference between the two sound samples were +13 dB(A) (STI=0.80), which corresponds to open-plan offices with no acoustic design.

Software

Computer-based task performance test was an arithmetic test, which determines both accuracy and reaction time of the subjects. An arithmetic problem and a target number were presented to the subjects on a computer screen. The arithmetic problems were always comprised of two single-digit numbers bound by an arithmetic symbol (+ or –). Subjects were asked to;

- Press the right arrow key on their keyboard as quickly as possible, if the answer to the arithmetic problem is greater than the target,
- Press the left arrow key on their keyboard as quickly as possible, if the answer to the arithmetic problem is less than the target,
- Press the left and right arrow keys on their keyboard simultaneously as quickly as possible, if the answer to the arithmetic problem equals the target,
- Press the left arrow key if the answer is greater than the target and press the left arrow key if the answer is less than the target, when the word 'Reversal' appears.

Two parameters were recorded after each test. The first parameter was 'accuracy', and the second parameter was 'reaction time'. After the session was completed, every subject's gender and age information were recorded.

Participants

The sample group consisted of a total of 40 full-time engineers of STM Bilkent Cyberpark. The building accommodates administrative, technical and software departments. However, total number of personnel working in that building is 110, circulation between STM headquarters, SSM (Civil Defense Undersecretaries) and STM Bilkent University Cyberpark decrease the number of available software developer personnel. For the experiment, 40 available software developers participated to the computer-based task performance test. All of the participants

work in open-plan offices, so they are all familiar to the work environment selected for the experiment.

Results

In this section, results of the computer simulation of the site, and the computer-based task performance test results are presented.

Computer Simulation

Acoustical simulation of the site was analyzed by investigating distribution graphs of reverberation time (T_{30}), clarity (C_{80}), definition (D_{50}) and speech transmission index (STI). Frequencies in the range of speech spectrum, which are 500 Hz, 1000 Hz, and 2000 Hz were evaluated. The basic information on each room acoustics parameter is given under the relevant section.

Reverberation Time (T_{30})

General scientific description of reverberation time is the time is required for sound energy to decay 60 dB after the sound source stopped. Today, reverberation time is the major acoustical parameter that defines acoustical characteristics of a room, and it is usually constant throughout the space (Barron, 1993).

Reverberation time (T_{30}) requirement for offices is generally known as below 0.5 seconds, but in open-plan offices, there need to be a sufficient level of reverberation time to decrease intelligibility of speech. This ideal T_{30} is based on the level of background noise and masking system in the open-plan office area. Offices with natural or electro-acoustical background noise require shorter reverberation times to achieve speech privacy; however, offices with lower background noise levels require longer reverberation times.

The quick estimate and global estimate results were analyzed to find out the T_{30} values at the open-plan office volume. The differences between the quick and global estimate results showed the effects of geometry and volume of the office area. Eyring results are 0.61 s at 500 Hz, 0.63 s at 1000 Hz and 0.70 s at 2000 Hz. The global estimate calculations with grid responses were 0.67 s at 500 Hz, 0.83 s at 1000 Hz and 1.03 s at 2000 Hz. When compared to the quick estimate results, global estimate T_{30} values were slightly higher at 500 Hz and 1000 Hz, and showed a greater difference at 2000 Hz. In order to achieve good acoustical conditions, both the global T_{30} values and its distribution is important, which needs to be balanced throughout the

environment. In the current study, the distribution graphs plotted from Odeon (Figure 1, 2, 3) revealed that especially at the corner points of the open-plan office, there were multiple focal points of higher reverberation times up to 2.40 s.

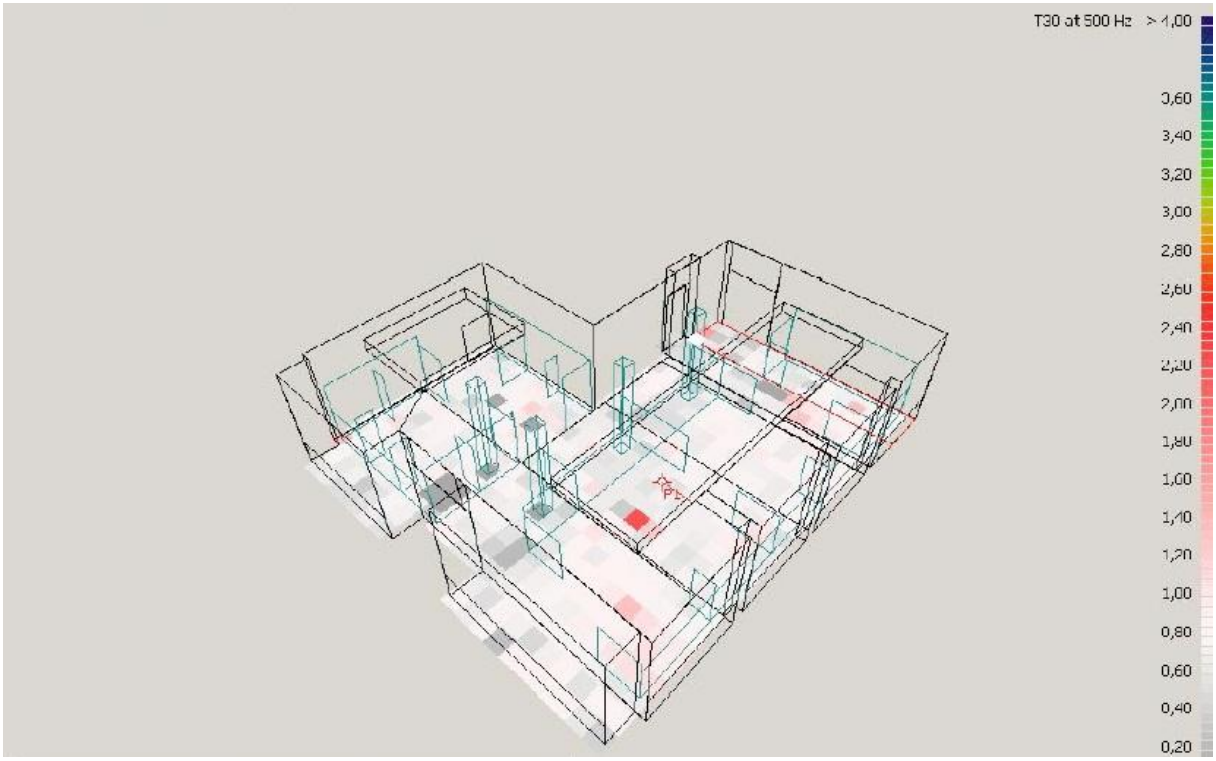

Figure 1 T30 distribution graph at 500 Hz.

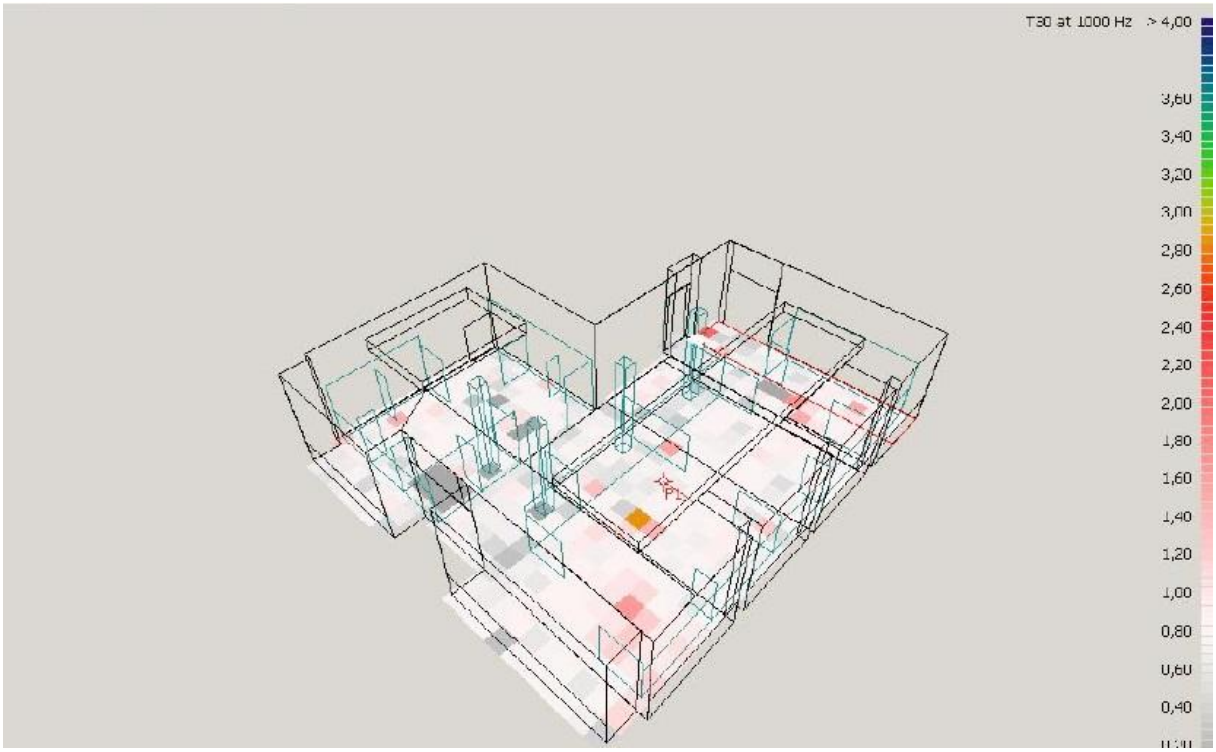

Figure 2 T30 distribution graph at 1000 Hz.

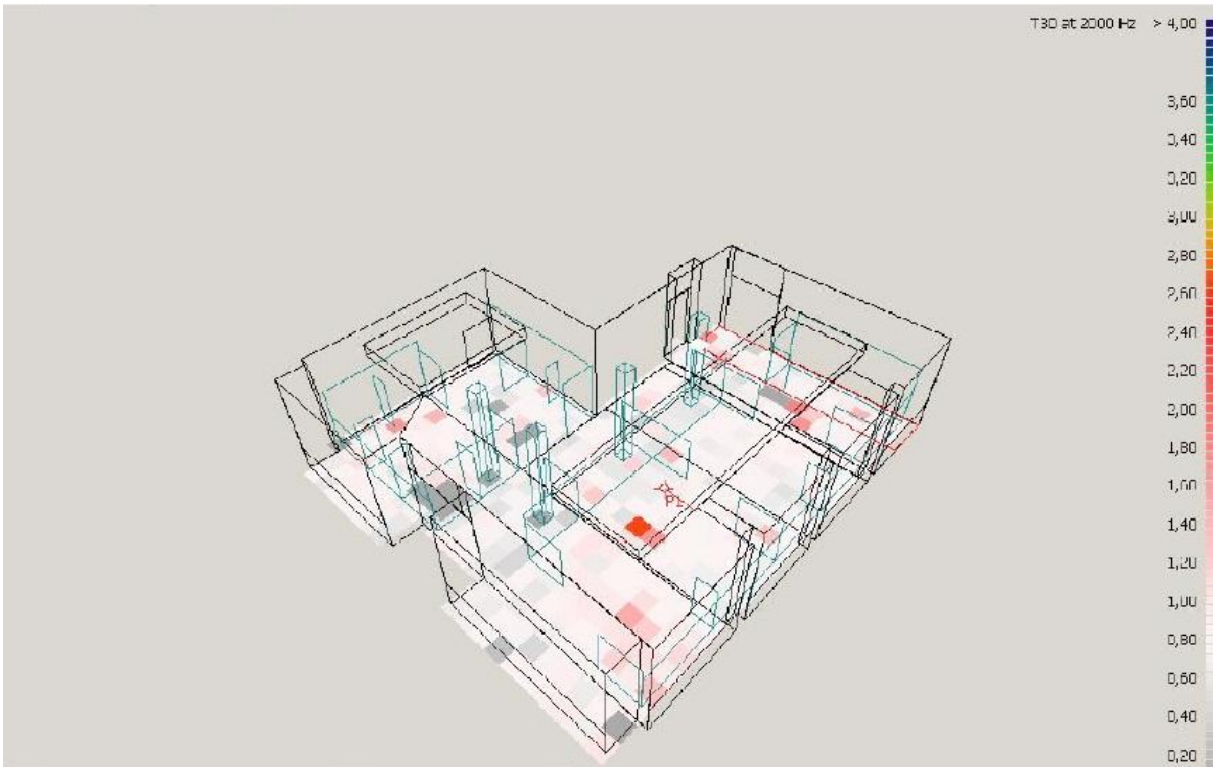

Figure 3 T30 distribution graph at 2000 Hz.

Clarity (C_{80})

The second room acoustics parameter that is related with speech privacy is the clarity of the sound in a field. Clarity is defined as the ratio of early sound energy to late or reverberant sound energy. Early-arriving reflected sound energy is the main parameter that defines clarity of sound in an enclosure. Early sound is usually defined as the direct and reflected sound arriving within the first 80 ms (Egan, 1988). The early arriving sound energy contributes to the clarity and definition, while the late reverberant part provides an acoustic context against which the early sound is heard. To evaluate the clarity of music, the relevant time interval is 80 ms, and 50 ms for speech. To achieve a more blurred speech and to decrease the intelligibility of speech, C_{80} needs to be as low as possible.

Evaluating the clarity distribution maps for low, mid and high frequencies (Fig. 4, Fig. 5, and Figure 6), it was revealed that the divider panels decrease the clarity of the sound significantly. The average clarity values are 0.7 dB at 500 Hz, 0.5 dB at 1000 Hz and 0.2 Hz at 2000 Hz, as a consequence of higher ceiling and wall reflections at such frequencies. The clarity distribution graphs show the effects of the divider panels, as well (Fig. 4, Fig. 5, and Figure 6). The areas close to the sound source had higher clarity values of 8.5 dB - 12.5 dB; however, the backside of the divider panels' clarity values decrease to the ranged between -1.5 dB and 2.5 dB. There were three focal points shown on clarity distribution graphs at mid frequencies, resulting at 16.5 dB.

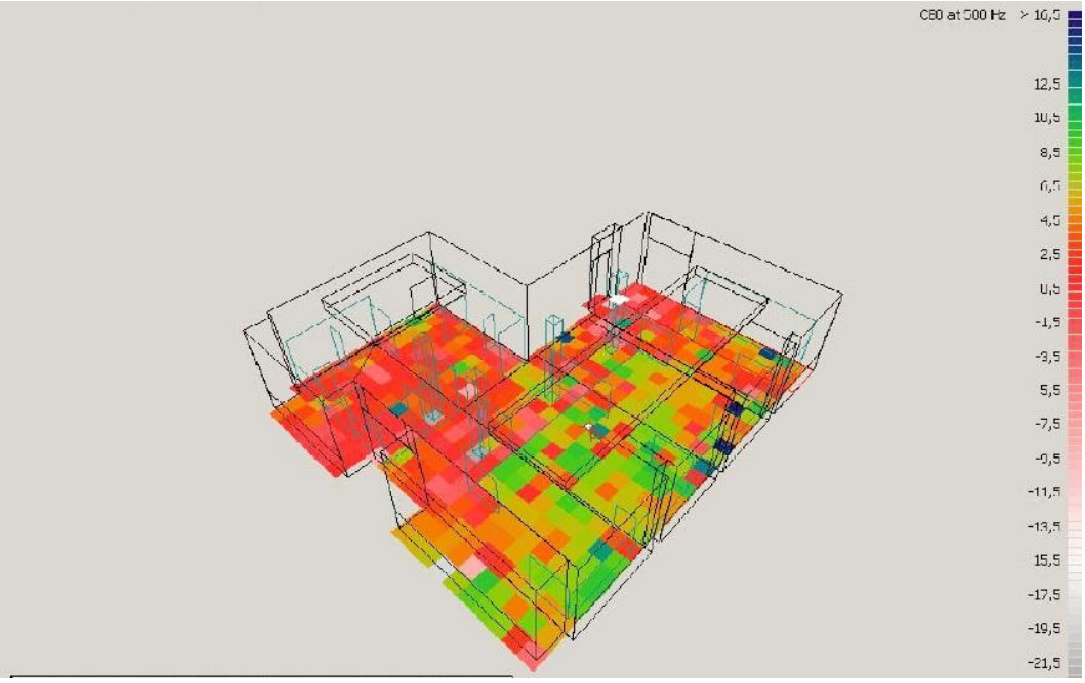

Figure 4 C80 distribution graph at 500 Hz.

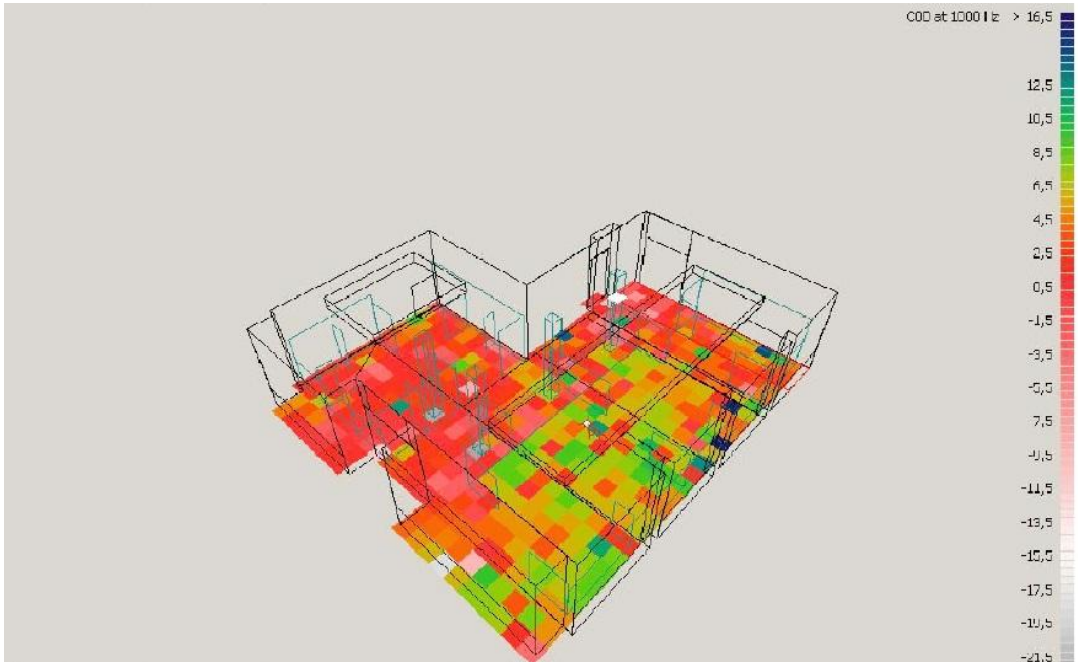

Figure 5 C80 distribution graph at 1000 Hz.

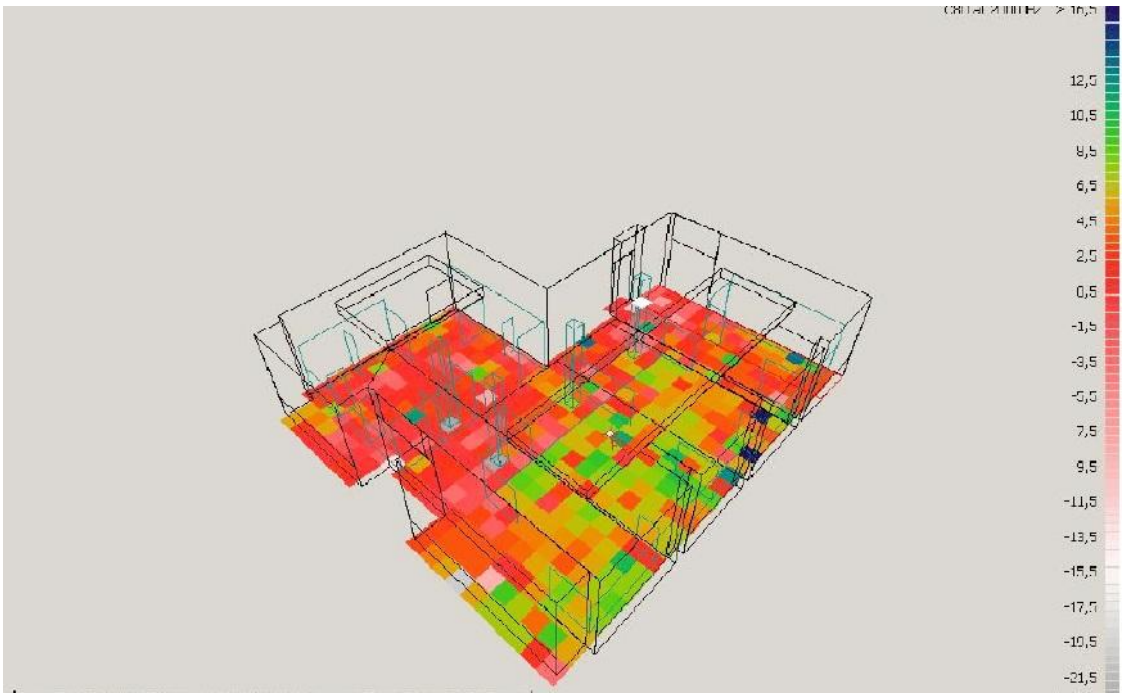

Figure 6 C80 distribution graph at 2000 Hz.

Definition (D_{50})

Definition is the ratio of the effective energy to the total energy in an impulse response. The effective energy contains both the direct sound energy and the reflected sound energy with respect to the direct sound by up to 50 ms (Egan, 1988).

Early arriving sound energy should be high enough to achieve good acoustical conditions for speech[21]. The ideal value of definition at halls for speech is higher than 0.15; however, in open-plan offices, the aim should be achieving unintelligible speech. Therefore, a lower value of definition is required to create better speech privacy in open-plan office environments.

The definition distribution graphs (Fig. 7, Fig. 8, and Fig. 9) showed that average D_{50} values were 0.43 at 500 Hz, 0.40 at 1000 Hz and 0.38 at 2000 Hz. Distribution of the parameter was not homogeneous in the area because of varying sound energy levels across the volume. The areas closer to the sound source had higher D_{50} levels ranged from 0.75 to 0.80. The back of the divider panels that were away from the sound source had a larger spectrum of D_{50} ranging from 0.01 to 0.70. Lower D_{50} levels cause poor speech intelligibility; therefore, the distribution graphs showed that the divider panels were working effectively at low frequencies. At high frequencies (i.e. 2000 Hz and 4000 Hz), D_{50} values decreases at closer points to the sound source, as well. As it was seen in the definition distribution graphs, far corners of the open-plan office area were lack of total sound energy, and showed very low sound definition properties.

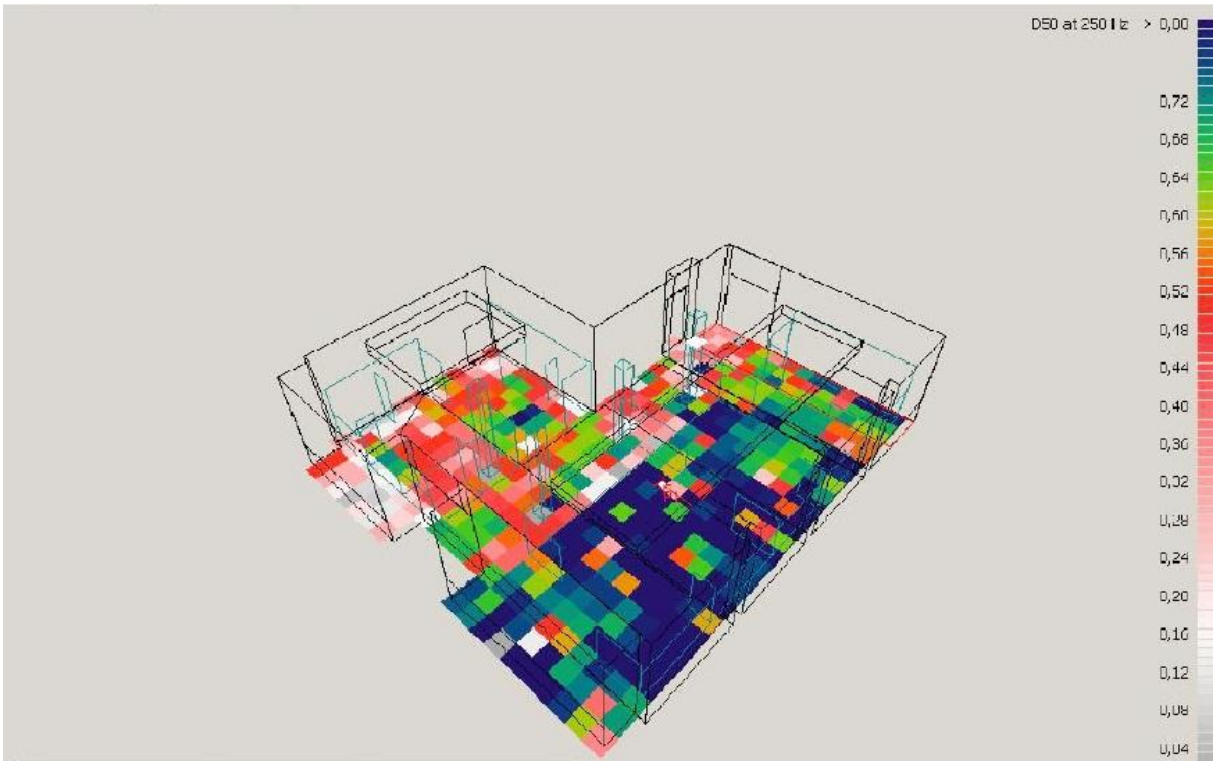

Figure 7 D50 distribution graph at 500 Hz.

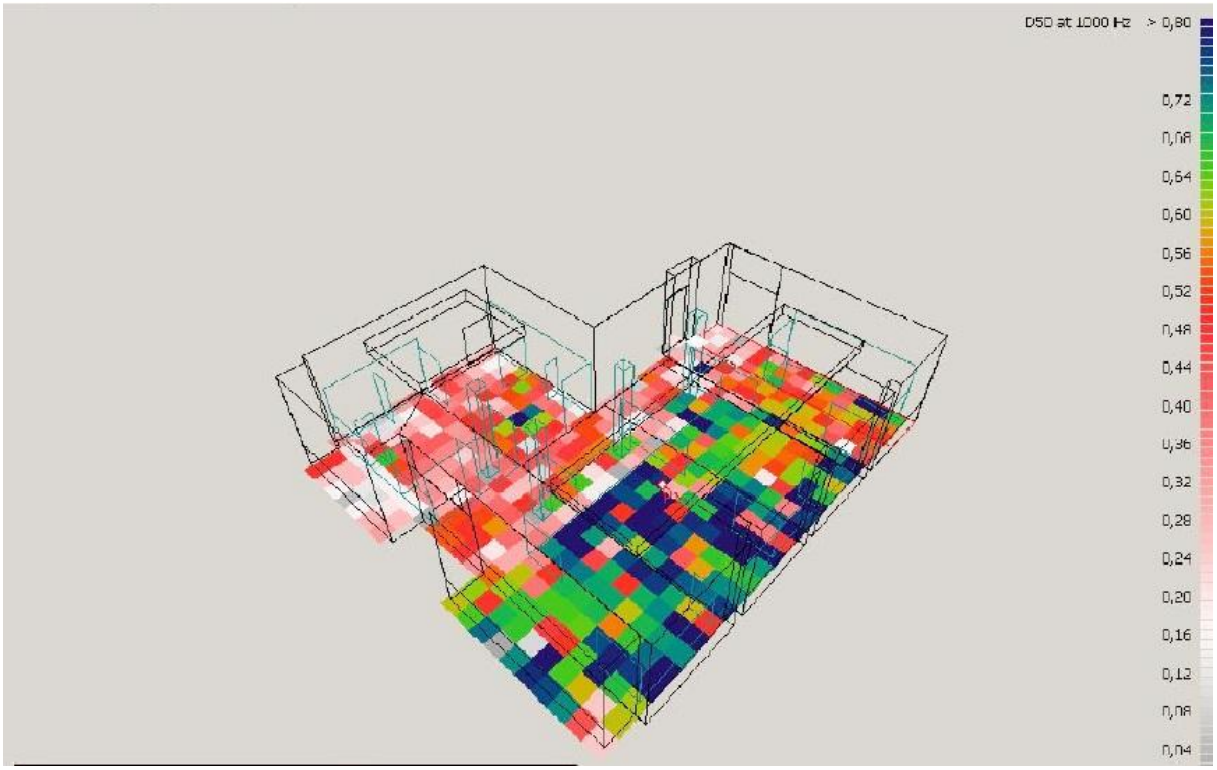

Figure 8 D50 distribution graph at 1000 Hz.

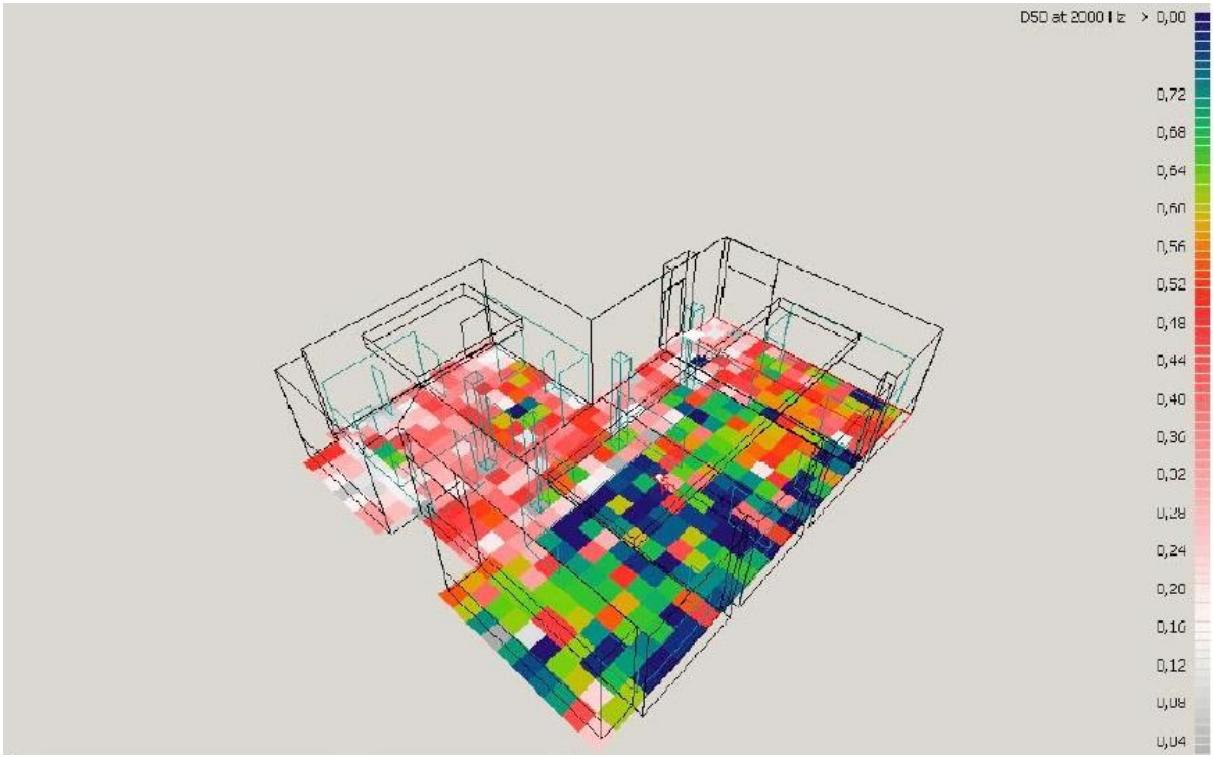

Figure 9 D50 distribution graph at 2000 Hz.

Speech Transmission Index (STI)

Developed in the early 1970's, the Speech Transmission Index (STI) is a machine measure of intelligibility whose value varies from 0 (completely unintelligible) to 1 (perfect intelligibility). The speech transmission index (STI) has been developed for the evaluation of speech intelligibility in both direct communication situations and electro-acoustical situations.

The calculation of STI combines various distortions, for instance echoes, peak clipping, and other nonlinear distortion and interfering noise. The STI parameter has been improved and it takes into account other effects like non-contiguous frequency transfer and severe band pass limitation. While calculating STI male and female speakers are treated separately and a diffuse sound field is assumed. The reverberation time and the background noise have a direct effect on speech transmission index and speech intelligibility. STI also can be calculated by impulse responses of enclosed spaces (Egan, 1988). The explanation of STI values can be conducted as: excellent (0.8 – 1.0), good (0.6 – 0.8), fair (0.4 – 0.6), and bad (0.0 – 0.4).

Overall STI values in an open-office should not reach to excellent values; however, too low STI is caused by either very high value of reverberation time or background noise levels. Therefore, long-term effects of high background noise on occupant health have to be considered to achieve a better open-plan office environment. Attention should be given to balance the ratio between reverberation time and background noise, especially if the background noise source is natural and uncontrolled.

Average speech transmission index for the open-plan office area simulated was 0.60 (Fig. 10), which means 'good' in terms of speech intelligibility. Areas closer to the sound source had higher STI values ranging between 0.75 and 0.80, meaning 'excellent' speech intelligibility. Even at close distances from the sound source, there were some dead spots in terms of speech intelligibility. Those dead points were mostly at the back of the divider panels used in the open-plan office area. The lack of energy transmission from one side of the divider panel to the other caused the STI to decrease to the levels ranging between 0.55 – 0.60. At the far corners of the office area, there were spots of high speech transmission index that were caused by the excessive surface reflections.

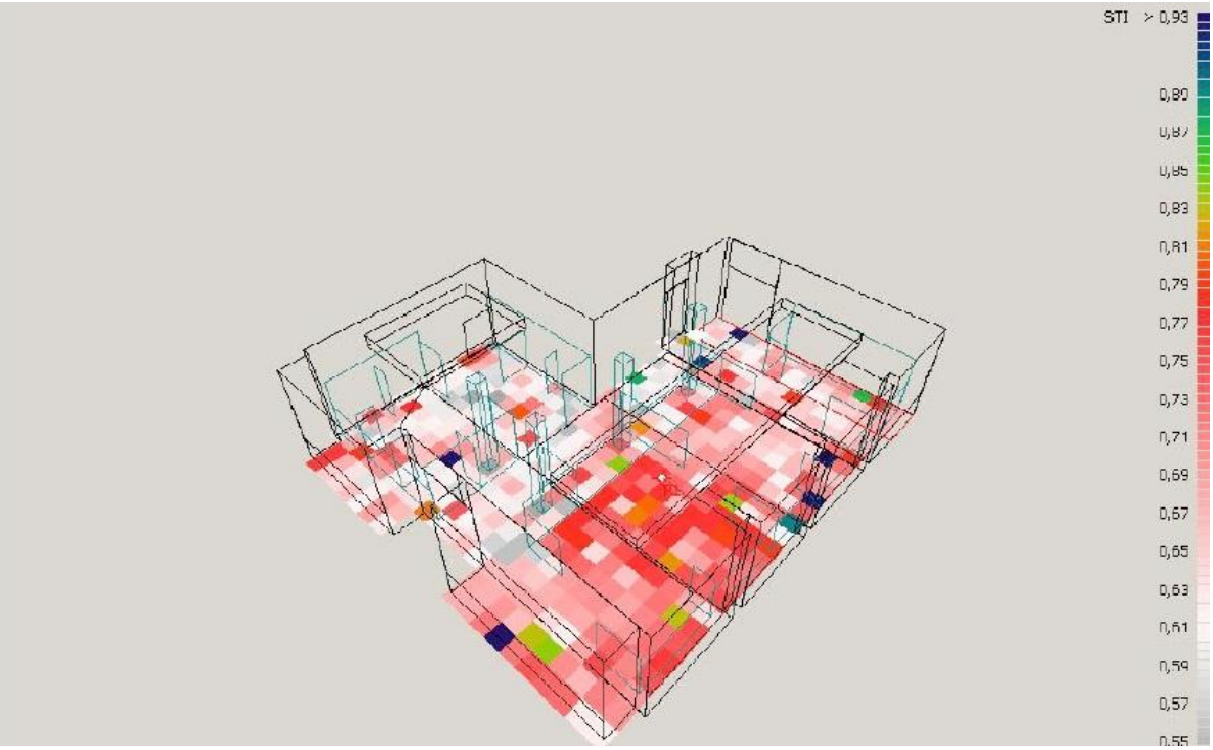

Figure 10 Average STI distribution graph.

Computer-Based Task Performance Test

For statistical analysis of findings from computer-based task performance test and subjective evaluation questionnaire, Statistical Package for the Social Sciences 15.0 (SPSS Inc., Chicago, IL, USA) was used. The one-way ANOVA test was used in the analysis of the data.

Two different parameters were recorded after the test; the reaction time, and the accuracy. Although it was expected that the reaction time results would increase and the accuracy results would decrease at masked speech (MS) and speech (S) environments, contradictory results were obtained between the three sound environments. It was significant that subjects' accuracy increased ($F=9.875$, $Sig.=0.000$) and reaction time decreased ($F=16.369$, $Sig.=0.000$) throughout the three sound environments. This increase of overall performance can be explained by familiarity to the test; however, all of the subjects had time to practice, and the test was simple enough for senior software developers to show the negative effects of intelligible speech between the three sound environments.

The data from the second questionnaire revealed that, the subjects felt distracted and under stress under the masked speech (MS) and speech (S) sound environments. The mean values of the results from the five-point scale questionnaire for the continuous noise (CN), the masked speech and the speech sound environments were 1.8, 2.37 and 3.27 sequentially. The difference

between the three sound environments was statistically significant across all subjects (F=24.006, Sig.=0.000). The internal validity of the questionnaire was tested by SPSS reliability module. Cronbach's Alpha result of the analysis was 0,989, where over 0,75 is considered reliable.

Discussion

According to literature survey, there was a significant effect of speech and speech intelligibility on various task performances. For instance, Hongisto listed various tasks of work performance (i.e. proofreading, short-term memory, reading comprehension). In most of the cases, subjects were affected by intelligible speech (2005). Banbury and Berry's (1998) experiment analyzed memory and arithmetic tasks, which were called 'office-related' tasks. Results showed that irrelevant speech reduced memory for prose and mental arithmetic task performance impressively. However, those studies were carried out under laboratory conditions. This study, analyze the effects of speech and speech intelligibility in a real open-plan office environment, which all of the subjects participated to the test is familiar to the working environment, and the task.

The computer simulation results of the site were analyzed to evaluate the speech privacy requirements of an open-plan office; therefore, the same four parameters related to speech privacy (T_{30}, C_{80}, D_{50}, STI) were analyzed. The results showed that, reverberation time was slightly higher than open-plan office acoustic requirements mentioned above; however, in open-plan offices, to achieve a less intelligible speech, reverberation time can be higher in case of lower background noise situations. By looking at clarity and definition distribution graphs, it was seen that the divider panels were effective at blocking the direct sound energy; however, the range of the effective areas behind screens were not enough to prevent the office open-plan office occupants from intelligible speech. The STI distribution graph showed the uneven distribution of reflections, and the effects of the divider panels on the intelligible speech.

The results of the computer-based task performance test showed that the effects of intelligible speech on work performance were only subjective. Objective test results did not show any negative effect on workers' task performance in the arithmetic test, neither in accuracy nor in reaction time parameter; however, according to the subjective questionnaire results, it was significant that the participants felt under stress under speech sound environment. It is suggested that the effects of intelligible speech in open-plan office environments have negative effects on occupants in a long term due to stress caused by room acoustic conditions. Intelligible speech needs to be controlled in open-plan office environments, to avoid the long-term negative effects caused by stress. The short-term effects of intelligible speech should be

investigated by using other tasks that are not relevant with the subjects' professional background and working habits.

Ultimately, the results suggest that if the worker is experienced with the task and familiar to the open-plan office environment, effect of intelligible speech is only psychological. Stress factor may cause various health or psychological problems in a long-term, rather than instant performance drops. According to those results, the site should be renovated to achieve an open-plan office environment with less intelligible speech.

It is claimed that the effects of unwanted speech is independent from sound pressure level of the sound; it is more related with the meaning of speech (Banburi & Berry, 1998). Speech becomes disturbing only when it is clear. Increasing the speech-noise ratio and decreasing the reverberation time provides more intelligible speech in rooms. As Hongisto stated, the designers should aim at high speech privacy in both conventional and open-plan offices. By evaluating real-size measurements and computer simulation of the site, three main renovations were suggested to improve work performance by decreasing speech intelligibility in STM case. First suggestion is the renovation of ceiling and floor materials on the circulation axis to absorb direct sound energy of sound instantly, by using heavy weighted carpet on the floor and acoustical gypsum board with glass wool on the ceiling. This renovation also prevents footstep noises that may distract the open-office personnel. Second suggestion is raising divider panels in between work surfaces to 160 cm, to enlarge the effective area of blocking the sound energy and early reflections. The final suggestion is isolating major noise sources like photocopy and fax machines, because of relatively high level of reverberation time.

Conclusions

Open-plan office environments are very popular today, because of the organizational benefits and better flow of communication. However, it is hard to achieve an ideal condition for a better work environment in open-plan settings. Intelligible speech and speech privacy are the most distracting effects on both work performance and occupants' health.

In the present study, interior design solutions were suggested according to the results of the acoustical simulation of the site and the occupants' computer-based task performances test results. The results revealed that, similar to the previous study of Ebissou et al. (2015), the effects of intelligible speech on task performance were only subjective and psychological. Stress factor may cause various health or psychological problems in a long-term, rather than instant performance drops. However, it should be stated that the office occupants who participated the task performance tests were all software engineers and it is possible that the short-term memory test was not challenging enough for them. Further studies can implement different

task performance tests that are challenging for subjects from various professions. By increasing the sample size and the variety of professions participating to the tests, it is possible to observe the differences between various tasks, and how they are affected by intelligible speech. Additionally, the tests should be conducted in a real open-plan office acoustic environment, rather than a digitally simulated acoustic environment, in order to evaluate the room affects.

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Affiliation of Archaeological Sites and People: Case Studies on Interpretation and Presentation Approaches

Başak KALFA*

Abstract

Archaeological heritage sites are one of the most trustworthy sources of our cultural and sociological history. Thus, once the archaeological heritage comes to daylight after centuries of darkness, they would like to connect with people immediately to pass the information they have been carrying. Hence, the bonding needs a catalyst in order to reflect the spirit of the place. This catalyst is called “interpretation and presentation”. Many approaches from excavating and presenting to virtual off-site tours have been used from the first archaeological excavation to now. These methods go beyond the physical representation of the site solely but help its audience to comprehend its spirit.

In this study, three archaeological sites from different countries are investigated in terms of their interpretation and presentation methods. These sites are Colonia UlpiaTraiana (Archaeological Park Xanten) in Germany, Ostia Antica in Italy and Çatalhöyük in Turkey. Having both distinct and common methods, these three sites provide an understanding how interpretation and presentation approaches place themselves as a communication tool between people and the archaeological site.

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Anahtar kelimeler:
Yorumlama, sunum, arkeolojik alan, Xanten Arkeolojik Parkı, Ostia Antica, Çatalhöyük, açık hava müzeleri

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Arkeolojik Alanların ve İnsanların Birleştirilmesi: Yorumlama ve Sunum Yaklaşımları Üzerine Örnekler

Başak KALFA*

Öz

Arkeolojik alanlar kültürel ve sosyolojik kültürümüzün en güvenilir kaynaklarından olma özelliği göstermektedirler. Bu sebepten dolayı, bir kere arkeolojik miras yüzyıllar boyu süren karanlıktan sonra gün yüzüne çıktığında, taşıdığı bilgileri insanlara aktarmak için bağ kurmak istemektedirler. Bu bağın, alanın ruhunu yansıtması için bir katalizöre ihtiyacı vardır. Bu katalizör de "yorumlama ve sunum"dur. Arkeolojik alanlarda günümüze kadar kazıp bırakma yaklaşımından, arazi dışından sağlanan sanal turlara kadar birçok sunum yöntemi kullanılmıştır. Bu yöntemler alanın fiziksel sunumunun ötesine geçerek ruhunu da okutmaya yarayan yaklaşımlar sunmaktadır.

Bu çalışmada, farklı ülkelerden üç tane arkeolojik alan, yorumlama ve sunum yöntemleri çerçevesinden incelenmektedir. Bu alanlar, Almanya'daki Colonia Ulpia Traiana (Xanten Arkeoloji Parkı), İtalya'daki Ostia Antica ve Türkiye'deki Çatalhöyük'tür. Birbirinden hem farklı hem de kesişen yöntemlere sahip bu alanlar, arkeolojik alanlarda yorumlama ve sunum kavramlarının insan ve arkeolojik alan arasında iletişim aracı olarak nasıl konumlandığını anlamamıza yardımcı olmaktadır.

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Introduction

The scholars mainly consider archaeological sites as the documentation areas. However, for a discipline that is related to the human and social life cannot only be restricted within academic archaeology level. What was done or created centuries ago still has architectural importance and most importantly sociological relevance for today's situation. Once the artifacts, whether they are Nature's work, or the act or work of Man (Tilden,1957), are unearthed, they are in need of bonding with the people. This link can be tied with special and careful interpretation and presentation of the archaeological heritage.

Non-specialist audiences, in this perspective, visitors are the ones to interpret archaeological sites at first hand. This interpretation should work for both sides of the scenario that are visitors and the site itself. Nevertheless, in a complex structure as in archaeology, the interpretation process needs experts in various disciplines where it can evolve to the appropriate presentation of the site. At this point conservation science steps forward for systematic comments and for the following paces.

The main problem of a visitor encounters is that they cannot create a bond with his/her expectations with what is visible to the eye. As United States Agency for International Development (2008) puts it generally their journey starts before the visit and will not end once they leave the site. Sam Ham says "Interpretation involves translating the technical language of a natural science or related field into terms and ideas that people who aren't scientists can readily understand." In a way, heritage sites are like open books. If one knows the language properly, a scientist in our case, he/she can easily read it. However, if one does not know the language enough, the person would need a translator, which is in our case an interpreter. Eventually if the data was not passed to the people, the continuity of the flow would be banned and "cultural heritage" would lose its "heritage" entity and become "cultural information."

Therefore, the interpretation and presentation of archaeological sites is an important asset for an archaeological site to be fully grasped by the visitors and sustainably protected for a long period of time.

Although they complete each other in archaeological sites, "interpretation" and "presentation" are two different terms. The term interpretation as it is used in cultural heritage was first described by Freeman Tilden as, "An educational activity which aims to reveal meanings and relationships through the use of original objects, by firsthand experience, and by illustrative media, rather than simply to communicate factual information."

Years later, the term appeared to be described in the international charters as well. Interpretation is explained in the Ename Charter (ICOMOS, 2007) as follows:

> "Interpretation refers to the full range of potential activities intended to heighten public awareness and enhance understanding of cultural heritage site. These can include print and electronic publications, public lectures, on-site and directly related off-site installations, educational programs,

community activities, and ongoing research, training, and evaluation of the interpretation process itself."

Presentation Approaches and Methods

Presentation reaches the audience with the appropriate methods. After the interpreter understands and evaluates the site as a whole, the right method or tool is needed to be chosen. Throughout the history, many methods have been used. Some of the earlier versions of these methods were abandoned where some of them have been modified for the contemporary situation. On the other hand, some are introduced to the cultural sites for the first time with the developments in the modern world.

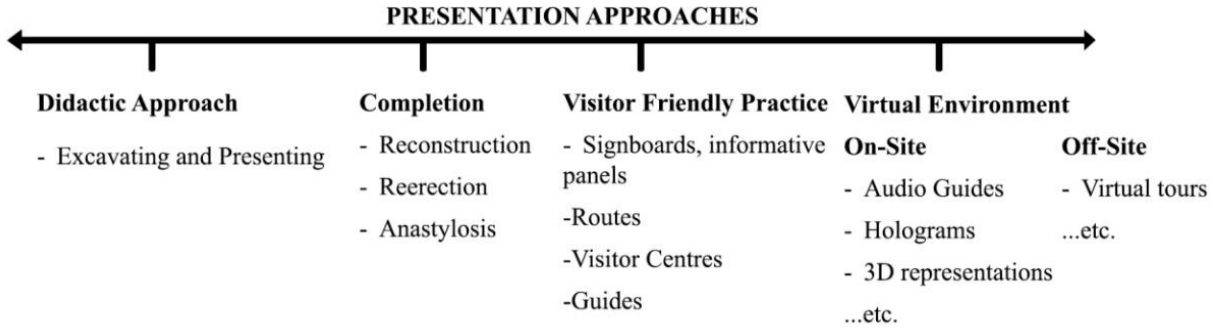

Figure 1 Chart of Presentation Approaches
Source: Authors Archive

Didactic approach where the archaeological site is excavated and presented without any or minor intervention limited to security means, entrance-exit units, modest information panels, visitor routes, is the earliest and yet still widely used presentation technique. Completion of the architectural remains, on the other hand, is one of the most popular presentation methods for many years. Reconstruction and anastylosis can be the subheads of this branch. By the help of these two techniques, since they provide three dimensional appearance of the subject matter, visitors get solid understanding about the archaeological remains. While anastylosis is done with original materials, reconstruction is not done by original materials, but modern ones.

In order to introduce the site in its entirety to the visitors, a story should be possessed by the site. As soon as the story is decided, the person(s) responsible of the presentation should select the place and methods or tools to realize it. There are several methods as it is mentioned. Hence, the criteria for the selection depend on the site itself (Sivan, 1997).

Therefore, in this study three cases around the world will be investigated and compared to each other in terms of their interpretation and presentation methods, which are Archaeological Park

Xanten (Germany), Ostia Antica (Italy) and Çatalhöyük (Turkey). These cases are chosen according to their diverse means of presentation and approach of interpretation. In order to achieve thorough understanding, all sites are deeply opened up from their establishment until their current situation.

Case Studies

Archaeological Park Xanten (Roman Museum Xanten)

As its name indicates, the Archaeological Park Xanten on the site of the ancient Roman city of Colonia Ulpia Traiana is in the small historical town of Xanten, situated in the district of Wessel in North Rhine-Westphalia, Germany. The wealthy city gets approximately one million visitors per year due to its largest archaeological open-air museum in Germany, artificial lake used for water sports and architecturally satisfying historic city center.

Archaeological excavations are mainly serious and long lasting procedures. To unearth entirely and to study scientifically an ancient settlement takes decades. So as the ancient legionnaire settlement Colonia Ulpia Traiana and its ancient harbor have been excavated since 1988 under the leadership of Pre-historian Dr. Norbert Zieling and only %20 of the total area unearthed. Unlike the current dominant system in Turkey that only in summer time archaeological excavations can take place, the ancient legionnaire city has been worked throughout the year by the excavation team. The team consists of highly experienced members with diverse professionals (Archeological Park Xanten, 2017).

The Roman City of Colonia Ulpia Traiana had an important role in the ancient history of Germany, considering its having been one of the most prominent Roman cities on its land. Besides, after the arrival of first legions around 12/13 century BC the city became the largest known legionary base of Europe of its time in 1st century BC. This military features had many positive impacts on Xanten area as it always had throughout history. Even today, many technological developments that we benefit in our daily lives are sub-products of martial innovative studies. Due to the excessive number of legionnaires, going up to ten thousand, the infrastructure of the city had to be upgraded. Therefore, roads and harbors were constructed. This development triggered the craftsmanship and trade in the city, while the first civil settlement started to emerge around the harbor area (Archeological Park Xanten, 2017).

Having been named after the emperor Marcus Ulpius Traianus, the city was given the “Colonia” status in the 1st century BC, which was meant being one of the 150 cities with highest urban degree. Only after then the city gained its largest territory. In the 2nd century, social and economic changes inevitably affected the architectural appearance of the city, where the Amphitheatre, the Baths, the Temples and the City wall constructed (Archeological Park Xanten, 2017).

Speaking of the socio-economic condition of the city, agriculture and craftsmanship were the driving economic source and the people had different backgrounds. To sum up, the City of

Colonia Ulpia Traiana holds a position of being a multinational and prosperous Roman city in 2nd century AD.

However, with the beginning of 3rd century, disruptions inside and outside the city brought an imbalance to the economy. Consequently, the city was invaded by Germanic Franks and with the end of Roman Empire it was almost emptied through outside the fortifications. Today the traces of old settlement of Colonia can be observed in modern Xanten since the ruins were used to construct the medieval city (Archeological Park Xanten, 2017).

Figure 2 Colonia Ulpia Traiana in the 2nd century AD (drawing by H. Stelter)
Source: Archaeological Park Xanten, n.d.

When we come to our time, Colonia UlpiaTraiana is represented as a multi-layered archaeological park. The park calls itself as "exciting and informative" (Archeological Park Xanten Offical Website, 2017). That is mainly because there are not only display areas like an ordinary museum but the places inviting visitors to be the part of the whole experience while enjoying with the offered activities. These activities and spaces can be listed as night and Sunday tours, theatrical events, game rooms, research center, themed pavilions, and of course museum and reconstructed buildings. Therefore, the facility offers delicate information on Roman life while making the visitors have fun and relax.

The Archaeological Park Xanten consists of the Roman Museum (RömerMuseum) and the park itself. Reconstructed buildings take great portion of the experience of the archaeopark. Being the result of years of study, the buildings that are Roman Houses, Harbor Temple, Amphitheatre, Roman Hostel and the City Walls and Gates reflect the Roman architecture.

Figure 3 Site view of the Archaeological Park Xanten
Source: Archaeological Park Xanten, n.d.

The reconstruction degree can be classified into two groups: complete reconstruction and partial reconstruction. The residential buildings – the houses and hostel - fit to the first group as every part whether structural or decorative, exterior or interior was realized. Modern technologies and materials were also used during the reconstruction process. For instance, the outer load bearing walls of the multi-storey strip houses were not constructed by not stone but by special formulated stamped loam with high endurance to dampness of the region. At the Roman Hostel, not only the visitor can visualize the actual three dimensional structure but also can "live" the place hands on. The herb garden at the courtyard was being activated and it is possible to wander around the garden with original Roman herb types. Besides, the restaurant of the hostel actually still serves as a restaurant for the visitors. In the commercial sections, there are modern media tools to tell which craftsmanship were valid and how they were implemented centuries ago (Archeological Park Xanten, 2017).

Figure 4 a – b: Reconstruction of the Roman Houses
Source: Archaeological Park Xanten, n.d.
c – d: Interior images of the Roman Houses
Source: Archaeological Park Xanten, n.d.

The other reconstruction technique used in the Archaeological Park Xanten is the partial reconstruction. The mostly visited parts of the park are in this group: Harbor Temple, Amphitheatre, and City Gates and Walls. In this manner, instead of arising the whole structure, only some selected parts are erected in order to create the three dimensional effect. To reconstruct the entire structure would be costly and useless if the main aim is possible to be achieved by partial erection. The amphitheater, for instance, was designed for the entire city population that was 20.000 people. Although Colonia Ulpia was a large city at that time, now the modern Xanten is in the rural and that huge of an amphitheater would not be used. Therefore, only the half of the amphitheater was erected. The pillars of the non-erected parts are left visible as an informative element merging into the landscape. Today it is used for many concerts and performing arts (Figure 5).

The same thing is valid for the Harbor Temple as well. Not knowing which deity it was dedicated, the Temple was named after its closeness to the harbor. Rose above the three-meter-high podium, only a section with actual-sized pillars and beams of the temple were reconstructed. The reconstructed area is seen as a protective structure for the remaining

artifacts. Besides, one of the pillars was painted in its original color as a sample of representation (Figure 6).

Another partial reconstruction example is the city walls. Surrounding the city, the 6-meter-high wall with 22 towers was partly reconstructed with original Roman techniques and materials. The visitors are able to walk on the top of that part. Besides, one of the reconstructed towers serves as an entrance gate to the Archaeological Park (Archeological Park Xanten, 2017).

Figure 5 The Amphitheater with the audience watching a performance
Source: Archaeological Park Xanten, n.d.

Figure 6 a-b: The Harbor Temple – Partial Reconstruction
Source: Archaeological Park Xanten, n.d.

Presentation techniques do not have to be in physical interventions on the structures. Social activities configured through the structures or the archaeological park itself is another method. In that sense, the archaeological park offers many activities blended with informative approach. Every activity in the park is attached or served to the realization of the Roman culture. This is to invite non-professional audience to a culture that they are strange to.

Being a Park in the first place, the green lands offer relaxing leisure environment for the visitors. In addition to that, playgrounds for kids are considered throughout the facility. Roman Games section reveals as its name indicates the ancient games to the junior visitors where the rules are written down on the panels.

LVR (LandschaftsverbandRheinland)-RömerMuseum (Union of Landscape of Rheinland-Roman Museum)

Since its inauguration in 2008, the Roman Museum tells Xanten's ancient story to the visitors. The setup of the organisation is based on "chronology". From the ashlars to the reconstruction of the city, every phase is taken into consideration whilst narrating Roman history in this region. Not only conventional, behind the showcase type of exhibition is offered but also visitors can experience hands-on and virtual presentation techniques targeting every age group (Archeological Park Xanten, 2017).

The museum consists of two mass structures: the entrance hall, where the actual display is held with the small-scaled objects and the protective building that, as its name indicates, covering the bath. The museum structure not only covers up the ancient ruins but also itself emphasizes and highlights the Roman architecture. It is indicated in the European Code of Good Practice that "The conservation and presentation of archaeological remains is also part of the approach to urban organization: through innovative planning and architectural solutions, their functional or symbolic reuse can play a part in contemporary design." Having been influenced from the Roman Basilica Thermanum and Roman Baths in general, it is a modern interpretation of Roman architecture.

Figure 7 The Site Plan of the Archaeological Park
Source: Archaeological Park Xanten, n.d.(edited by the author)

Designed by the architecture firm Gatermann + Schossig of Cologne, the entrance hall – museum building – has 1.900 square meters of exhibition area. The building uses the bath foundation and by implementing ramp and platform systems, it takes visitors up and around the space seamlessly. While doing this, the 70 meter long and 5 meter high foundation wall and other display objects are naturally observed by the visitors (Archeological Park Xanten, 2017).

Figure 8 Protective Building over the Roman Bath
Source: Archaeological Park Xanten, n.d.; Thomas Mayer Archive, n.d.

The other structure – protective building– made of steel and glass floats over the Roman Bath, both conserving it from the disastrous effects of nature and defining a space of exhibition. The shell reflects the Roman Bath architecture inside and outside. By differentiation of roof levels on the exterior, placement of the steel columns to the original position of the ancient columns interior, the complexity and greatness of Roman architecture is represented.

Besides the administrative bodies, the archaeological park and museum consist of three main departments: Archaeological Excavation, Museum & Restoration and Museum Education.

The other departmental body is the Museum & Restoration section. With the opening of the Roman Museum (Römermuseum) in 2008, the museum team has been working on installation organizations. The museum's main aim is to keep the level it has been maintaining while creating new bonds between other museums and research institutions. Restoration section, on the other hand, has been serving since 1995 specializing in the professional treatment of thousands of finds in the ancient city.

The last but not least body "Museum Education" mostly concentrates on the building research. Being an ancient settlement, there are many visible structures or foundations belonging to the superstructures. There is a specialized team of architects making and implementing decisions on such buildings.

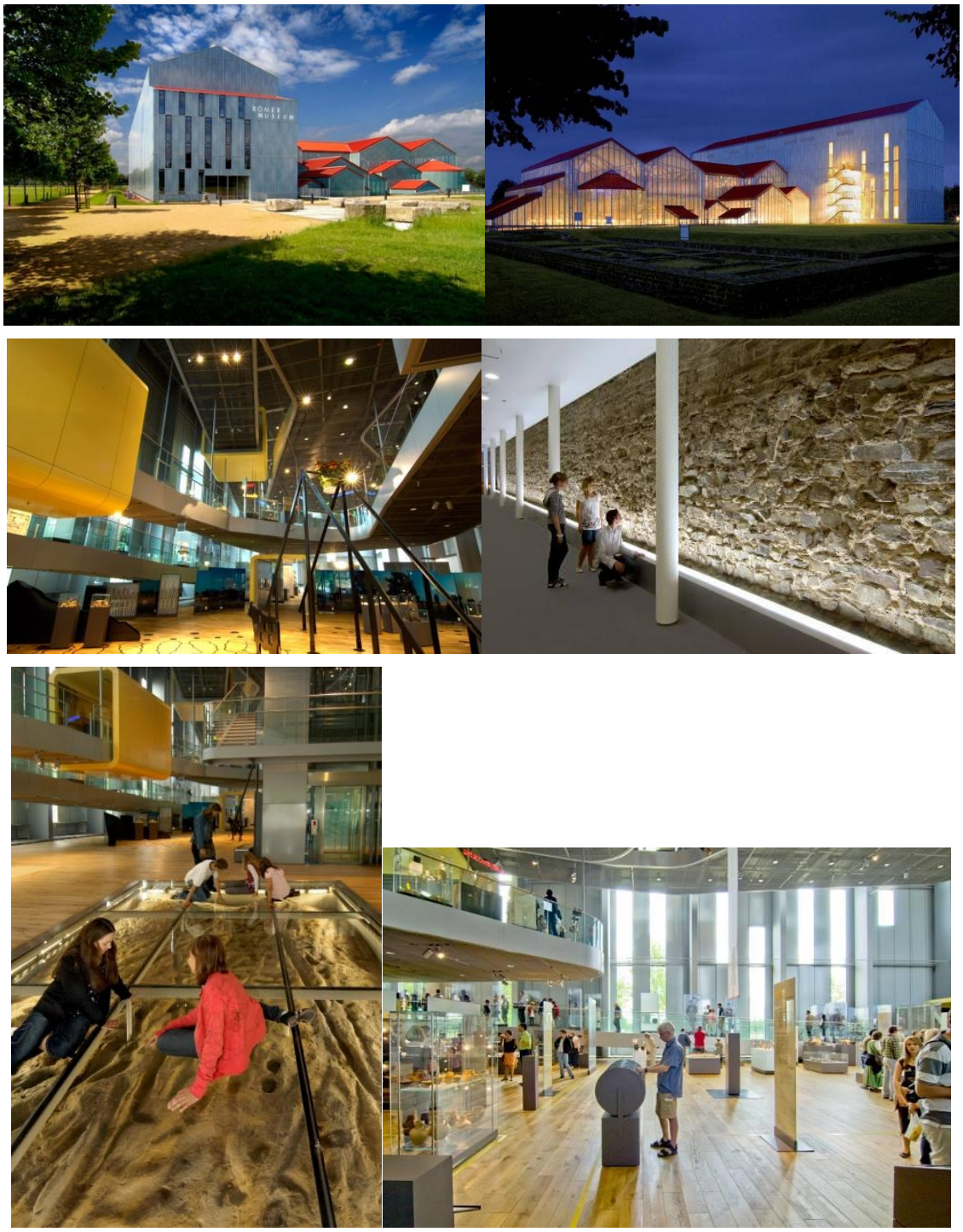

Figure 9 a-b: RömerMuseum- Entrance Hall and Protective Building
c-d-e-f: RömerMuseum from inside
Source: Archaeological Park Xanten, n.d.

Çatalhöyük

Çatalhöyük is a Neolithic tell town in Küçükköy, Konya – central Anatolia – dating back to 9000 years ago (Hodder, 2014). The site had been inhabited for longer than 2000 years, after which it had been left deserted. Having been excavated by James Mellaart first between 1961 and 1965, the excavation studies have been carried out by the leadership of Ian Hodder until 2017 (Atalay, Çamurcuoğlu, Hodder, Moser, Orbaşlı, Pye, 2010). The site was admitted to the World Heritage Sites of UNESCO in June 2012, becoming the eleventh cultural heritage site of Turkey in the list.

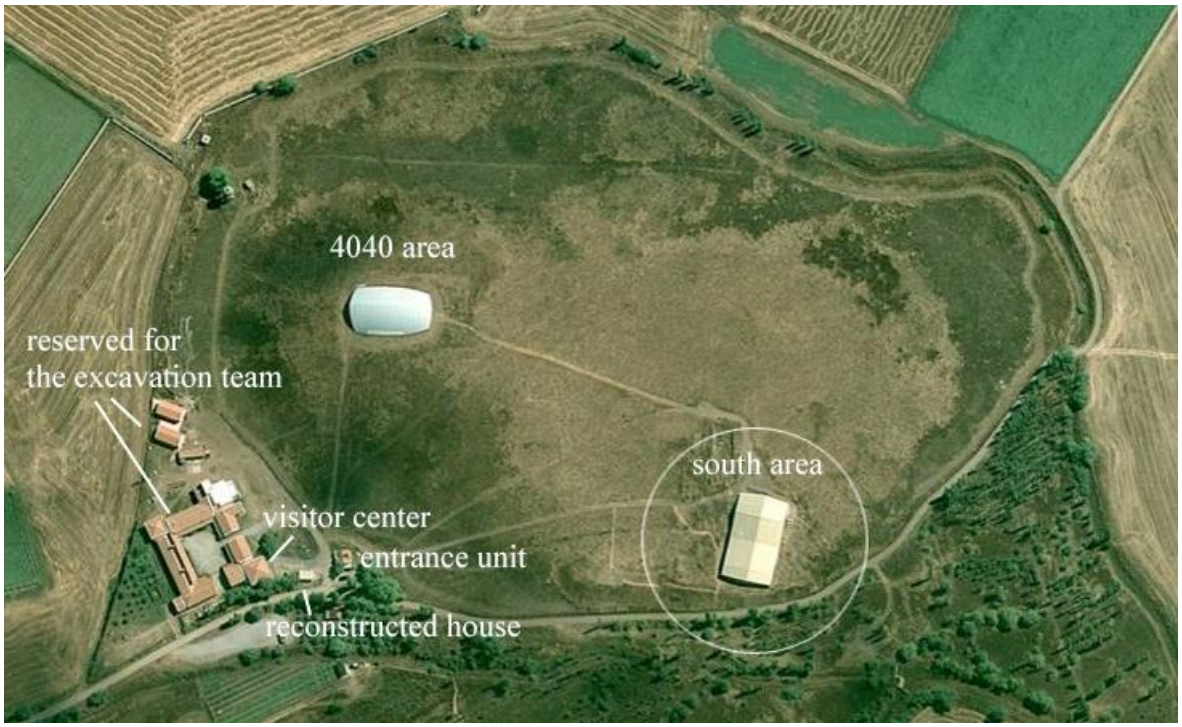

Figure 10 Site Plan of Çatalhöyük
Source: Location of Çatalhöyük,n.d.

Not only because being a Neolithic site occupied for more than two millennia, covering a large area of 13.5 hectares and crowded population ranging from 3500 to 8000, Çatalhöyük has special peculiarity in art and symbolism among the peer ancient sites. The first mural paintings of the history having been found there along with use of decorative bull heads inside the dwellings put the site to an internationally recognizable level (Dural, 2007).

Management plans for archaeological sites are vital in order to have them to be long-term protected and their cultural importance to be appreciated by the beholders. In addition, it helps the site to gain more attraction which results in economic increase as well as helping local community financially. In that sense, a “Site Management Plan” was prepared for Çatalhöyük in 2004 along with three other management plans for similar sites in the Eastern Mediterranean region under the guidance of TEMPER Project of the European Union Euromed Heritage II

Programme (Atalay, Çamurcuoğlu, Hodder, Moser, Orbaşlı, Pye, 2010). Additionally, the management plan of Çatalhöyük laid a ground work for "Law No. 2863 Legislation Called as Law Concerning to Conservation of Natural and Cultural Property" in 2005. However, since the management plan was conducted before the legislation, it has not been legally approved. The team explains the urge of having a site management plan as "to recognize the nature and characteristics of prehistoric sites, including the intangible dimension of prehistoric heritage and the social and human values it relates to" (Atalay, Çamurcuoğlu, Hodder, Moser, Orbaşlı, Pye, 2010).

Figure 11 a-b: The shelter of 4040 area (North Area) (from authors archive)
c. Shelter of the South Area
Source: Atölye Mimarlık, n.d
d. Inside the shelter of South area
Source: Authors Archive

There are many studies in the favor of conservation and preservation of the site. Considering its architectural and materialistic features, the settlement requires several protection means due to erosion and collapse (Hodder, 2014). After using temporary textile covers for a while and seeing their quick deterioration over time, permanent decisions needed to be taken. Therefore, two shelters designed by AtölyeMimarlık were constructed starting from 2000 which were located at South Area and 4040 area (also known as North Area). The first one is constructed

with steel frame system sitting on a concrete belt and has a polycarbonate roof. The latter is again resting on a concrete belt but having timber construction system covered with polycarbonate as well. The both have sides that can be opened up during summer time in order to get proper airflow and balance the temperature inside. In addition, the shelters have shallow foundations in order to minimize touching surface to the excavation area. However, the shelters create their own problems since they may cause a microenvironment inside the shelter which results in harming the ruins, thus a proper and regular monitoring is necessitated (Atalay, Çamurcuoğlu, Hodder, Moser, Orbaşlı, Pye, 2010).

Figure 12 The reconstructed Neolithic house of Çatalhöyük
Source: Authors Archive

In terms of interpretation and presentation framework, Çatalhöyük stands as a model for the ancient cities in Anatolia. The excavation team took it as their priority – or one of the most–to present or advertize the site in a systematic and holistic way. Although main findings and detailed information are presented in Anatolian Civilization Museum in Ankara and Konya Archaeological Museum, in-situ experience is priceless. So as to that, a reconstructed Neolithic dwelling at the entrance and a Visitor Center help non-specialist audiences to grasp the site and the ongoing process (Atalay, Çamurcuoğlu, Hodder, Moser, Orbaşlı, Pye, 2010).

In order to determine strategies for exhibiting Çatalhöyük, a team was set up consisted of American and English researchers trained for presentation and visualization of archaeological heritage. The “visualization team” tries to find the most appropriate ways to display research findings to the diverse type of audiences via using virtual environments, graphic communications and conventional exhibition techniques. Besides, the team also works for the

visitor's centre, new informative panels and signage system, guidebook and pathway for the visitors (Atalay, Çamurcuoğlu, Hodder, Moser, Orbaşlı, Pye, 2010).

Figure 13 a. The Visitor Center
Source: Authors Archive
b-c: The information panels at 4040 area and South area
Source: Authors Archive

Usually conservation is thought to be a physical act. But maybe as vital as it is, there is another factor which plays an important role: that is the social act. Localization is thought to be one of the most efficient ways in that sense. The first hand conservation can be efficiently done by integrating locals to the excavation project. These approaches both enable cultural development and integration of the past and present particularly as well as contributing to the economy. One of the best examples for the successful localization can be the case of Sadrettin

Dural, the guide of Çatalhöyük. As Ian Hodder refers to him as “self-improved”, he even published a memoir book narrating his life at the site (Dural, 2007).

Ostia Antica (Old Ostia)

Roman harbor city of Ostia was located at the mouth of Tiber River in the ancient times, as the name Ostia means “mouth” in Latin. Today the city still lies on the bed of Tiber but due to the silting and the change of the river course, the settlement stands recessed from the shoreline.

The archaeological site Ostia Antica, which means Old Ostia, stands 30 km away from the city center of Rome. It is inside the borders of modern suburb Ostia, which is a popular destination for Roman citizens to get away for some sea vacation on weekends. The trip takes around half an hour from Rome to the archaeological site, where there is a close train station to the archaeological park. The park compares a visit there with a visit to Tivoli and Hadrian’s villa, and claims it as “a relaxing trip that takes you away from the noise and incessant police-sirens of Rome” (Ostia Antica Tourist Guide, 2017).

Figure 14 Aerial View of Ostia Antica
Source: OSTIA, n.d.

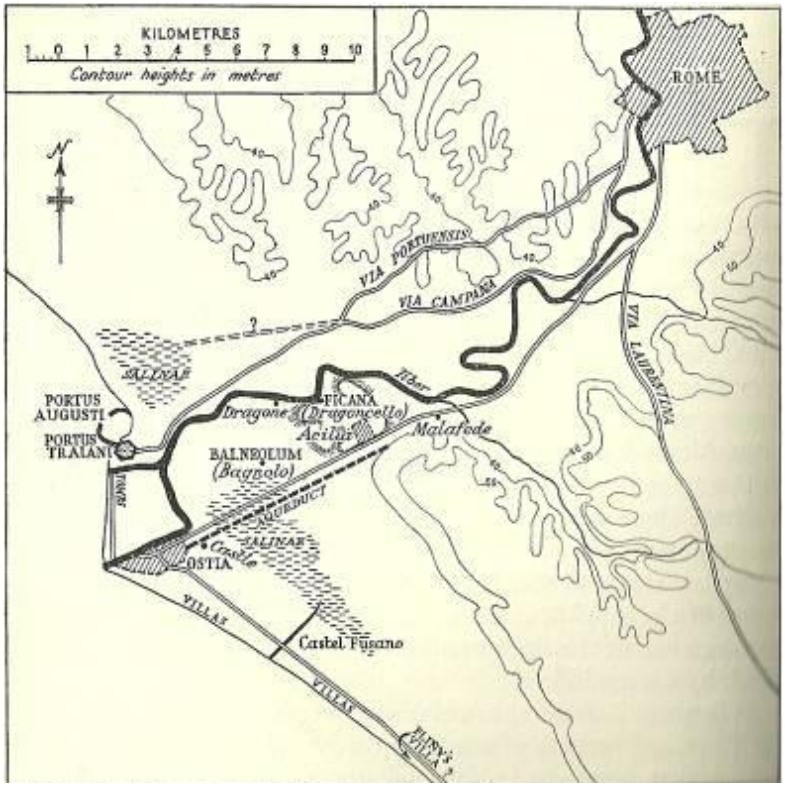

Figure 15 Map showing Rome and Ostia
Source: Meiggs, 1973

The ancient city of Ostia dates back to late 7th century BC and was founded by Ancus Marcius, the fourth king of Rome. Not before 2nd century, the city gained commercial importance as a harbor due to the city of Rome's enlargement in population. Tiber was used as a main transportation mean however the mouth of the river was not sufficient for large ships to enter. Thus, the products used to be loaded down in Ostia and transported to Rome separately by smaller ships. However, this harbor became insufficient and lacked of security for large ships. Therefore, two more harbors were constructed at north of Ostia in 1st and 2nd century AD: Portus Augusti during Claudius reign and Trajan's Harbor during Nero's (Ostia Antica Tourist Guide, 2017).

Due to the new harbor districts, Ostia gained a lot of prosperity and inevitably enlarged its size. So as to that, the city went into serious restorations and new constructions in 2nd century AD. Due to these restorations, the city is thought to be a perfect example for how the most powerful Imperial Rome would have been looked like (Aldrete, 2008). Hence the architectural elements belonging before that cannot be traced back, except the Castrum built in 3rd century BC.

The decline of Ostia started around early 3rd century with the loss of Roman power gradually. Density of the population decreased, so as the economy. Besides, natural disasters prepared the end for Ostia. Due to the economic reasons, buildings could not be renovated. By the middle of

6th century AD, Ostia was totally abandoned. In later years, since it was not covered entirely by dust and earth, building materials, especially marbles were used in many cities (Meiggs, 1973).

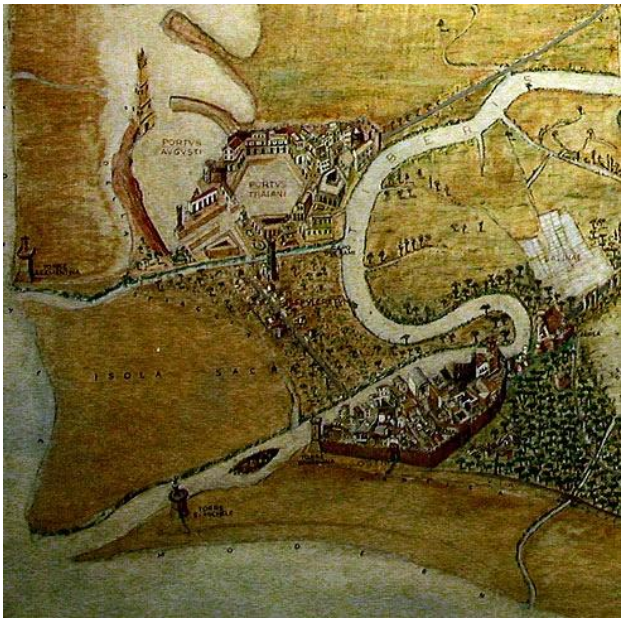

Figure 16 Map showing Ostia, Portus Augusti and Portus Trojani
Source: VROMA, n.d.

After the abandonment for centuries, the excavation studies started in 1855 under the control of Pope Pius IX, since Ostia was Vatican's property back then. The first scientific excavation, however, was initiated in 1907 under the directory of Dante Vaglieri. Until 1938 with the interruption of Mussolini, the systematic studies continued. According to Mussolini's political policy, he wanted to link his governance with the ancient Roman Empire, whereas Ostia would have been his display area for World Fair. Between 1938 and 1942, rapid excavations were held in Ostia, without any documentation. The fair was never realized and after the World War II, the excavations continued in a smaller scale. Till then, the site is not excavated but restorations are taking place (Meiggs, 1973).

Ostia Antica displays a didactic presentation technique where only minor restorations, reconstructions and anastylosis are made. During the restorations, the aim was to return the very original state of the structure. Additions thought as "flimsy" belonging to the late-antique and early-mediaeval periods were thrown away, as well as lately added windows and doors. During the reconstruction of the walls, weighing tons sometimes, fallen materials such as masonry and ancient bricks were used to fill the gaps. In case of insufficient original material on the ground, new bricks were used which are almost identical with the ancient ones (Ostia Antica Tourist Guide, 2017).

Along with the restorations, visitor friendly methods are provided in the site. The information panels are placed around, content of which vary from visitor route, excavation zoning through time to information about buildings. The panels defining routes are placed only at the entrance of the archaeological site. Information panels all around the site are helpful hence they need to be renewed. At the end of the site, there is a building with frescos on the walls. It is covered with a protective shelter in a modern way, allowing the visitors to see the mosaics from outside. Mainly the graphic communication approach of presentation is basic and far from being modern.

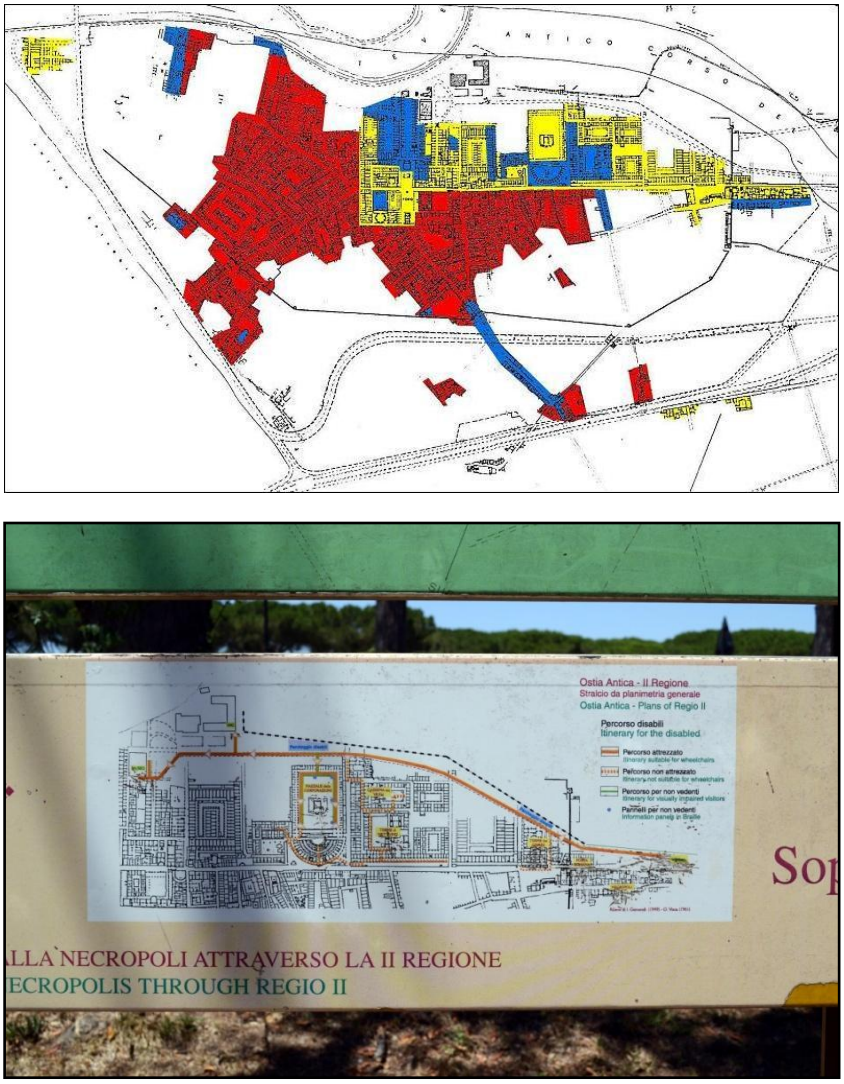

Figure 17 a. Information panel showing excavation areas of Ostia by date.
Source: OSTIA, n.d.
b. Information panel showing visitor routes, 2016
Source: Authors Archive

Figure 18 a-b-c: Intervention techniques in Ostia Antica, 2016
Source: Authors Archive

Figure 19 Protective Shelter
Source: Authors Archive

Conclusion

In the case of Xanten, there are many reconstruction techniques implemented since there were very few traces left. By this implementation, economic development is achieved with high number of visitors because they like what is visible to the eye. Each year the site gets approximately one million visitors. However, in terms of conservation, that amount of reconstructions and realizations without sufficient materials can cause misunderstanding and create wrong imagination to the visitors as well as scholars.

On the other hand, at Ostia Antica the architectural remains are ample. Therefore, only by reconstructing some parts, three dimensional city image is obtained with minor presentation

related additions. As well preserved as it is, the site has a problem of bonding with the people. One would feel walking down the street watching show cases. In addition, the information panels should be renovated since many of them are rusted and their number should be increased.

In the case of Çatalhöyük, there is not any physical intervention to the architectural remains. The reconstruction of the Neolithic house gives visitors a solid understanding of what the ruins were once used to be. In addition to that, Çatalhöyük reflect the spirit of the place by innovative yet simple graphical language. In Çatalhöyük, using the figures of the famous wall paintings in the information sources creates an intimate and strong bond with the visitors since they find something about being human and the site was once used by humans.

These three cases show us that several interpretation and presentation methods can be used separately or together in archaeological sites. Actually there are common methods for each case: for example the information panels. Although they all benefit from this method, in each case it is treated in a different manner. This outcome reveals that every site has its own peculiarities so that prototype methods cannot provide the reflection of the spirit of the place. Even though archaeological sites, being cultural heritages, share a common cultural background, they represent different layers and visions of it, none of which can be represented by a single point of view.

The choice of the interpretation and presentation methods has many variables. As it is driven from the three cases that, the historical period of the ancient city and the current country it is situated at; relatively sociological, cultural and economic approach of the country affects the decision of the method. Besides, several interpretation and presentation methods can be implemented according to the amount of architectural remains the site has, the attitude of the interpreter, amount and quality of the data that is wanted to be given.

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The Discussion of Turkey's "Space - Dwelling" Notions in the Context of 'Value': A Theoretical Analysis

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Abstract

Cultural sustainability, as an important part of sustainability, is considered one of the key remarks of spatial design. The variable structure of culture provides different environmental values for different periods. For this reason, it is thought that the values of the built environment will provide a significant data to question cultural sustainability. The aim of this study is to investigate the effects of the dwelling options produced in Turkey after 2000s' on the 'value' parameter in spatial design discipline, by compiling indications made in different disciplines. The value of design, which are described by Madea as social goals and qualitative characteristics (2006), was chosen as a criteria for evaluating space and dwelling notions. The sub criteria of social value is defined as 'culture - society' and the sub criteria of qualitative value is defined as 'identity - individual' by means of semiotics. The study, in which theoretical structure is based on literature survey, evaluate the dwelling samples presented after 2000, in the light of the dwelling development process of Anatolia and Turkey, in the context of space and dwelling notions. As a result of this evaluation, possible suggestions are given for the spatial design.

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Anahtar kelimeler:

Mekân tasarımı, tasarım değeri, kültür-toplum, kimlik-birey

2000'ler Türkiye'sinde "Mekân - Mesken" Kavramlarının 'Değer' Kavramı Üzerinden Sorgulanması: Kuramsal Bir İnceleme

Gökçe ATAKAN*

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Öz

Sürdürülebilirliğin önemli bir parçası olan kültürel sürdürülebilirlik, mekân tasarımının en önemli konularından biri olarak düşünülür. Kültürün değişken yapısı, farklı dönemler için farklı çevresel değerler sağlar. Bu nedenle, yapılı çevrenin değerlerinin kültürel sürdürülebilirliği sorgulamak için önemli bir veri sağlayacağı düşünülmektedir. Bu çalışmanın amacı, 2000 sonrası Türkiye'de üretilmiş olan konut seçenekleri ve etkileri hakkında farklı disiplinlerde yapılmış olan tespitleri bir araya getirerek, mekân tasarımının 'değer' parametresi üzerindeki etkilerini araştırmaktadır. Madea tarafından, toplumsal hedefler ve niteliksel özelliklerle açıklanan tasarımın değeri (2006), bu çalışmada mekân ve mesken kavramlarını değerlendirmek üzere ölçüt olarak seçilmiştir. Toplumsal değer alt ölçütü 'kültür – toplum' olarak, niteliksel değer alt ölçütü ise göstergebilim üzerinden 'kimlik – birey' olarak belirlenmiştir. Kuramsal altyapısı literatür taraması yöntemi ile yapılmış olan çalışma, Anadolu ve Türkiye konut gelişim sürecinin ışığında, 2000 sonrası sunulan konut örneklerini mekân ve mesken kavramları bağlamında okumaktadır. Çalışmada yapılan değerlendirilme sonucunda, mekân tasarımı için olası öneriler verilmektedir.

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Giriş

Sürdürülebilirlik kavramı, 'toplum-insan' ikiliğinde var olagelmiş ve birçok alt başlığı içinde barındıran bir olgu. Özellikle soğuk savaş sonrasında (1990'lar) gündeme getirilen ve önemi vurgulanan kavram, çevresel dengenin sağlanması amaçlamaktadır (Brocchi, 2008). Türkiye'de de çalışılan ve sıklıkla önemi belirtilen kavramın, özellikle kültürel bağlamda yeterince önemsenmediği düşünülmektedir. Kültür, toplumun duygu ve düşünce birliğini sağlayan değerlerin tümü olarak tanımlanmaktadır (Hançerlioğlu, 1976). Oldukça karmaşık olan kültür olgusu, semiyotik ve normatif bir sistemdir (Finke 2003'den akt. Brocchi, 2008). İnsan yaşamına dair kararlarını, çevresinde kodlanmış olan bu norm ve değerlerden alır. Kültür ile aktarılan bu değerler, yalnızca sözel kaynaklardan değil, aynı zamanda da yapılı çevreden insana ulaşır (Brocchi, 2008).

Kültürel sürdürülebilirliğin koşulu olan yapılı değerler, toplum-insan diyalektiğinin sonucunda meydana gelir. İnsan, biyolojik olarak türüne tanımsız bir çevreye doğar. Bu sebeple çevresini şekillendirerek adapte olur. Bahsi geçen tanımsızlık, insanı toplum yaşamına iter. Dolayısıyla toplum insanı var ederken, insan da toplumu var eder. Bu diyalektik hem kültürün, hem de yapılı çevrenin var oluşunun temelini oluşturur (Berger, 1967). Kültürün değişken yapısı, dönemsel farklılıklara gebe bir yapılı çevre sunar. Ancak burada iki önemli vurgu yapmak gerekir. Bunlardan birincisi, kültürün yapılı çevreye referans teşkil etmesi, ikincisi ise dönemsel verilerin yapılı çevreden okunması ile ilgilidir. Herbert Marshal Mcluhan'ın sözü ile her ortam (medium) aslında kendisi bir mesajdır (McLuhan Herbert'dan akt. Brocchi, 2008). Bir diğer deyişle; her yapı, işlevi ne olursa olsun, yapıldığı döneme dair yapısal özellikler taşır (Atakan, 2016).

Tüm avantaj ve gerekliliklerine rağmen, kültürel sürdürülebilirlik, küresel kapitalist düzende geri plana atılmak istenmektedir; çünkü tüketim toplumu ile beslenen kapitalizm daima yeniyi arz etmek ister. Arzın koşulu da taleptir. Yeniyi talep etmenin norm kabul edilmesi için ise eniyi araç medyadır. Toplum, izlediği haber ve eğlence programları ya da reklamlardan, kullanıma sunulan tüm ürünlere kadar bu mesajı alır (Brocchi, 2008). Topluma sunulan yaşam alanları ya da alternatifleri bu konuya dahil edilebilir.

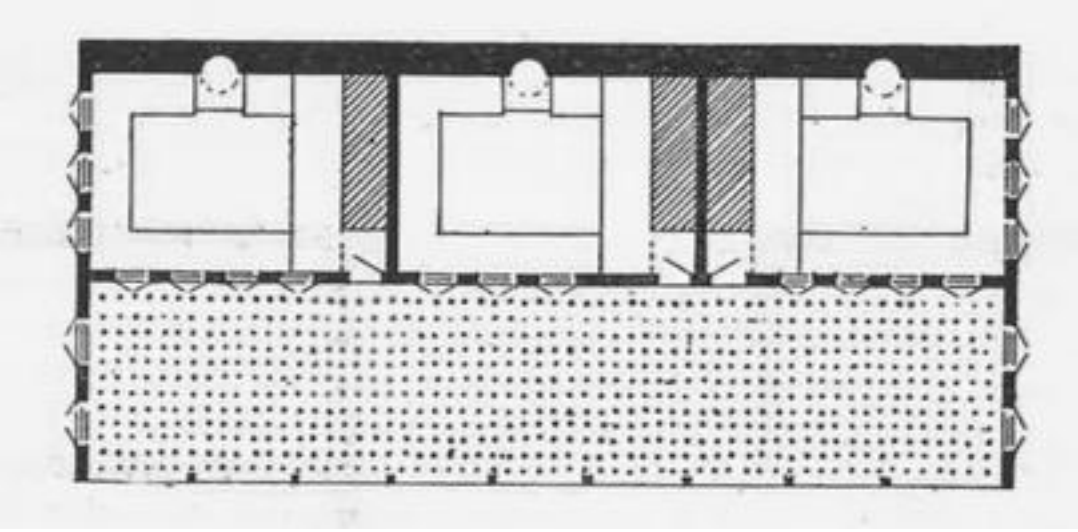
Bu çalışma 2000 sonrası Türkiye'de üretilmiş olan konut seçenekleri ve etkileri hakkında, farklı disiplinlerde yapılmış olan tespitleri bir araya getirerek, mekân tasarım disiplinlerine etkilerini araştırmaktadır. Araştırma tasarımın 'değer' parametresi üzerinden ilerleyerek, 'kültür – toplum' ve 'kimlik – birey' ölçütleri ile kuramsal bir değerlendirme yapmayı amaçlamıştır.

Anadolu ve Türkiye'de Konut Üretimi Gelişmeleri

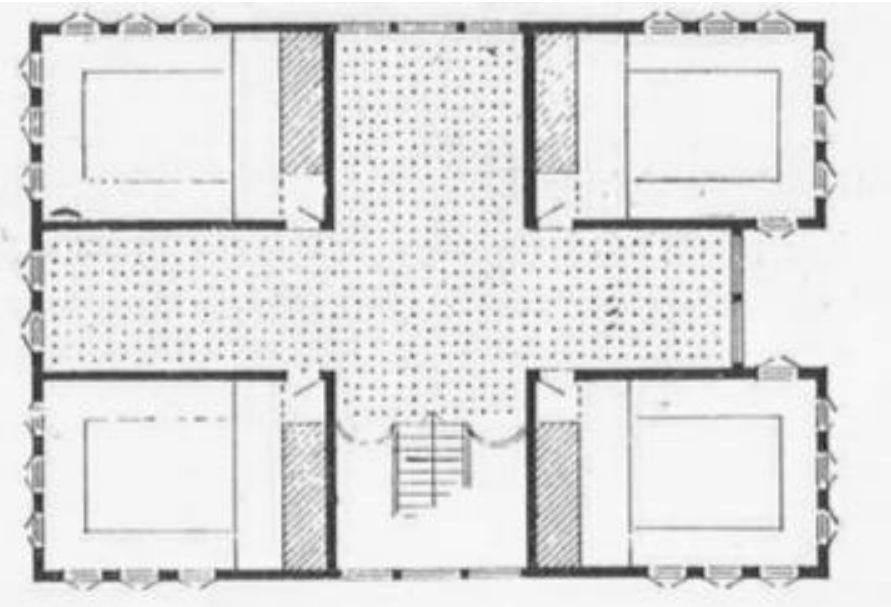
Türkiye'de 2000 yılından bu yana gözlemlenen yapılaşma ve konut üretimi değerlendirilmeden önce, Anadolu Kültürü konut biçimlendirmelerinin de irdelenmesinin doğru olacağı düşünülmüştür.

Anadolu konutu, toplum yapısını ve kültürel yaklaşımı en iyi anlatan birimlerden biridir (Kayserili & Kocaman, 2014). Plan şemalarında yöresel özellikler gösterse de geleneksel Anadolu konutu; birim odalar ve onların arasında olan sofalarla kurgulanmıştır. Birim oda evli bir çifti barındıracak niteliktedir. Oturulabilir, yatılabilir, yıkanılabilir, yemek yenebilir ve hatta yemek pişirilebilir. Bu nitelik boyutlara bağlı değildir. Değiştirilebilir bir düzene sahip kurgu göçebe kültüründen evrilmiştir. Her işlevin gerekleri, eylem bitince ortadan kaldırılır. Odanın ortası daima boş bırakılma eğilimindedir (Günay, 1998).

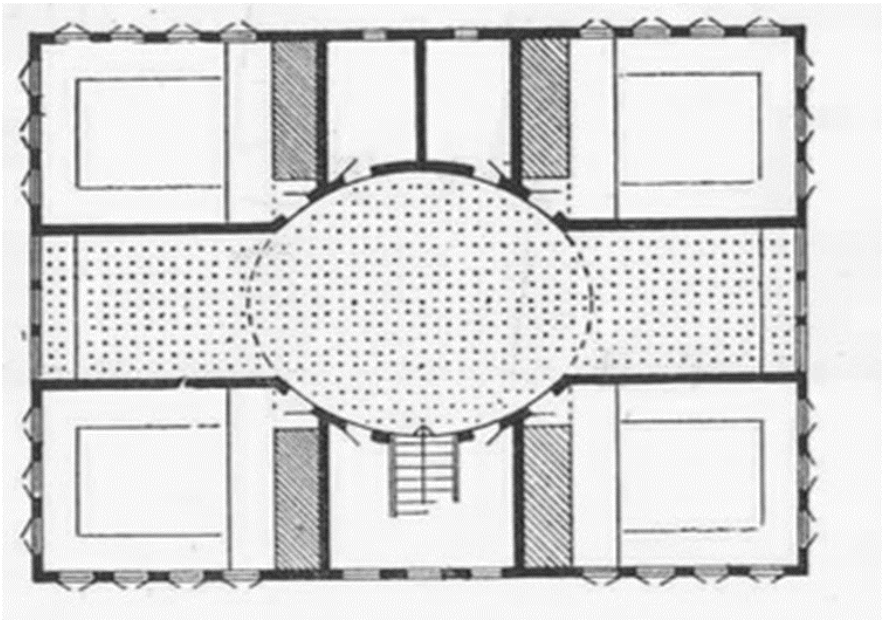
Planlar, birden fazla birimin bir 'sofa' çevresinde dizilmesiyle oluşur. Sofalar, odalar arası ilişkilerin sağlandığı, ancak sadece dolaşım için değil aynı zamanda toplanma amacıyla da kullanılan ortak alanlardır (Küçükerman, 1985). Odaların aksine her özelliği ile değişkendir. Bu sebeple biçimlendirmeleri değişen Anadolu evi tipleri sofalara göre ilk kez Sedat Hakkı Eldem tarafından dış sofalı, iç sofalı ve orta sofalı olarak sınıflandırılmıştır (Eldem, 1954) (Şekiller 1, 2 ve 3).



Şekil 1 Dış Sofalı İdeal Plan Tipi Örneği
Kaynak: Eldem, 1954, s.34



Şekil 2 İç Sofalı İdeal Plan Tipi Örneği
Kaynak: Eldem, 1954, s.93



Şekil 3 Orta Sofalı İdeal Plan Tipi Örneği
Kaynak: Eldem, 1954, s.130

Bu biçimlendirmeler, tarihi, coğrafi, iklimsel etkilerden ve toplum yapısı, aile yapısı, yaşama biçimi gibi sosyal etkilerden kaynaklanmıştır. Ancak, Türk evinin biçim ve boyutlarının belirlenmesinde ekonomik etkenlerin yeri yoktur. Ekonomik değişkenler sadece yapı malzemelerinde ve süslemelerde görülür (Küçükerman, 1985).

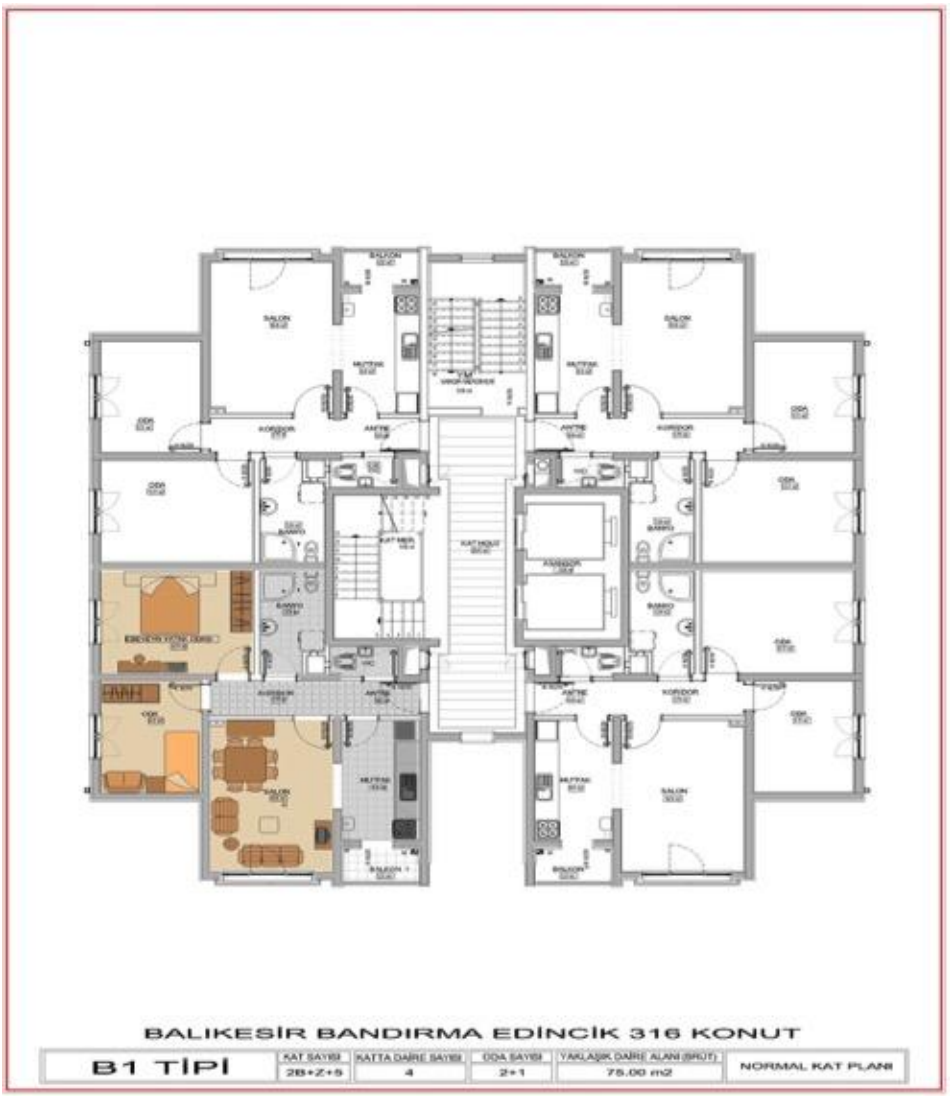
Anadolu konutu 1814'lere kadar farklı biçimlenişlerle var olmuş olsa da, modernleşme ile konutun kendiliğinden tanımlı mimarisinin bulunduğu çağ bitmiştir (Tanyeli, 1999). Geleneksel konut kültürü terk edilmiş ve küresel bir konut kültürü yaygınlaşmaya başlamıştır (Ungan, 1962). Ancak bu yayılma keskin olmamıştır. 1830'lar ve 1920'ler arasında yaşanan göreli modernleşme konutu şehirde önce yatay sıralı sonra düşey sıralı düzene getirmiştir (Bilgin, 1999). Eş zamanlı olarak, kamu yapılarında modernleşme dikkati çeker. Ancak bu biçimlerin hiç biri Anadolu'ya ait değildir (Bilgin, 1999). Cumhuriyetin kurulması sonrası radikal bir hal alan modernleşme, şehir ölçeğinde planlamalar yapılarak büyümeye devam etmiştir. Ancak 1945 – 1980 arası gerçekleşen tarımda makineleşme sonrası Anadolu'da artan işsizlik, şehirlere göçü arttırmış, bu da şehirlerde plansız büyümeyi ve gecekondulaşmayı getirmiştir (Koca, 2015).

Merkezinde tüketim olan neo-liberal politikaların desteğiyle 1980'lerle beraber karşılaşılan her ekonomik krizde, sunulmak üzere daha fazla konut üretilir. Ancak üretilen konutlarda artık evrensel ya da modernist olma kaygısı taşınmamaktadır. Yapılan konutlar sadece üretim odaklıdır (Bilgin, 1999).

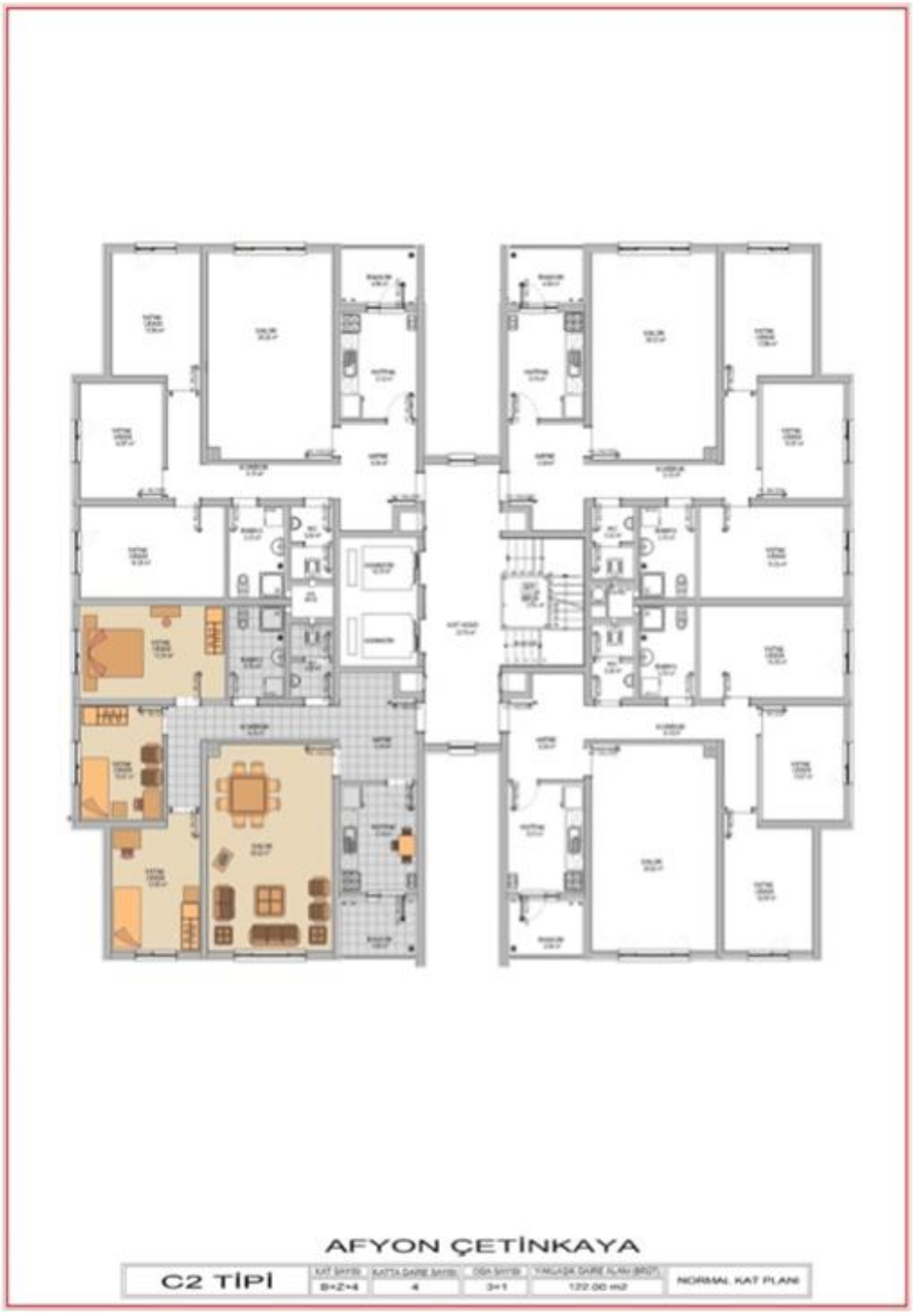
Türkiye'de inşaat sektörünün ikinci büyüme dönemi olarak kabul edilen 2002 – 2008 yılları arasında devlet, büyümeyi desteklemek üzere yasal ve yönetsel düzenlemeyi yürürlüğe sokmuştur (Balaban, 2011). Özellikle Gölcük depremi (1999) sonrası sorgulanmaya başlayan, yapılı çevrenin dayanıklılık durumu (Genç 2008'den akt. Koca, 2015), kentsel yenileme ve kentsel dönüşüm fikirlerinin temelini oluşturmuş, ancak proje bazlı bir yenileme sürecine girilmiştir. Yerel yönetimlere verilen haklar ve afet riski üzerine çıkan kanun sayesinde özgürleşen konut sektörü, yapılı çevreyi dönüştürmek yerine, yıkılma ve yeniden yapma yolunu tercih etmiştir (Koca, 2015). "Oysa her yıkılan eski konut, kent dokusunu, tarihi ve sosyal yapıya dair belgeleri de ortadan kaldırmaktadır" (Kuban, 2000, s. 149).

İnşaat sektöründeki büyümenin desteklenmesi kapsamındaki düzenlemelerin odağında devletin toplu konut politikası ve üretimi yer almıştır (Balaban, 2011) ve bu durum önemli bir kimlik sorunu oluşturmaktadır (Koca, 2015). Toplu Konut İdaresi (TOKİ), özünde konut üretimiyle görevli bir kurum olarak kurulmuş olsa da, 2003 sonrası çeşitli yasalarla çalışma alanı genişletilmiştir. Doğrudan başbakanlığa bağlı olarak çalışan, herhangi bir denetim mekanizması olmayan kurum, 500'e yakın yüklenici ile çalışan bir yönetim birimi olmuştur (Yapıcı 2011'den

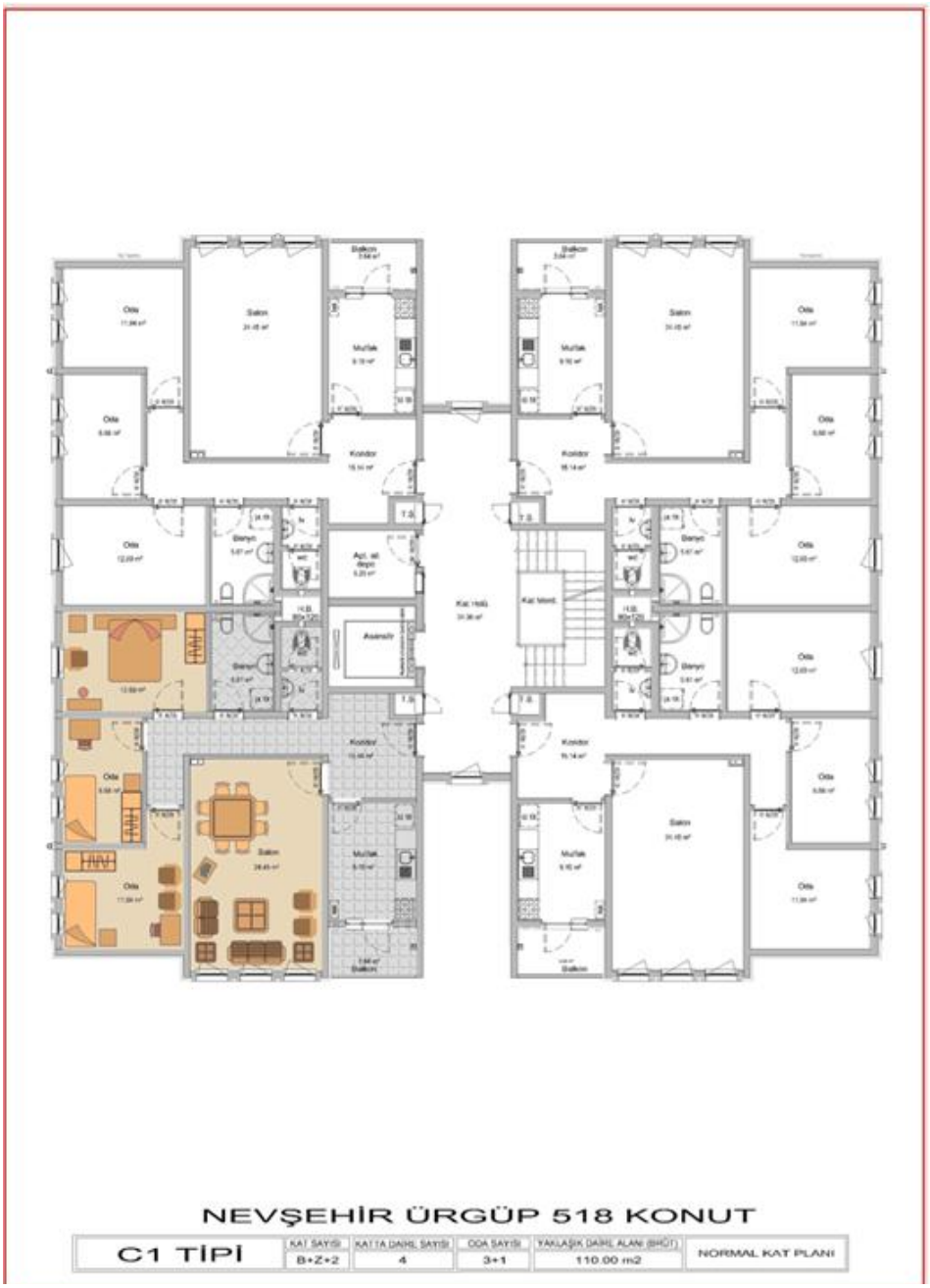
akt. Koca, 2015). Bu yetkilendirme sonrasında, konut politikalarını yöneten kurum haline gelen TOKİ, Türkiye'nin her yerinde, iklimsel ya da kültürel etkileri gözetmeksizin, aynı tip konut üretimini gerçekleştirmektedir. TOKİ'nin ürettiği projelerde, bölgesel ve yerel sivil mimari örneklerini de yansıtan bir planlama bağlamında, mimari kültürden beslenmiş çağdaş yorumlama gibi bir kaygı olmadığı açıktır (Gür, 2017) (Şekiller 4, 5 ve 6).



Şekil 4 Balıkesir B1 tipi TOKİ konut örnek planı
Kaynak: TOKİ, (n.d.)



Şekil 5 Afyon C2 tipi TOKİ konut örnek planı
Kaynak: TOKİ, (n.d.)



Şekil 6 Nevşehir C1 tipi TOKİ konut örnek planı
Kaynak: TOKİ, (n.d.)

Özellikle ekonomik gücü düşük 3. Dünya ülkelerinin zaaflarından olan, içi boşaltılmış, anlamını yitirmiş popülist ve sıradan konutlar, sadece bir kabuktur (Bilgin, 1999). Geri kalmışlıkla kendi kültürel değerlerinden uzaklaşan ülkelerde konut da olumsuz yönde evrimleşmiş ve o topluma dair olan anlamından kopmaya başlamıştır (Kayserili & Kocaman, 2014). "Modernizmin kelime anlamı boşaltılara taklit ile tek tip bir görsellik oluşturulmaya çalışılmış, kültürel özellikler arka plana atılmıştır" (Yayınoğlu & Sunar, 2008, s. 19). Taklit, düşünsel anlamda içi boşaltılmış bir yaklaşımdır. Taklit edilen, eklendiği kavramı olduğundan fazla göstermek içindir (Adorno, 2007). Taklit bu bağlamda değerlendirildiğinde, süsleme olarak kavramsallaştırılır. Süsleme, mekândan meskeni çıkartırken, ruha dokunmak için sahte bir paravanla insan ile mesken arasındaki bağı koparmaktadır (Loos, 2014).

2000'ler Türkiye'sinde gelindiğinde, popülist ve kapitalist modernleşme üzerine geliştirilen "plansız ve yetersiz projelerin sonucunda kültürel mirası yok etme" (Stevenson, 2003, s. 87), "toplumsal ayrımcılığı güçlendirme" (Best & Kellner, 1998, s. 31), 'bireylerde sanal tatmin duygusu yaratma' (Marmasan, 2014) ve 'kimliksizleştirme' (Heidegger, 1971) etkileri okumaları yapılabilmektedir.

Kavram ve Ölçütler

Bu çalışmada, temel alınmış olan kavram ve ölçütler Tablo 1'de özet olarak verilmiştir.

Tablo 1 Çalışmanın Kavram ve Ölçüt Tablosu

KAVRAMLAR	MEKAN: İŞLEVİ BELİRLİ KİMLİKLENDİRİLMEMİŞ YER
	MESKEN: KİMLİKLENDİRİLMİŞ KONUT (GÜVEN, AİDİYET, KENDİLEME)
ÖLÇÜTLER	KİMLİK – BİREY: MEKANIN ANLAMLANDIRILMASI VE KİMLİĞE GÖRE (GÖSTERGEBİLİM BAĞLAMINDA BİÇİM – İŞLEV – ÇAĞRIŞIM)
	KÜLTÜR – TOPLUM: KÜLTÜR VE TOPLUM YAPISINA, İKLİMSEL COĞRAFİ ÖZELLİKLERE GÖRE (SÜRDÜRÜLEBİLİR, EVRENSEL TASARIM İLKELERİNE UYGUN VB.)

Kavramlar

Bu çalışma, Türkiye'de 2000 senesi ve sonrasında üretilen konutların tasarım değerini irdelemeyi amaçlamaktadır. Çalışmanın daha verilmiş okunabilmesi için, çalışma kapsamında kullanılan mekân ve mesken kavramlarını açıklamak uygun görülmektedir.

Mesken; insanlığın varoluş mücadelesi içinde barınma güdüsü ile ortaya çıkmıştır. Bu güdü, Maslow'un İhtiyaçlar Koramı'nın en temelinde yer alır (1954) ve kendini gerçekleme yolunda en alt seviyededir. Bireyin, tamamlanmamışlığı içinde, dış dünya ile kurduğu ilişkilerinde deneyimlediği ve algıladıkları üzerinden, kendisini ve çevresini zamanın gereklerine göre inşa ettiği söylenebilir. Algılama bilişsel bir süreçtir ve çevreden gelen uyarıcıların, duyu organları yoluyla sinirsel tepkiye dönüşmesi sonucu, zihinsel olarak işlenerek yorumlanması ve kavranması olarak tanımlanmaktadır (Solso, Maclin, & Maclin, 2011). Bu yorumlama eylemi, bireyin uzun süreli belleğinde varolan kısmen nesnel, kısmen öznel birikimleri ile ilişkilendirilmesi sonucunda gerçekleşir ve bilgiye dönüşür (Senemoğlu, 2007). Düşünce ve davranışlara yön vermek üzere devingen olarak üreten beyin için mekân ve çevre – uyaran verilerin toplandığı yerler – göz önüne alınması gereken değerler olarak kabul edilmektedir. Bu bağlamda mekân ve çevrenin niteliksel ve niceliksel özelliklerinin bireyin algısı üzerinde önem taşıdığı düşünülmektedir.

Öznel birikimler, anı ve deneyimler olduğu kadar bireyin içinde yaşadığı toplumun kültürüyle de ilişkilendirilmektedir. Çünkü semiyoloji bağlamda anlamlandırma ve değer biçme çağrışım ile tarif edilmektedir. Bu bağlamda Kültür, bir toplumun duygu ve düşünce birliğini sağlayan değerlerin tümü (toplumun tüm değerleri) olarak tarif edildiğinde (Hançerlioğlu, 1976); toplumsal bellek, kültürün düşünsel değerlerine karşılık gelebilir. Toplumsal bellek, bir topluma ait olarak heyecanları, anıları, gelenekleri olarak düşünülmektedir. Kültürün önemli bir parçasını oluşturur ve mekân tasarımının temel taşlarından biri olarak kabul edilir. Çünkü tasarlanan mekân; mesken olmak üzere yapılandırılacak ise her türlü duyu ile algılanmış ve bellekte saklanmış bireysel ve toplumsal imlerin çağrıştıracak ve duyguları canlandıracak bir yer olmalıdır.

Kültürel getirileri ve çevresel ilişkileri ile mesken, aidiyet duygusunu yansıtacak ve kişide "nasıl ve nerede" olduğu bilgisini verecektir. Kişi kendi mekânında ve güvende olduğunu bilecektir. Ergonomik ve ekonomik düzenlemeler üzerinden kurgulanmış, sıradan bir ünite olan mekân; kültürel ve çevresel girdiler ve deneyimler ile meskene dönüşebilecektir. Bu sebeple bu çalışma kapsamında mekânsal algı; toplumsal kabuller (kültür) ve kişisel deneyimlerle mekânın niceliksel değerlerinin yorumlanması olarak çevresel algı ise; sosyal ilişkiler üzerinden yapılı çevrenin değerlendirilmesi olarak kabul edilmektedir.

Maslow'un İhtiyaçlar Kuramı'nın ikinci basamağı olan güven duygusu ve üçüncü basamağı olan aidiyet gereksinimi (1954), konut kültürünün önemli konularından biridir. Aidiyet; bireyin çevresine ve içinde yaşadığı topluma kendini ilişkili hissetmesine dair duygu ve durum olarak tarif edilebilir (Aydın, 1999). Bu ilişkili hissetme–tanıma, aşina olma olarak yorumlanabilir. Tanıma işlemi, bilişsel olarak uzun süreli bellekte var olan bilgilerle, yeni duyumsanan verilerin karşılaştırılarak algılanmasıdır (Senemoğlu, 2007). Uyarının bağlamıyla ve bireyin uzun süreli belleğinde daha önce geliştirdiği şema ve kavramlarla, bilişsel becerileri doğrultusunda gerçekleşmektedir (Ülgen, 2004). "Tanıdık gelen mekânlarda birey kendini daha güvende hisseder ve dolayısıyla aidiyet duygusu geliştirebilir" (Yıldırım Erniş, 2012, s. 144). Özellikle yer-mekân bağlamında; "yaşantı, anılar, sosyal ilişkiler, kimlik, simge ve semboller, bireyin çevresini algılamakta etkilidir ve aidiyet durumu bu etkileşimle gelişmektedir" (Manzo, 2003, s. 52). Birey, kimliğini çevresiyle özleşmesiyle bulur ya da çevresinin kimliği bireyin kimliğini de belirler. Bu bağlamda kimlik, aidiyet duygusu ile de ilişkilendirilmektedir (Norbert-Schulz, 1971).

Kimlik; benzerler arasında sahip olunan ayırt edici özellik (Gür, 2017) olarak tanımlansa da, sosyal psikolojide; bireyin kendi ve başkalarının gözünde ne olduğu olarak da açıklanır. Varoluşçu bir bakış açısından bakıldığında; kimliğini arayan birey, çevresinden duyumsadığı verilerle kendini tanımlar. Heidegger'e göre, evren ancak insansal varlığın bulunduğu oranda vardır (1971). Tamamlanmamışlık düşüncesine paralel, varoluşçu bir görüşle, inşa ve iskân eylemlerinin varoluşu anlamlandırmak üzere yapılageldiğini savunmaktadır. Bu durumda mekân kavramı; insanın ihtiyaçları doğrultusunda şekillenen, ait hissedilen bir alan olarak tanımlanabilir. Ancak, meskenin özellikle varoluşsal kurguda mekândan daha fazlasını ifade ettiği düşünülmektedir.

Kullanıcını fiziksel ihtiyaçlarına cevap vermesinin yanı sıra mesken ya da yuva; bireyin deneyimleriyle ilişkilenen ve yaşantısının dâhil olduğu, korunma ve güven duygularını hissettiği, kısaca 'ait olduğu' yer olarak tarif edilebilir. Bireyin varoluşsal eğilimleri arasında, aidiyet ve güvenlik duygusunu güçlendiren kendileme yani mekâna sahip olmak da gelir.

Kendileme, çok anlamlı bir terimdir. Kültürel açıdan bireyin kendini gerçekleştirmesini ve değer kazanmasını sağlayan çevre özelliklerine referansla tanımlanır (Fischer, 1997). Kendileme süreci, önce belirli bir mekân parçasının sınırlandırılması, işaretlenmesi, ardından mekânla yakınlaşmanın gerçekleşmesi ve nihayet kişisel bir mekânın inşası aşamalarını kapsar (Moles & Rohmer, 1976). Kendileme aidiyet ve kimlik ortaklaşa olarak şu fikre işaret etmektedir; birey mekânları anlam ve önemle donatır ve bu mekânla ilişkisini yansıtarak davranır (Werner, Altman, & Oxley, 1985). Kendileme ihtiyacı sadece aidiyet ve güven duygusundan değil aynı

zamanda mahremiyet arzusundan da kaynaklanabilmektedir. “Kültürden kültüre, hatta değerlendirilen zaman aralığının değerlerine göre bile farklılık gösteren mahremiyet kavramı” (Speller & Twigger-Ross, 2009, s. 362), “kendi başına kalma, yalnızlık, gizlilik, özel alanı paylaşmama, diğer insanlarla ilişki istememe” (Göregenli, 2010, s. 61) olarak tanımlanabilmektedir. Mekânsal bağlamda ise kendilenmiş alan, mesafelerine bakılmaksınız mahrem kabul edilmelidir. Kişinin yalnız kalma arzusunu da karşılaması beklenen özel ya da kişisel alan, bireyin çevresini kendisine özgü hale getirmesi ile de aidiyet duygusunu pekiştirmektedir (Güleç Solak, 2017).

Bu çalışma kapsamında mekân kavramı; işlevi belirli, anlamlandırılmış ama kimliklendirilmemiş yer, mesken kavramı ise; kimliklendirilmiş konut olarak kabul edilmiştir. Ev kavramı, çalışma kapsamında mesken kavramına eş tutulmuştur.

Ölçütler

Tasarımda ‘değer’; tasarımcının toplumsal hedefleri ya da tasarımın niteliksel özelliklerini tarif eder (Madea, 2006). Tasarımın niteliksel özelliğinin, iletilen mesajın içeriğini yani anlamını sorgulamayı gerektirdiği düşünülmektedir (Atakan, Adaptive Reuse and Semiotics, 2016). Semiyotik (göstergebilim), işaretlerle ulaştırılan mesajların irdelendiği bir bilim dalıdır. Dolayısıyla, konuya bu bağlamda bakmak yararlı görülmektedir.

Yapılı çevreye bir eleştiri olarak mimari alanda 1950’li yılların sonunda gündeme gelmiş olan göstergebilim, günümüzde de önemini sürdürmektedir (Eco, 1997). Umberto Eco’nun kendi söylemi ile“mimari objelerle olan ilişkimizin fenomenolojik bir düşünceyi, işlevi tanımakta bile, iletişim kurduğumuzu söyler” (Eco, 1997, s. 174).

Mimari bağlamda ‘biçim – işlev – çağrışım’ döngüsü ile yorumlanan Pierce’ın göstergebilim kuramı (Pierce, 1965, 2003), yapılı çevrenin eleştirisi için önemli bir ölçüttür. Burada bahsi geçen ‘çağrışım’ toplumsal bellekte yani kültür de ‘anlam’ olarak yerini bulur (Aydınlı, 1993). Yani, mekânın deneyimlenmesi sırasında kullanıcının zihninde oluşan çağrışım, semiyolojik olarak biçimin anlamsal karşılığıdır. “Mekânın anlamı, kimlik, bağlılık, yer duygusu gibi çevresel psikoloji dalında deneysel çalışmalarda yer ve tanım bulabilmektedir” (Gustafson, 2001, s. 7). “Çevresiyle sürekli iki yönlü iletişim içinde olan birey için üç bileşenden vardır, kimlik, yapı ve anlam” (Lynch, 2010, s. 8). Birey, çevresindeki fiziksel yapıya kimlik kazandırır ve ona bir anlam (değer) yükler; çünkü bir yer, “birey tarafından tanımlanıp, kimliklendirilmeden mekân olamaz” (Gieryn, 2000, s. 465). Bireyin en güçlü kimlikleştireceği mekân, yaşadığı yer yani ‘mesken’dir.

Madea (2006) tarafından dile getirilen tasarımın toplumsal hedefleri; Salama (2015) tarafından şu şekilde sıralanmıştır (Salama, 2015, s. 312):

- Fakir toplumlar için daha iyi bir çevre tasarlamak
- Tasarım karar sürecine 3. kişileri (kullanıcıyı) dahil etmek
- Yapılı mirası korumak
- Doğayı tamamlayan bir çevre tasarlamak
- Yaşlı, çocuk ve engellileri ilgilendiren problemleri çözmek
- Sosyo-ekonomik ve sosyo-kültürel konuların etkilerine cevap verebilmek
- Telekomünikatif ve yapı teknolojilerindeki ilerlemelere cevap verebilmek.
- Yerel kimlikte ve mekân üretiminde, küresel koşulların etkilerini incelemek

Bu doğrultuda bakıldığında üretilen mekânların, sürdürülebilir olması (ekonomik, ekolojik, kültürel), toplumu ayırmak ve parsellemek yerine birleştirici ve kapsayıcı olması (evrensel tasarım ilkelerine duyarlı) gerektiği düşünülmektedir. Ayrıca tasarlanan mekânların, yerel kimlik, toplumsal kimlik ve toplumsal ilişkiler gibi konular kadar yerel iklim, coğrafya, topografya gibi konulara da cevap vermesi gerektiği düşünülmektedir.

Bu çalışmada, 2000 yılı ve sonrasında Türkiye'de üretilen mekân ve mesken seçenekleri, mekân tasarımı bağlamında niteliksel değerler için 'kimlik-birey' ilişkisi, toplumsal değerler için ise 'kültür-toplum' ilişkisi ölçüt olarak belirlenmiştir.

2000 Yılı ve Sonrası Türkiye'de Mekân ve Mesken Değerlendirmesi

Çalışmanın bu bölümünde, 2000 yılı sonrasında, Türkiye'de izlenen politik, ekonomik ve toplumsal eğilimlerin, mekan tasarımına etkisinin, belirlenen ölçütler bağlamında irdelenmesi ve değerlendirilmesi ilgili literatür üzerinden yapılmıştır.

Kültür ve Toplum Bağlamında Değerlendirme

2000 yılı ve sonrasında Türkiye'de, toplumun alt ve üst düzey gelirli bireyleri arasındaki uçurum benimsenen neo-liberal politikalar sebebiyle artmış, toplum parçalı bir yapıya evrilmiştir. Bu yapı kentsel mekânda da parçalanmaya yol açmıştır (Firidin Özgür, 2007). Küresel kapitalist düzene

dahil edilmiş ve tüketici özelliği ön plana çıkan toplum, yaşam niteliklerini, kimliğini ve sınıf aidiyetlerini tüketme gücüyle elde etmeye evrilmiştir. Kapitalist toplum, mekânı yalnızca niteliksel değerleri üzerinden ölçmekte, sosyo-ekonomik gelişimlere göre mekânı tanımlayıp, değiştirip gerektiğinde yıkıp yeniden yapmaktadır. Bu sebeple mekân, iklimsel, coğrafi ve kültürel niteliklerinden ayrılıp nesneleşmektedir (Marmasan, 2014). "Konut sektöründe izlenen artışın sebebi, kapitalist neo-liberal yaklaşım üzerinden okunmaktadır" (Koca, 2015, s. 28).

Konut sektörü içinde yapılan yatırımlar, diğer sektörleri dolaylı olarak bağlar ve finansal anlamda öncü bir sektördür (Öztürk & Fitöz, 2009). Konutun finansal bağlamda değerlendirilmesi ve dolayısıyla üretimi, 2000'ler Türkiye'sinde konut algısını ve değerini değiştirmiştir (Koca, 2015). Bu doğrultuda mekân üretimi, tüketim üzerinden biçimlenen, popüler kültürün bir yansıması olmaktadır (Aydınlı, 2004). Toplum, toplumsal kültürün ve anıların biçimlendirdiği, kişisel ihtiyaçlarını karşılayan mekân algısından uzaklaştırılmış, toplumsal statü ile ilişkili bir sanal algı yaratılmıştır. Konut artık bir barınma aracı, mahremiyet ve aidiyet duygularının yaşandığı bir mekân değil, bir rant aracı olarak görülmektedir ve bu anlamsal değerine zarar vermektedir. Kapitalist bir düzeni olan küresel finans piyasası, orta gelirli kullanıcıyı daha yüksek standartlı daha büyük konut almaya yönlendirir ve bu edimin bir haz ve doyum yaratacağı varsayımını vurgular (Alkan, 2015). "Kapitalist toplumda tüketim alışkanlıkları, sanal olarak üretilen bu ihtiyaçlar doğrultusunda oluşturulmaktadır" (Baudrillard, 2004, s. 90). Bu yönlendirmeyle konut, bir toplumsal statü aracı olma eğilimi göstermektedir. Bireyin sosyo-ekonomik durumunda yaşanan değişiklikler beraberinde konut değiştirmeyi de getirmektedir (Tekeli, 2010). 'Lüks' konutlar, yeşil alanlar, spor ve eğlence alanları ile temiz yalıtılmış site görselleri, bireyleri kentin kalabalık, güvensiz kirliliğinden uzakta yaşama dair heyecanlandırmakta ancak, "bu izole etme toplumu sınıflara ayırmakta ve bireyi kültürel belleğini terk etmeye teşvik etmektedir" (Best & Kellner, 1998, s. 31). Bu mekânsal meta reklamları, aslında üründen çok yaşam biçimi satmaktadır (Marmasan, 2014).

Biçimsel ve anlamsal bütünlük mekân üretiminde önemlidir. Lefebvre, mekânın üretimini toplumsal görür ve üç yönden inceler; yaşanan yani fiziksel mekân, algılanan yani zihinsel mekân ve tasarlanan yani toplumsal mekân (Lefebre, 2014). Her bir yön farklı bilim dalları altında incelenmiştir. Ancak Lefebvre'in yaklaşımında amaç bu ayrılmış olan yaklaşımları ilişkilendirmektir (Lefebre, 2014). Burada kast edilen üretim, yalnızca fiziksel bir kabuk üretmek değil, Benjamin'in üzerinde ısrarla durduğu atmosferinin (aura), yani bireysel ve toplumsal öz'ün üretilmesidir (Benjamin, 2004). Bu sebeple, mekânın var olduğu yer, mekânın özünün

bileşenlerinden biri olmalıdır. Tüm bu söylemler günümüzde, sanal olarak tüketime yönlendirilen toplumun kültürün kaybıyla beraber, kimlik arayışına girdiği olarak yorumlanabilir.

Mimarlık ürünleri – hangi işleve sahip olursa olsun- toplumun ya da dönemin sosyal, kültürel, toplumsal, ekonomik ve siyasal karakteristik özelliklerini yansıtan ve bu dönemlere tanıklık eden varoluşlardır. Çevreyi şekillendiren bireyin sosyal ve kültürel değerleridir (Alkan, 2015). Sürdürülebilirliğin amaçlarından biri, sürekli gelişmeyi başarmak için eski binaların yeniden kullanılması ve iyileştirilmesidir (Bullen, 2007). Yapılı çevrenin sürdürülebilirliği bağlamında, kullanıcı gereksinim ve isteklerinin belirlenmesi, negatif çevre ve etkilerinden kaçınılması, madde ve enerji tüketiminin minimize edilmesi önem taşımaktadır (Vanegas, DuBose, & Pearce, 1996). Kültürün sürmesi yani toplumsal değer ve birikimlerin aktarılması her tür ortamın devamlılığının sağlanması ile mümkün olabilecektir. Bu sebeple, yapılı çevrenin korunması ya da yeniden kullanıma adapte edilmesi, kültürel sürdürülebilirlik bağlamı içinde yer almakta olduğu kabul edilebilir.

Yeniden kullanıma adaptasyon; yapısal olarak ayakta olan bir binanın ilk yapılış amacına dönük olarak işlevsel, çevresel, ekonomik sebeplerle kullanılamaması, farklı bir işlevle yeniden değerlendirilerek kullanılması demektir (Aydın & Yaldız, 2010). Yeniden kullanım yüklemenin alternatifi yıkılmasıdır. Yıkım ile oluşacak çevre kirliliği, malzeme işgücü ve zaman kaybı ve yerine yeni bina yapılması için kullanılacak olan doğal kaynak kullanımları, ekonomik harcamalar ve yine çevreye verilecek zarar düşünüldüğünde bu işlevin dezavantaj olacağı anlaşılır. Oysa bu binaların yeniden kullanıma adaptasyonu ekonomik, çevresel, sosyo-kültürel yarar sağlayacaktır (Cınık, 2005).

Belirli bir süreçten geçerek günümüze ulaşabilmiş anıtsal yapıların yeni işlevler yüklenerek yeniden örgütlenmesi, geçmişle gelecek arasında sürekliliğin sağlanmasında etkili olduğu kadar, ekonomik olma (Özdemir, Kars, & Şahin, 2005), kültürel ve tarihsel sürekliliği sağlama ve çevresel anlamda enerji tüketimini azaltma bakımından avantajlar sağlamaktadır (Langston & Shen, 2007). Türkiye bu kapsamda değerlendirildiğinde yapılan eleştirilerin çoğunlukla karşılığını bulduğu bir ülke olarak karşımıza çıkmaktadır. Kültürel miras niteliği taşıyabilecek birçok yapı yıkılmış ve boşaltılan araziler yeni projelerle değerlendirilme yönüne gidilmiştir (Cınık, 2005). Bu durumun kültürel sürdürülebilirliğin önünü kesen konulardan biri olduğu düşünülmektedir.

Kültürel bağlamda Türkiye'de 2000'den sonra karşılaşılan bir diğer konu ise, kültürün konut üretimindeki sürdürülebilirliğidir. TOKİ tarafından yapılandırılan tip konutlar; herhangi bir bireyin dünyanın herhangi bir yerinde, herhangi bir zaman diliminde kullanabileceği tanımsız ve ruhsuz mekânlardır. Bu standartlaştırma, modernizmin kendi içinde yaşadığı çelişki ile de

değerlendirilebilir. Örnek olarak Le Corbusier, mekân ve şehir tasarımı üzerine yaptığı ve yazdığı birçok çalışmasında, mekân tasarımının uyum ile ilgili bir durum olduğunu vurgulamıştır (2001). Le Corbusier uyumu, yerin ruhunu tartışmak ve yaşatmak yerine, modern dünyanın düzenini yaratmaktır. Bu düzen, tüm insanların ortak özellikleri üzerine temellenen, bütüncül bir düzen olacaktır. Bu Marksist bir yaklaşım olarak görülebilir; ancak burada kültürel süreklilik sorusunun, mekân tasarımı için, anlamını yitirmekte olduğu düşünülmektedir. Çünkü Norbert-Schulz'un yerin ruhu olarak tarif ettiği bölgesel ve kültürel farklılıklar, mesken ve konut arasındaki farkı önemli düzeyde vurgulamaktadır (Norbert-Schulz, 1984). Zengin Türkiye ve Anadolu mimarisinin gelenek ve örnekleri yerine tercih edilen, basmakalıp ve tekdüze 'toplu konut' mantığı, tasarımdan uzaktır ve mesken anlayışını ulusal değerleri kaybetmeye doğru yönlendirmektedir.

TOKİ konutlarında karşılaşılan bir diğer sorun ise, yine standartlaşma ile gelen kimliksizleşmedir. Adorno; kapitalizmin toplumda zorunluluk haline getirdiği, sınıf sahibi olmak için yaratılan bu kimliksizleşmeyi ağır şekilde eleştirmektedir. Bu durumun, beraberinde duyarsızlaşmayı ve kültürel yozlaşmayı getirdiği öne sürülebilir. Marx'ın, metanın kullanım değerini ne kadar kullanışlı olduğu ile ölçülmesi düşüncesi yerini, sunum değerine dönüştürmüş denilebilir. Burada mimarlık bağlamında ele alınan meta, işlev bağımsız bina olarak değerlendirildiğinde, yapıların değerinin ölçülmesinde kullanım değerinden çok görsel değerinin ön plana çıktığı vurgulanabilir. Özellikle Günümüz Türkiye'sinde toplu konut olarak inşa edilen ve üç boyutlu görsellerle pazarlanan yer bağımsız mekânların, yalnızca kimliksizleşmeyi değil, aynı zamanda kültürel çevrenin sürdürülebilirliğine de ters düştüğü düşünülmektedir.

Kimlik-Birey Bağlamında Değerlendirme

Norberg-Schulz, mekânda kimliğin varlığını, belirgin bir çevresel karakter ile özdeşleşir ise mümkün bulur. Bu özdeşleşme kişiye 'hangi yerde olduğunu' bildirir (Norbert-Schulz, 1971). Özellikle mekân üretimi bağlamında yitirilmiş olan değerlerin temelinde 'kültürel yoksunluk' yatmakta olduğu düşünülmektedir. 2000'ler Türkiye'sinde bahsi geçen kültür yoksunluğu gözle görülür düzeydedir. Yaratılan mekânlar birbirinin aynı ve özelliksiz olarak tasarlanmaktadır. İnşa eylemi kar amaçlı yapılan, birbirinin kopyası birçok görsel değerden oluşmaktadır. Afet konusunda alınan önlemler doğrultusunda şehir merkezlerinde boşaltılan araziler, özellikle özel sektör ve sermaye sahipleri tarafından yüksek yoğunluklu konut yapıları ile ticaret, hizmet spor ya da sosyal işlevleri de barındıran karma işlevli ve güvenlikli tasarımlarla değerlendirilmektedir (Koca, 2015). Bu tip yapılar yalnızca konut sahibi olmak eğiliminde olanlara hitaben değil, aynı zamanda kolay paraya dönüştürülmeleri sebebi ile yatırım aracı olarak da üst gelir grubuna

yönelik tasarlanmaktadır. Merkezlerde tasarlanan bir diğer tip ise, karmaşık işlevli yüksek tekil yapılardır. Bu yapıları, alt kotlarda kurgulanan hizmet mekânları ile üst kotlarda yapılan konut veya ofis-konutlar oluşturur. Bu yapılar da, inşaat sektöründe önemli yere sahiptir (Koca, 2015). Çağdaş konutlar ve güvenlikli tarif edilen karmaşık işlevli siteler, reklamlarda birer "meta" olarak pazarlanmaktadır (Marmasan, 2014). Oysa mimarlık; insanın duyuları ile algıladığı, belleğindeki imler ile örtüşen, duygusal bir atmosfer yaratmaktadır (Loos, 2014).

Günümüzde, sıkça karşılaşılan ve 'süsleme' olarak adlandırılabilecek; taş görünümlü duvar kaplamalar, ahşap görünümlü plastikler malzemeler veya ahşap doku verilmiş seramiklerin, malzemenin öz değerini düşürdüğü ve anlamını yitirmesine sebep olduğu düşünülmektedir. Çünkü sadelikle tasarlanmış bir mekân meskene dönüştürülmeye müsait bir kabuk olur. Bu yaklaşım, modern mimarlık bağlamında "malzemenin dürüstlüğü" olarak isimlendirilir ve malzemenin doğal hali ile gerektiği yerde kullanılması olarak tarif edilir. Modern mimarlığın kurucularından Kabul edilen Frank Lloyd Wright'da malzemenin 'kendisi olabilmesi' üzerine düşüncelerini keskin biçimde savunmakta ve 'her malzemenin ne olduğuna göre değerlendirilmesi gerekliliğini' vurgulamaktadır (Wright, 1975, s. 147). Adorno malzemenin ham halinin anlattıkları ile anlamın verileceğini vurgularken, malzemenin de doğru işlenmesi gerekliliğinin de üzerinde durmaktadır (Adorno, 2007). Aksi davranışlar; yalnızca malzeme bağlamında değil mekânsal bağlamda da kimliksizleşmeyi de beraberinde getirdiği düşünülmektedir.

2000'ler Türkiye'sinde 'düşlerin' ithal edildiği düşünülmektedir. İçi boşaltılarak popülist bir yaklaşımla kullanılan 'modern' kavramı gibi, kendi geleneğinden evrilmemiş mekânlar, görsel olmaktan ileri gidemeyen, birer sanal ortam olarak piyasaya sunulmaktadır (Bilgin, 1999). Bu sanal yönlendirmeler içinde gözlemlenen büyük sorunlarından biri insansızlaşmadır. Le Corbusier, insansızlaşma sorunu üzerine yapmış olduğu söylemlerinde sorunun temelini düşünsel ve maddesel varoluş arasındaki bağın kopması olarak nitelendirmektedir (2001). Çünkü insan artık merkezde değildir, merkezde para ve statü vardır. Heidegger, yapım ve yerleşimi her zaman insan varlığın içinde görür ve bu sebeple de şiirsel olarak değerlendirir (Heidegger, 1971). Burada bahsi geçen şiirsel, tüm düşünsel yaratımları kapsar. Yani aslında yapım eylemi yalnızca matematiksel değildir, bu sebeple ölçme aracı, insan olmalıdır. Düşünsel yaratımlar, Bachelard'ın mesken (ev) tarifinde oldukça belirgin bir yer tutmaktadır. "ev, insanın düşünceleri, anıları ve düşleri için en büyük bütünleştirici güçtür" (Bachelard, 2008, s. 37). Çünkü ilk ev, sığınma ve aidiyet duygularının geliştiği ve ayrıca yaşama dair her türlü tecrübenin ilk kez yaşandığı yerdir. Bu tecrübeler belleğimize işler ve mesken kavramı için imler oluşturulmasını sağlar. Bellek

herhangi bir zamana ait değildir çünkü düşünseldir. Mekân da bireyin belleğine seslenmelidir (Bachelard, 2008). Norbert-Schulz da meskeni; insanın varoluşunun merkezine koyar (Norbert-Schulz, 1971). Tamamlanmamışlık duygusu süregelmekte olan insan, iç dünyasını dışsallaştırabileceği ve kendine barınma duygusunu tatmin edebileceği bir kabuk bulmalıdır. Mesken, işlevsel düşünüldüğünde, kişinin kendini bulmasına, düş üretmesine imkân verecek bir mekân olmalıdır. Bu sebeple, toplumsal bellek üzerinden yapılan tasarımların, kullanıcıya mesken oluşturacak nitelikte olacağı düşünülmüştür.

Oysa 2000 yılı ve sonrasında Türkiye'de pazarlanan hayaller; kişisel belleğe değil, görsel belleğe seslenir. Herkese hitabeden, içi boşaltılmış, sözde modern görseller, bireye bir yaşam hayal ettirir. Ancak o hayalin tüm medya ortamlarında tekrarından dolayı tanıdık gelen bir hayal olduğu düşünülmektedir. Bireyin kendi hayali, belleğindeki korunmuş, mahrem ilklerinden gelmektedir (Bachelard, 2008). Bu sebeple bireyin mesken seçerken gözleriyle değil, hisleriyle hareket etmesi gerektiği düşünülmektedir.

Sonuç

Bu çalışma, mekân ve mesken kavramlarını niteliksel ve toplumsal değerler bağlamında 'kimlik-birey' ve 'toplum-kültür' ölçütleri üzerinden değerlendirmiştir. Mekân ve mesken kavramları tarihsel süreç içinde, kendini sürekli yenilemiş ve zamanın gereklerine göre şekillenmiş olduğu görülmüştür. Bu şekillenmenin boyutu, dönemsel olarak farklılıklar göstermekle birlikte, mekân kavramı zaman içinde 'ihtiyaçtan kendini tanımlamaya' doğru evrilmiştir. Günümüz toplumunda birey, ne ürettiğiyle değil ne tükettiği ile kimlik ve statü kazanmaktadır (Firidin Özgür, 2007). Özellikle kapitalist düzenin statü kazanma, kar, rekabet gibi etiket halini almış, resimleşmiş mekânları ile gelinen noktada, amaç ve araç kavramları birbirine karışmıştır. Artık mesken bir araç olmaktan uzaklaşmış bir amaç olmuştur. Türkiye'de olagelen kimliksizleşme, dünyanın herhangi bir yerinde olabilecek, yerin ruhundan yoksun mekân tasarımları, mimarlık ve iç mimarlık meslekleri bağlamında içi boş biçimler gibi algılanmaktadır. 2000'ler sondasında 'TOKİ'leşme olarak adlandırabileceğimiz yapı sektöründe, özgünlük kaybedilmiş, bölge, kültür ve yaşam bağımsız mekân üretimi egemen olmuştur. Bu boş kabuk, kültürel süreksizlik getiren bir unsur olarak görülmektedir. Heidegger ile başlayan Bachelard, Loos, Adorno gibi önemli düşünürlerin dikkatini çeken mekân üretimindeki kimliksizleşme, geçmişi geleceğe taşıma amacı ile yapılmış olan süslemeler ve çağdaş yaşam standardı olarak üretilen modernist taklitler, mekânların içini boşaltarak kültürel bağlamda aksi yönde çalışmaktadır (1971, 2008, 2014). Yapılan değerlendirmeler sonucunda, yaratılan mekânlar ruha dokunmaları yaşanmışlığı ve

deneyimi yansıtmaları gerektiği okunmuştur. Ancak, kültürel değerleri yalnızca biçimsel olarak kabul edip, geçmişi kopyalayarak ilerlemek taklit ve süslemeye doğru ilerler (Loos, 2014). Bahsi geçen düşünürlerin çoğu, konutun anlamsal değerinden yoksunlaşması üzerine eleştiriler getirmişlerdir.

Bunun çözümü uygulamacı mekân tasarımcılarının tasarımlarını yaparken, toplumsal belleği öngörerek, bulunulan yerin ruhu ve geçmişini düşünerek ve bu verileri soyutlayarak tasarım yapmaları olarak öngörülmüştür. Mekân tasarımcılarının görevi, toplumsal bellek ve kültür bilinci ile geçmişe dair düşler verebilmek, ancak bugünün dilinde mekânlar yaratmak Toplumsal değeri yansıtması beklenen ve kültürün izlerini taşıyan orijinal kabuğu bulmak olarak düşünülmüştür. Bu kabuk kültürün izlerini taşıyan bir yapının rehabilitasyonu ile olabileceği gibi, yeni yaratımlarda kültürün irdelenmesi, incelenmesi ve modern ile ilişkilenerek sunulmasını olarak da tarif edilebilir. Kültür kopyalanmamalıdır, tasarımcı bir aracıdır ve görevi kültürü topluma ulaştırmaktır. Bu yöntem ile yapılacak olan mekân tasarımı, mesken yaratmak için kültürel sürekliliği sağlayabilecek, toplumsal belleği değerlendirecek çalışmalardır. Bir mekânın değer kazanmasının, kültürel sürekliliğin korunması ancak belleği canlandıran öğelerin varlığı ile mümkün olabilir. Deneyim ve anıların varlığının mekâna yansıtılması düşüncesi kapsamında, bölgesel farklılıkların da mekân tasarımında dikkate alınması gerekliliği vurgulanmalıdır. Mekân, algılandığı sürece var olur. Biçim ile değil deneyim ile yorumlanır. Bu sebeple birey, yaşama mekânını üretirken kimliğini de üretir. Mekân-insan etkileşimi ile anlamı aramak gerekir. Bir mekânın mesken oluşu, geçmişi çağrıştırabilmesi yani kimlik kazanması ile mümkün görülmektedir. Anlam bireye bellek ve hayal gücü yoluyla ulaşmalıdır.

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Art Deco a Frustrated Style and Reflections from Ankara - Turkey

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Abstract

Architecture carries a strong effect on people as life passes physically between what is constructed. The ambience of the works of architecture differs in time, place and society. These differences are observed and named as “styles” in general. The periods that past styles have been exercised happened to be very slow in Antiquity, in a world of tranquility and stability. Its acceleration increased with the technological developments and now, it is nearly too hard to trace the differences occurring during the life span of a human.

It is difficult to distinguish the styles at the period when one lives in, but easy to see and understand when observed as the past. However, there are ways to describe a certain style in general by examining the features controlling the daily use objects, buildings and even settlements. Every period reflects a certain aesthetic understanding observable on everything that is manmade. From this point of view the basic style governing the 20th century can be named as Modernism. On the other hand, the Modernist Movement in architecture and design carry varieties or branches in it. Some are distinct and powerful, while the others have been left in shadow. Art Deco is one of the latter, and therefore is chosen as the subject of this article.

The reflections of Art Deco differing from place to place will be examined over the city of Ankara, chosen as the case study. The style is tried to be explained in the conditions it was exercised during the establishment years of the Turkish Republic and the reasons for their conservation is discussed.

Anahtar kelimeler:

Art Deco, modern hareket, Ankara'da Modernizm, kentsel koruma

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Art Deco Hakkı Yenmiş Bir Üslup ve Türkiye - Ankara'dan Yansımaları

Zühal ÖZCAN*

Öz

Hayat fiziki olarak içinde geçtiği için, mimarlığın insanlar üzerinde güçlü bir etkisi vardır. Mimarlık eserlerinin ifadesi zamana, yer ve toplumlara göre değişiklikler gösterir. Bu değişiklikler gözlemlenmiş ve genel olarak "üslûp" diye adlandırılmışlardır. Sükûnet ve durağanlığın hâkim olduğu Eski Çağlar'da üslûpların uygulanması çok yavaş olmuştur. Üslûp değişimlerinin hızı teknolojik gelişmelere bağlı olarak giderek arttı, o kadar ki bir insan ömrü içindeki değişimlerin hızını takip etmek çok güç. İçinde yaşanılan dönem içerisinde oluşan üslûpları ayırt etmek güçtür fakat geçmiş dönemler incelendiğinde görebilmek kolaydır. Bununla birlikte, gündelik hayatı kontrol eden günlük nesneler, yapılar ve hatta yerleşimler incelendiğinde, belli bir üslûbu tanımlayabilmek mümkündür. Her dönem insan eliyle yaratılmış her şey üzerinden gözlemlenebilecek belli bir estetik anlayışı yansıtır. Bu noktadan hareketle, 20. yüzyıla hükmeden temel üslûp Modernizm olarak adlandırılabilir. Öte yandan mimaride ve tasarımda Modern Hareket kendi içinde çeşitlemeler ya da dallar içerir. Bunlardan bazıları belirgin ve güçlüyken bir kısmı da gölgede kalmışlardır. Art Deco bu ikinci gruptandır ve bu nedenle bu makalenin konusu olarak seçilmiştir.

Ülkeden ülkeye değişen Art Deco, araştırma örneklemi olarak seçilen Ankara'daki yansımaları üzerinden incelenecektir. Üslûp, Türkiye Cumhuriyeti'nin kuruluş yıllarındaki koşullar içinde açıklanmaya çalışılmış ve korunmalarının gereklilik nedenleri tartışılmıştır.

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Introduction

The styles in art and architecture have found places to themselves with changing life spans. Some like the Ancient Egyptian has survived for thousands of years where the eye-catching Gothic of the Medieval Ages has lasted for only two centuries approximately. As we come closer in time it can easily be observed that the styles of the last 150 years had hardly a life time of 20-25 years. Among them some could even be popular for 10 or 15 years utmost. Art Nouveau of the 19th and Art Deco of the early 20th centuries can be named among them. The subject of this paper is to make a review of the Art Deco style over the European and USA examples and to select their reflections in Ankara-Turkey. The aim is to introduce and discuss the Turkish Art Deco within the frame of Modernist Movement examples, so as to put a small asterix to remember their importance and value in making an urban identity.

About The History and Principles of Art Deco

In the late 19th century Art Nouveau started as a movement more than a style with a purpose of defeating the "revivalistic" approaches of the day (Duncan, 1994), but the new art swayed between the curviliniarity of Victor Horta and calm, serene, linear lines of Charles R. Mackintosh (Fiell & Fiell, 1995). Around 1890 Henry van de Velde and William Morris were trying to find a new formula to achieve the "aesthetique moderne". Art Nouveau became very popular in a short time and has been exercised nearly in all European countries from Britain to Italy, from Spain to Latvia. It even spread to Istanbul and found considerable supporters among architects, designers and contractors (Barillari & Godoli, 1997). Its influences spread to far West; Louis C. Tiffany became well-known with his lighting elements. Just like its birth, the fame of the style dropped down in a very short time and died after the Ist World War at the beginning of the 20th century.

Art Deco emerged around 1920s and somehow shaped within the frame of Modernist approaches. The Dutch De Stijl of Western Europe found a common language with the Bauhaus School of Walter Gropius (Droste, 1993) and Russian Constructivists (Ouroussoff, 2017). It can be stated that Art Deco is an extension of Art Nouveau but highly refined with the effects of European Modernists, applied with superlative crafsmanship and use of new materials. Unfortunately, just like Art Nouveau, it did not last longer than twenty years, but the influences were seen up to 1950's especially in countries like Turkey. Sharing a similar fate with Art Nouveau, Art Deco lost its popularity with the IInd World War (Duncan, 1995).

The Characteristics Summarizing Art Deco

The two terms “abstraction” and “simplification” can be accepted as the basic principles of Art Deco. The style being melted in the pure lines, strict geometry and the “less is more” statement of Modernism, Art Deco acted like a transitional period between Art Nouveau and the Modernist Movement. The era was a time of unexpected inventions like the TV and discoveries like Tutankhamun’s grave in Egypt, giving way to Egyptology, as well as the Maya and Aztec remains of the continent of America. It was the days when Russian dancers left their homeland after the 1917 October Revolution. They brought a new outlook and aesthetic taste to the European stages, especially to France. The emerging machine evolvement with repeating and overlapping production, mixed with the streamline voyages between Europe and USA. The peak point of Art Deco design can be mentioned as the 1925 Paris International Exposition. Indeed the style borrows its name from this fair; “Exposition Internationale des Arts Decoratifs et Industriel Modernes.” In France, it found a colorful and playful arena to itself, being first applied in the “Haut-Couture Ateliers” of the day. The fashion show halls of the famous tailors / creators like Lanvin, Chanel and later Cardin hosted and spoiled their clients in a new atmosphere designed in bright stunning colors mainly red, blue and black.

Each of the events described above formed one of the characteristic principles of Art Deco. The bright colors of fashion studios mixed with the golden reflections of Egyptian art and with the strict zig-zag lines of the Maya architecture. The streamliners gave the main clues for horizontally elongated lines, curving forms, sometimes nautical elements (Cerwinske, 1981). The overlapping continuity of the machine production emphasized their repetitions, the circular forms reminded the shafts and portholes of the ships. The dancers found their place in graphic arts and sculptures.

The role of the newly invented synthetique resin “bakalite” which was widely used in daily life objects must be denied. The world was introduced with a new material, the plastics, as well as a new set of building materials, mainly in the developing reinforced concrete technology (Akman, 2003). However, Art Deco was disguised in the USA and accused of being the aesthetic taste of the “middle class consumers”.

Art and Architecture of Art Deco

Art Deco has mainly been repeated in nearly all the branches of art, interior design and architecture. It is interesting to note that the style has found a place to itself concerning the work fields of artists and artisans both.

Art Deco in Art

Nearly in all the branches like graphic arts, sculpture, textile, stained glass, furniture, lighting equipment, accessories and jewelry it is possible to find a perfect example. It must be mentioned that after the highly appreciated Art Nouveau poster designs of Alphonse Mucha (Bridges, Henderson, & Dvorak, 1983), the graphic designs of Romain de Thirtoff- Ertè seem as the alphabet of 1920-30's (Figures 1 and 2). They are still elegant and carry a curviliniarity but with less, simplified lines and bright colors. The cubic geometry of Modernism can easily be read at a glance. The leaf cover of the magazine Vogue carries a special place in graphic design ("George Lepape Illustrations," 1927) (Figure 3). The orderly pure geometric shapes can easily be detected in the costumes of the day. The sculpture of the period may well be exemplified in the works of Demetre Chiparus. The reliefs of Sidney Biehler Waugh are a summary of overlapping zig-zag lines with an angularity describing the Art Deco principles in his branch of art. Artists had a collaborative production also; in a comfortable chair of Leon Buchet, the textile was designed by Raoul Duffy (Duncan, 1995) (Figures 4, 5 and 6). Ceiling fixtures of Albert Cheuret, even the stained glasses of Frank Lloyd Wright can be given as mature glass examples although fairly earlier in time(Pfeiffer, 1994) (Figure 7). Jewelry from the 1924 collection of Van Cleef and Arpels is worth mentioning, which carries clues from archaeological findings(Duncan, 1995). Although commonly accepted as an Art Nouveau designer Charles R. Mackintosh has interiors in the Art Deco style like the Entrance hall of no. 74 at Derngate Southampton as the very early steps of Art Deco (Fiell & Fiell, 1995).

Art Deco in Architecture

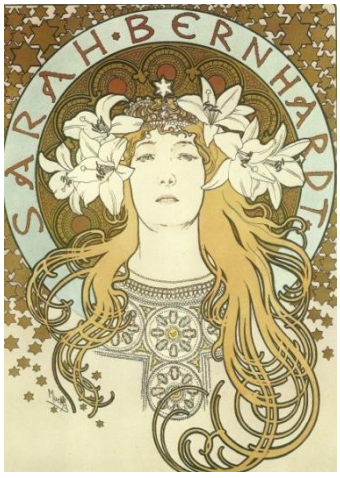

Figure 1 An Art Nouveau Illustration from Alphonse Mucha
Source: Bridges et al., 1983, p.38.

Figure 2 An Art Deco Graphic Design from Thirtoff- Erté
Source: The Prolific Art, Illustrations & Designs of Erté, 2010.

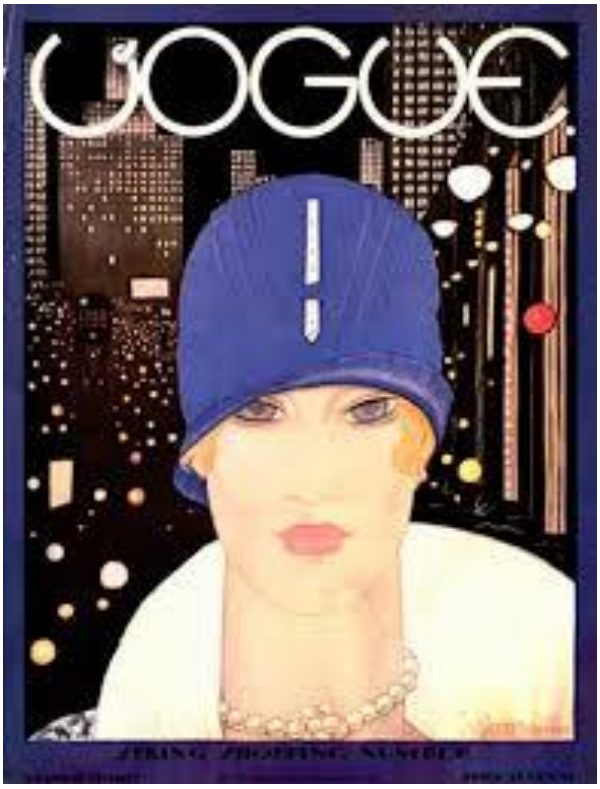

Figure 3 Illustration of George Lepape
Source: Vogue Magazine Cover, March 1927.

Figure 4 A figurine from Chiparus indicating the repeating lines of Art Deco with marble, bronze, ivory
Source: Sothebys, 1928.

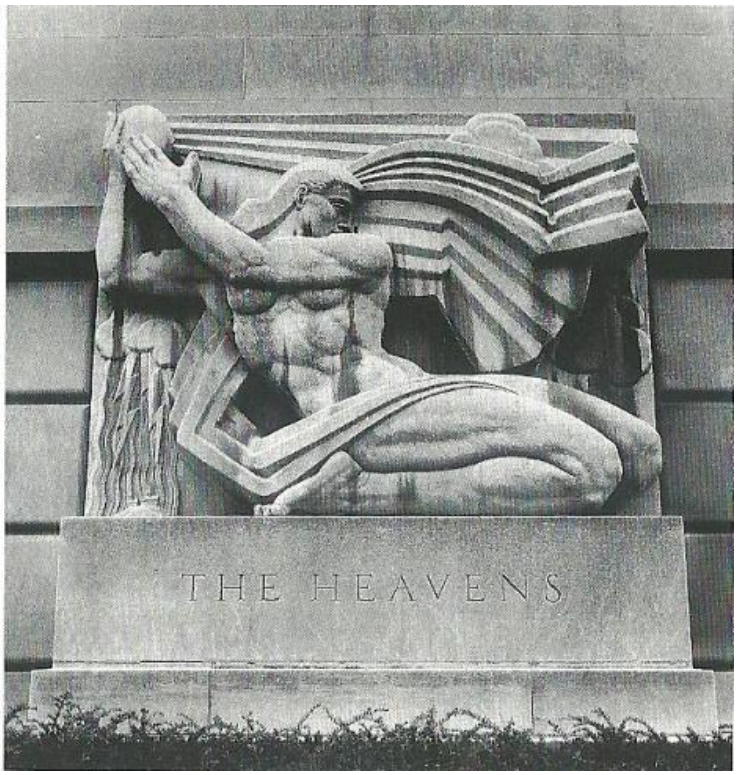

Figure 5 The relief on Buhl Science Center, Pittsburgh, 1940
Source: Duncan, 1995, p.140.

Figure 6 A Comfortable Chair of the Period
Source: Duncan, 1995, p.43.

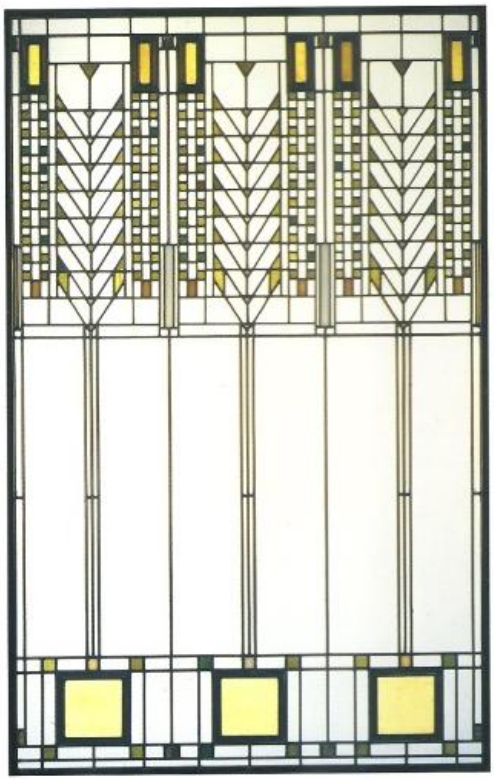

Figure 7 Stained Glass from Darwin D. Martin House, New York
Source: Fiell & Fiell, 1995, p.71.

Perhaps the best-known Art Deco building is William van Allen's Chrysler Building in New York constructed between 1928 and 1930, The Empire State Building followed it with a similar architectural understanding. However, Eliel Saarinen's Helsinki Station is accepted as the earliest example representing the Art Deco principles as a whole. A keen eye can easily detect the lighting fixtures, façade reliefs, sculptures, functional interiors and the general volumetric composition of the building with linear and curved contours, revealing the Art Deco aesthetique. In USA, the reputation of the Old Miami Beach buildings has been given back later in the 1980's. The post office and performance (cinema, theatre) buildings carry a distinctive place among the dwellings which are mostly used for touristic purposes today. Some easily reveal the link between streamliners of the day clearly (Figure 8). The interiors were enriched with sequential scenes of wall paintings as in the Miami Beach Post Office (Cerwinske, 1981) (Figures 9 and 10)

It is a truth that the highly appreciated Art Deco came to an end with the IInd World War but has not been forgotten completely. It has been repeated twice; firstly, during the 1960's and secondly during 1980-1990's. The latter being a part of Post-Modernism applied in USA with the name "Deco Revival". In his Portland Building in Oregon constructed in 1982, Michael Graves made a new attempt to revitalize the style but stayed as a personal approach emulating the history. Currently, the style lives and finds a place on the TV screens in the "Hercules Poirot" character of Agatha Christie or as the "Great Gatsby" watched with interest in a successful movie film.

Figure 8 House designed to represent a streamliner by H. Hohauser, 1939
Source: Cerwinske, 1981, p.23.

Figure 9 Miami Post Office Building
Source: Cerwinske, 1981, p.18.

Figure 10 Wall Paintings in Miami Post Office Building (muralist Charles Hardman)
Source: Cerwinske, 1981, p.104.

A New Republic, a New Capital in the Middle East

After the decline of the Ottoman Empire at the end of the Ist World War, the newly established state is named as the Turkish Republic. The new start has needed a new capital. Tankut (1993) indicates that Ankara has been established as an administrative center directed to the western, contemporary, rational world leaving the eastern one in the past. Ankara became not only a symbol but took over a new understanding by being the capital of a new way of living. Achieving an organized well-planned city had been the main aim of the founders. The first planning attempts started as early as 1924-25 but at the end of a competition held in 1928 Hermann Jansen's plan was approved.

Depending on the planning principles accepted, the city began to be shaped with buildings necessary for the new Republic. The former buildings of Ankara or those constructed at the early years of the republic, generally reflect an eclectic style trying to continue the Neoclassicism, embedded in a cover of Ottoman and Islamic architecture (Aslanoğlu, 2001). At a very early date like 1929 it was seen that the new Republic should also share a contemporary formation in architecture, just like in all the branches influencing public life.

Historically 1930s had been the years when European architects were invited to Ankara to shape the new outlook of the city. Their mission was not only designing the Modern buildings but to train the young Turkish architects and designers to continue the job that they would be responsible in the near future.

Among these foreign architects who had the first chance to have their buildings constructed, had been A. Ernst Egli and Clemens Holzmeister (Kortan, 2014; Tankut, 1993). The catastrophic years of Germany during 1930's indeed became the great chance of Ankara. German architects who had adopted Modernist Movement and obliged to leave their country were willingly welcomed in Ankara; namely, Ernst Egli, Clemens Holzmeister, Bruno Taut, Theodor Jost, Robert Oerley, Theo Leveau, Martin Elsaesser, Paulo Vietti-Violi, Paul Bonatz. The young Turkish architects some trained in Europe before, and understood the importance and value of the Modernist Movement like Şevki Balmumcu, Seyfi Arkan, Şekip Akalın, Sedad Hakkı Eldem, Sami Arsev had a leading role in shaping new Ankara as the desired capital city.

Modernist Movement Examples of Ankara

Although the buildings shaping the city had administrative functions they were not limited with governmental buildings. The construction of the schools, hospitals, banks, service and entertainment buildings, sports complexes, even houses, the city parks and squares were among the agenda of the Republic. Most of the ministries and the active National Assembly building were designed by Clemens Holzmeister. The main axis starting from the city center Ulus and elongating towards the new residential zones at the south (Yenişehir) hosted the Modern Movement examples. The banks, university and exhibition buildings, parks, squares accompanied with monuments, ministries were aligned at both sides of it and crowned with the National Assembly Building.

Namely, the best known works on education belong to Ernst Egli and Bruno Taut while the project of medical institutions belongs to Robert Oerley and Theodore Jost. The designer of banks varies; Martin Elsaesser, Clemens Holzmeister, and a Turkish architect Seyfi Arkan can be mentioned(Cengizkan, İnan, & Cengizkan, 2011). The city park named as "Gençlik Parkı" later, designed by Theo Leveau. He has also been the designer of an entertainment building at the

new dam area, the new recreational zone of Ankara (Orhan, 2009). It is possible to make a long list of the public buildings but the new residences were not that lucky. They lost their places easily as they could not resist to the high rant demands starting from 1960's.

The Modernist Period buildings are detectable with their cubic shapes, flat roofs, band or serial window openings and monumental appearances like their European contemporaries. Straight vertical and mostly horizontal lines dictate the main design characteristics. The only exception can be mentioned as the Saraçoğlu District at Yenişehir designed by Paul Bonatz (Sey, 1998). He has not only used the Modernist principles but has made a good interpretation of the timber constructed traditional Ankara houses, both in their appearances and interior designs. Among the design efforts which are tried to be summarized above, a group of buildings carry the traces of the popular characteristics of the time.

The "Shy Art Deco" Examples of Ankara

Certainly, the first half of the 20th century Turkish Republic Architecture has been widely and deeply searched. The key word for the literature study condenses on Modernism, but most of them lack its link with Art Deco. Although it is difficult to detect pure Art Deco examples, as it is valid for the most European similar examples, it is worth to make an attempt to point out distinctive interferences.

The main city square at the center of the 1930's Ankara is certainly Ulus. The square at the junction point of the historical citadel and the train station axis, with the administrative axis mentioned above, seems to be the meeting point of architectural styles, even during the establishment years of the Republic. The first National Assembly built before the new state accompanies the first private sector bank of the day, İşbankası. Although the latter carry Art Nouveau details, they both share an eclectic style. Their neighboring Sümerbank designed by Martin Elsaesser is a Modernist Period building composed of two cubic parts but in a completing manner. The cubic body of the building is composed of two curvilinear parts one after the other (Özcan, 1997) (Figures 11 and 12). The entrance hall repeats the curviliniarity ending with a circular stair at the back and enclosed with a shallow dome at the top.

Figure 11 Sümerbank Building Ankara-Ulus
Source: Author's Archive

Figure 12 Entrance Hall of Sümerbank Building Ankara-Ulus
Source: Author's Archive

The train station constructed during 1935-1937 and designed by Şekip Akalın can be summarized with two side towers hiding the stairs, which are designed as two vertical cylinders. The building has a VIP hall, currently exhibited like a museum and has been furnished in the Art Deco style (Figures 13 and14). The entrance hall of the building has a high ceiling with an empty band of 4 x 21m. The area was planned to be decorated with paintings having a subject taken

from the Independence War. In order to achieve the painting a competition was held in 1937 but unfortunately has never been applied. The models of the painting is exhibited in the Station Museum nearby (Figures15 and 16). The approach directly reminds the wall paintings of the Miami Post office building and its interior decoration. The logos over the glass work of the building are worth mentioning from the aspect of Art Deco graphic design (Figure 17). The "Gar Gazinosu" building next to the station is connected with a colonnaded concavely designed portico at one side and ends with a cubic clock tower at the other, inspiring the Old Miami District in USA (Figure 18).

Figure 13 Ankara Train Station
Source: Author's Archive

Figure 14 Ankara Train Station, the VIP Hall
Source: Author's Archive

Figure 15 Ankara Train Station, Entrance Hall Empty Wall Painting Area
Source: Author's Archive

Figure 16 Ankara Train Station, Entrance Hall The Painting Models to be Applied to the Empty Wall Painting Area
Source: Author's Archive

Figure 17 Ankara Train Station, Logo on the Glass Doors and Detail from Door Handle
Source: Author's Archive

Figure 18 Ankara Gar Gazinosu / Gar Club Clock Tower
Source: Author's Archive

On the other axis towards the Yenişehir District two unlucky Art Deco inspired buildings took place. The first is the "Sergi Evi" / Exibition Hall designed by Şevki Balmumcu during 1933-1934 (Aslanoğlu, 2001) (Figures19 and 20). The main body of the building ends in a convex form at one end. At the other end, a self-repeating block before a clock tower, perfectly reveals the Art Deco traces. The building has been converted into an opera house with an eclectic facade later and has lost its elegant ambience. Although the Art Deco effect could only be traced at its ground floor, the recently destroyed Belediyeler Birliği Bankası / İller Bankası designed by Seyfi Arkan can be mentioned among buildings having Art Deco inspirations (Figure 21). It will be

interesting to note that “Gençlik Parkı” / the city park on the cross axis of the train station, designed by Theo Leveau in 1936, composed around a big pool with a similar geometry connected the station to the two Art Deco inspired buildings, the Exhibition Hall and Belediyeler Birliği Bankası (Figure 22).

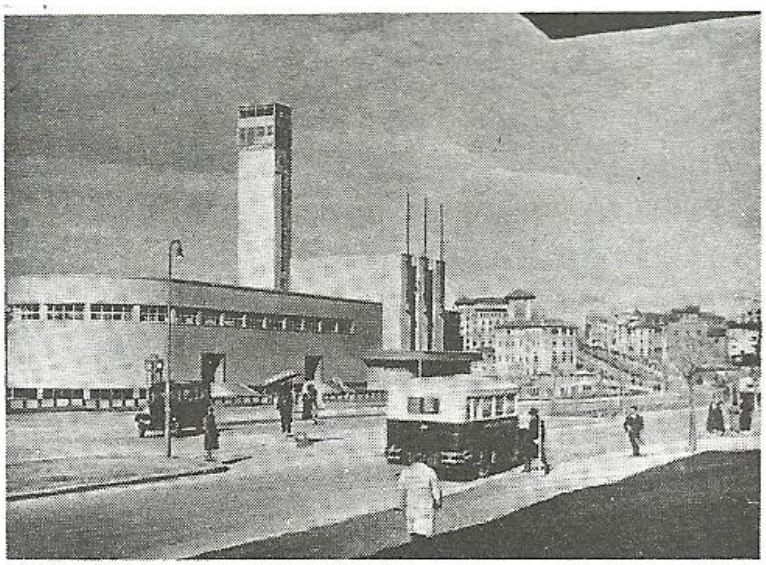

Figure 19 Ankara Sergi Evi / Exibition Hall, 1933-1934
Source: Aslanoğlu, 2001, p.207.

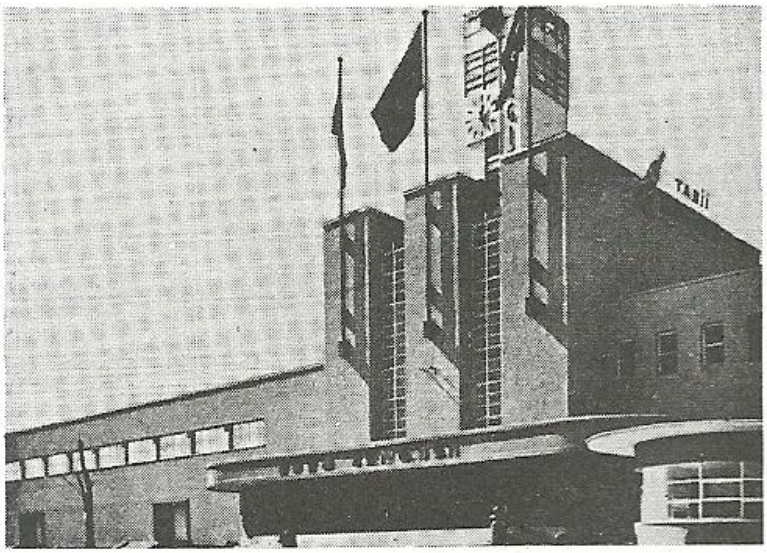

Figure 20 Ankara Sergi Evi / Exibition Hall, 1933-1934
Source: Aslanoğlu, 2001, p.207.

Figure 21 Belediyeler Birliği Bankası / İller Bankası Ground Floor Facade
Source: Sudaş, 2014.

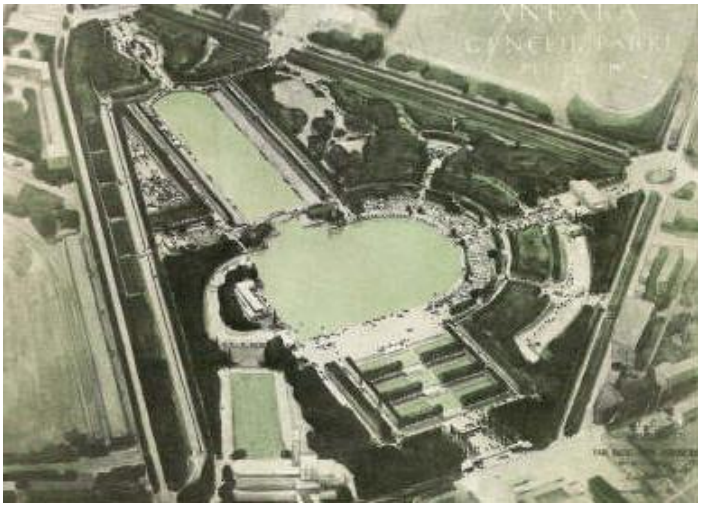

Figure 22 Gençlik Parkı Plan
Source: Bayındırlık İşleri Dergisi, Cover Leaf 1938.

Another bank building which is still used as an office on the above mentioned axis is the first Etibank building designed by Sami Arsev and constructed in 1935-1936. It reveals the traces of Art Deco in its plans more than the elevations. The "Hıfz-ı Sıhha Enstitüsü" / Refik Saydam Medical Institute carries Art Deco influences with its architecture and the relief over the entrance facade. The institute complex was designed by Theodore Jost and Robert Oerly in 1927-1932 (Figures 23 and 24). The overlapping technique of the relief reminds of the works of Waugh (Figure 5).

Figure 23 Hıfz-ı Sıhha Enstitüsü / Refik Saydam Medical Institute General View
Source: Goethe-Institut, 2010.

Figure 24 Hıfz-ı Sıhha Enstitüsü / Refik Saydam Medical Institute General View
Detail from the Relief
Source: Goethe-Institut, 2010.

The list of buildings with similar characteristics can be listed as follows: “Su Süzgeci” /Water-filter Building (1935-1936 contractor Hochtief Ltd., destroyed recently), “Çubuk Baraj Gazinosu” / Çubuk Dam Refreshment bar-club (1937-1938, Theo Leveau, destroyed recently), “Dr. Celal Bey House” / Milka patissery (1932, Muallim İlyaszade Arif Hikmet, destroyed during the first decade of 2000’s), security control Gençlik Parkı- Solmaz Kılıçtepe police station and AOÇ military control point.

Evaluation and Conclusion

It is a fascinating adventure to observe how mankind has started art at a very abstract point and has turned back to it thousands of years later. The extravagant Baroque art and architecture forced the designers to look for a new view, supported by the technical and scientific developments of the 19th century. The whole century turned into an arena of past styles, some exactly repeating the historical design principles as in Classicism, some even stricter than its original like the Gothic Revival. The desire for a new world-view connected with new building materials and with designers full of inspirations from the Far East, brought Art Nouveau. However, the painters, sculptors, graphic and interior designers and architects found what they needed in pure abstraction. De Stijl, Constructivism, Futurism and Bauhaus exercised a new understanding in architecture applicable with a plastic material, the concrete. Modernist Movement can be accepted as a result of this procedure and became a remedy to the frivolities of the near past.

Although Modernist Movement in architecture can be detected at a glance, it carries a set of diversities in itself. Art Deco can be accepted as one of these. It is a pity that it has not been given the importance it has deserved, although efforts to revitalize it has been tried persistently. As a style it has found a better place in arts more than architecture or it can be said that they occurred as details in or on buildings more than being an Art Deco building by itself.

At the beginning of the 20th century the ideals of the new Turkish Republic coincided with the new look of the designers. A new ideology needed a new architecture; certainly functional and opposite to the chaotic revivals, eclecticism of the past. Thus, the European architects, mostly the Germans found a good professional practice area. Besides, the contemporary style was so effective that it became world-wide used in a very short time. Both Modernism and Art Deco within it, shaped the capital city of Ankara.

On the other hand, cityscape turned to an arena of what is “new” only. Except a single implementation mentioned above, the traces of traditional architecture seems to be totally denied. I will be an unfair approach to blame the idea of the day because what was being done

was to save a nation from the prohibitive limits of the past. Architecture became a tool in constructing the future.

The architecture of Modernist period and design examples in Ankara still have a great importance in the formation of the city. Some have serene cubic forms, strict lines without any extra decoration over, but some differ with their geometric forms and small details. Reflections of Art Deco in Ankara can be traced in curvilinear geometric forms embedded in the cubic. They can be accompanied by overlapping or repeating lines, reliefs, logo designs. Together they witness a time which carries great importance for the Turkish Republic. They cannot be solely treated as the historical buildings of the near history because they carry a role in the construction of the contemporary world-view of a nation. It is a cultural richness and chance to have the pure Modernist and Art Deco inspired buildings nearly aligned at both sides of an axis which makes the area an open-air museum. The cityscape thus formed, is not only composed of buildings but with parks, squares and street furniture completing them designed in the same language. It is a great pity to see them destroyed unconsciously as they make up the cultural properties of Ankara which deserve to be neatly preserved and used.

Urban conservation is not a matter of selecting periods and styles of the past, the ideology of a certain period, beliefs and understanding of some, but is a matter of cultural consciousness. Urban consciousness brings urban identity, which points out that the citizens are there to own their city willingly. We owe to the past, what we have today is borrowed from the future.

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Aviation Facilities of Nuri Demirağ in Beşiktaş and Yeşilköy

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Abstract

20th century at its dawn was referred to as “age of aviation” by the invention of aircraft. Founding of aviational activities triggered growth of aviation and aircraft industry rapidly. Aviation facilities and its architecture began developing in Europe and the United States. While military aviation had a significant role in creating and developing aviation, civil and commercial aviation began to develop accordingly. As in Europe and the United States in 1920s and 1930s, there were also some important developments in the newly born Turkish Republic. Along with international civil and commercial aviation companies in Istanbul (such as Italian AEI, French CFRNA/CIDNA), national entrepreneurs established a number of facilities for providing services in civil and commercial aviation. Vecihi Hürkuş and Nuri Demirağ were among these entrepreneurs. In this article, aviation facilities of Nuri Demirağ being established in Istanbul are reviewed by tracing Prime Ministry Republic Archive (BCA) documents and by the images related to that period.

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Anahtar kelimeler:

Havacılık mimarisi, Nuri Demirağ, uçak, Beşiktaş ve Yeşilköy Nu.D. havacılık tesisleri.

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Beşiktaş ve Yeşilköy'de Nuri Demirağ'ın Havacılık Tesisleri

N. Tuba YUSUFOĞLU*

Öz

20. yy başında uçağın icadı ile 20. yy, "havacılık ve uçak çağı" olarak anılmaya başlanmıştır. Uçağın icadı, havacılığı ve uçak sanayisini hızla tetiklemiş, Avrupa ile Amerika'da havacılık yapıları ve mimarisi de gelişmeye başlamıştır. Askeri havacılık, havacılık mimarisinin oluşumunda ve gelişiminde önemli rol oynarken, paralelinde sivil ve ticari havacılık gelişmeye başlamıştır. 1920'li ve 30'lu yıllarda Avrupa ve Amerika'da olduğu gibi, Türkiye Cumhuriyeti'nde de bu alanda önemli gelişmeler olmuştur. İstanbul'da uluslar arası sivil ve ticari havacılık şirketlerinin yanı sıra (İtalyan AEI, Fransız CFRNA/CIDNA gibi), ulusal girişimciler de sivil ve ticari havacılık hizmetlerinde bulunmak için birtakım tesisler kurmuştur. Bu isimlerden birisi Vecihi Hürkuş, diğeri Nuri Demirağ'dır. Bu makalede Nuri Demirağ'ın İstanbul'da kurmuş olduğu havacılık tesisleri, Başbakanlık Cumhuriyet Arşivi (BCA) belgeleri ve dönemin ilgili görselleri eşliğinde incelenmiştir.

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Human being has been generating and developing own civilization while taking a close interest in what was happening in nature and finding several beneficial solutions; they have been influenced and inspired by animal behaviors and their abilities in particular (Artut, 2014). In this context, flying birds triggered the desire of human being about having this ability (Kansu, Şensöz, & Öztuna, 1971). This desire was mentioned in various legends and myths. Works for centuries were made in accordance with the desire of flying and required impulse was maintained with the required technology, human being took off together with motor vehicle. Together with taking off with a heavy motor vehicle under the control of Wright Brothers in 1903, 20th century began as the age of aviation and aircraft. Beginning of 20th century wars triggered the use of aircraft as new technology for the sake of discovery and surveillance, better and relatively more advanced aircraft designs could hang in the air for longer time and go far distances with *War Effort* (Kronenburg, 2002) made for winning the war. At the end of 19th century and beginning of 20th, a creative energy sparked, the cities of new order were established as "modern architecture" on one side and the era of aviation and aircraft began as an important tool in generating new balances on the other side. These processes were experienced together with considerably fast and intense developments (Yusufoğlu, 2017).

Use of technologic developments during the wars in particular applied on the aircraft as well as Europe and the United States gave importance to the aircraft which was related to the desire of traveling Far East and to colonial policies (Kronenburg, 2002; Spenser, 2008). Joseph Corn defined this phenomenon as "winged gospel"; the opinions related to aircraft and aviation were one of the results of the belief that aircraft would be a part of life in near future (Corn, 1983). Indeed, aircraft added a brand new perception, space-time experience, speed, movement, entertainment and sport to 20th century life.

The invention of aircraft generated aviation industry and this new flying machine developed architecture of aviation. Aircraft facilities as new industry branch followed basic hangar structures in order to protect aircraft from external factors (weather conditions etc.); meteorology structures and networks, airport facilities, wind tunnels required for flying became new structure types generated by this new industry. In this article, the facilities of Nuri Demirağ (his logo is the abbreviation of name and surname Nu. D.) (1886-1957) being established in Beşiktaş and Yeşilköy situated in European side of Istanbul, who followed newly established aviation industry closely in civil and commercial way, considered aircraft as the vehicle of future and realized its importance early, were reviewed together by Prime Ministry Republic Archive

(BCA) documents. The establishment process of these facilities corresponds to the period characterized as “Golden Age” of aviation (1918-1939) in the West, particularly in U.S.

In the early 20th century within a tense political atmosphere of the world, Turco-Italian war started with the Italy’s occupation of Tripolitania as the territory of the Ottoman Empire in Africa (29 September 1911). It was the first war in which aircraft was used (Kurter, 2006; Sarıgöl, Hürtürk, & Kline, 2009). The first aviation installments of the Ottoman State was at Yeşilköy (Ayastefanos) Aircraft School/Station (1912-1919)which were urgently thought and applied upon witnessing the importance of air force in this war and were tried to be completed during Balkan Wars (1912-1913). Yeşilköy Aircraft School project was generated under the presidency of Süreyya Bey (İlmen) who was assigned by Harbiye Minister Mahmut Şevket Pasha to carry out these structures. In the period following Balkan Wars, Aircraft School organization was completed by making several additions to this project (Kansu et al., 1971) (Figures 1 and 2). In addition to that; Yeşilköy Watercraft (Marine) School was also established in Yeşilköy (1914-1919) during war years (1914-1918) to support the fleet and raise marine personnel (Gülten, 2010; Yusufoğlu, 2017).

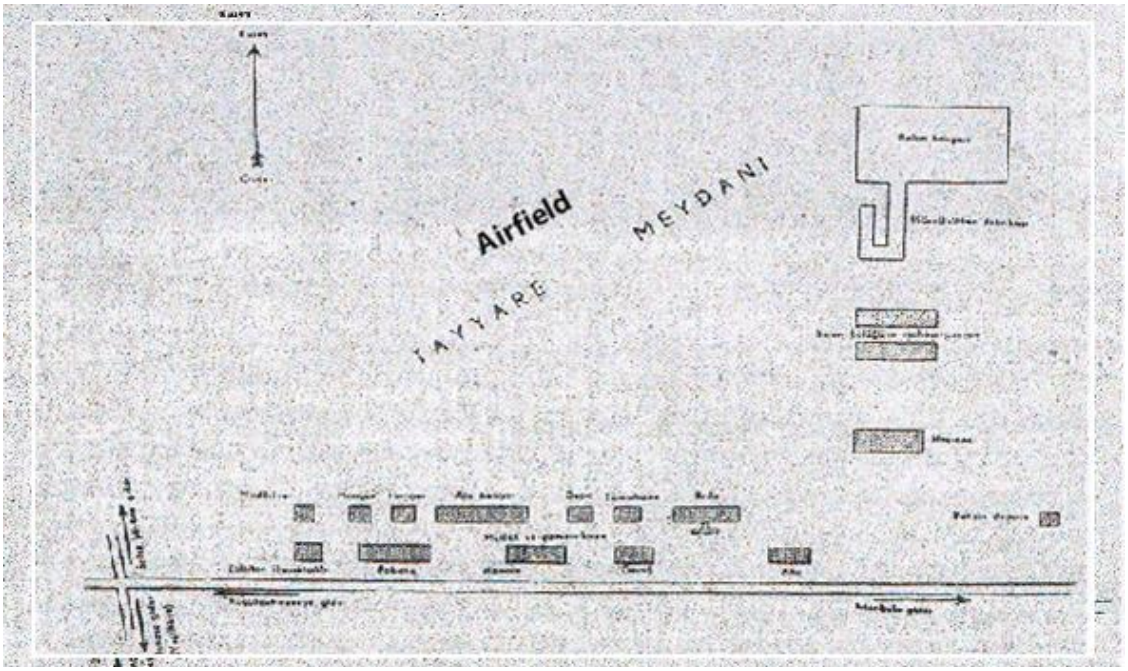

Figure 1 Aircraft School Plan, Draft
Source: İlmen, 1947, p.113.

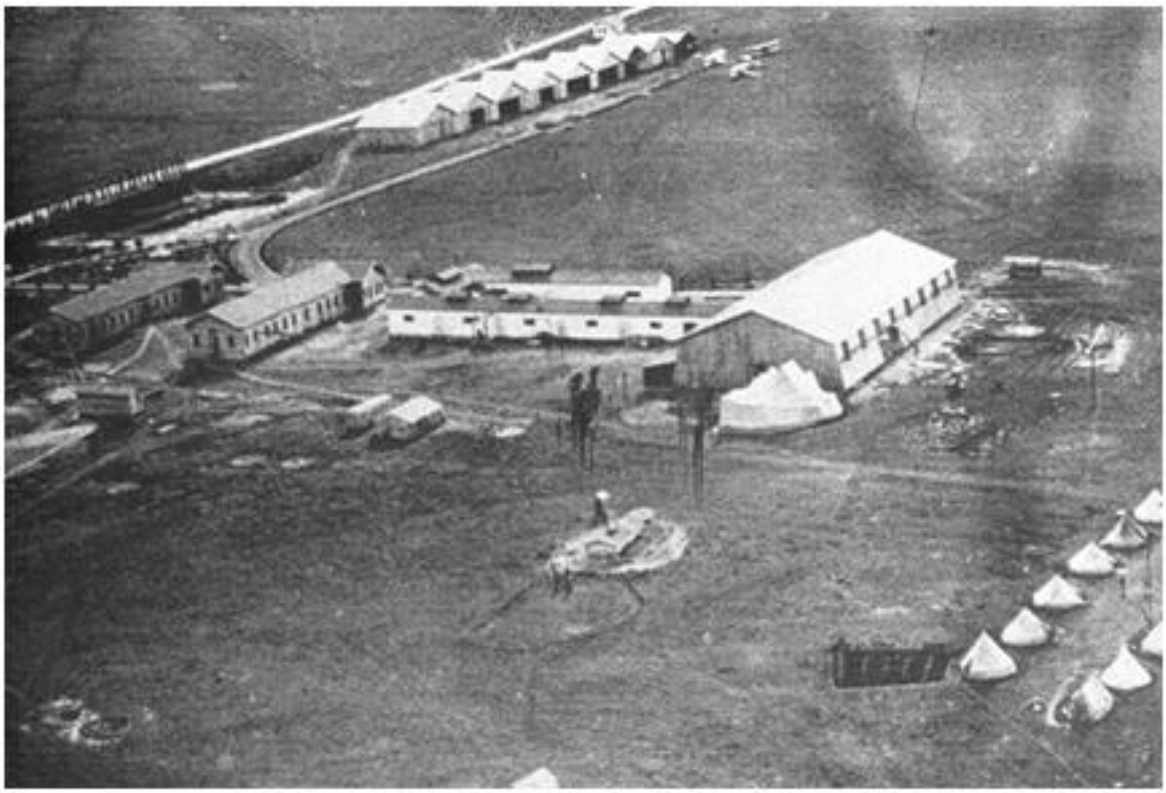

Figure 2 Aerial view of Yeşilköy Aircraft School, Istanbul, 1918
Source: Air Force Museum Archive

Following World War I (1914-1918) and Independence War (1919-1922), aviation gained an exclusive importance in the newly established Republic of Turkey. Works were initiated for providing guns and aircraft at the cutting edge to Turkish Air Forces (T.Hv.K.K.) towards developing aviation with national opportunities. These works can be summarized as establishment of Turkish Aircraft Community (T.Ta.C.) (Turkish Air Association-THK) and military, civil and commercial aviation works. As aviation is related to modernism, aircraft was considered as a symbol of modernity by itself (Yusufoğlu, 2017). In this context; interest of the society for aviation might be seen as a subject of gathering in structured environment, working, education, participation to entertainment and sport, namely participation to modern life. It must be pointed out that military and civil women aviators (Sabiha Gökçen in Turkey, Amelia Earhart in U.S.) were considerably popular in this period. While the works related to aviation industry continued, meteorology organization was established on the other side. Along with all these developments, foreign companies began requesting to provide aviational services for

postage and cargo aviation in Turkey since 1919 took steps towards establishment of aviation facilities. The remarkable one among them was the facility related to French CFRNA/CIDNA company in 1920 which was established in Yeşilköy situated in the European side of Istanbul and watercraft facility related to Italian AEI Company in 1920 which was established in Büyükdere situated again in the European side of Istanbul. With the facility related to Italian AEI company established in Istanbul, the voyages of watercraft was a new and luxury way of traveling in transportation that was not fully known in the urban history of Istanbul until 1930's (Yusufoğlu, 2017; Zelef, 2014).

Apart from foreign companies, there are two important figures being interested in civil aviation in this period. They were aviator Vecihi Bey (Hürkuş) and entrepreneur Nuri Bey (Demirağ). Having made significant contributions related to aviation since Ottoman Empire and participated personally to World War I and Independence War as aviator/pilot, Vecihi Hürkuş established a workshop and a school in Kadıköy, situated in Anatolian side of Istanbul. Hürkuş continued his civil aviation works in the Republican period and manufactured the aircrafts together with his students (Figures 3and 4). Another important figure related to aviation is Nuri Demirağ (Hürkuş, 2014; Yavuz, 2013) (Figure 5).

Figure 3 Vecihi Hürkuş and his aircraft Vecihi- XIV
Source: Air Force Museum Archive

Figure 4 The workshop of Vecihi Hürkuş in Istanbul and his aircrafts
Source: The Prime Ministry Republic Archive

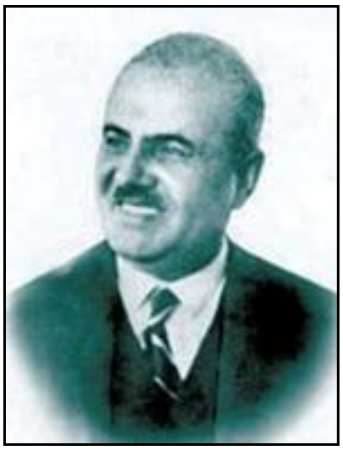

Figure 5 Nuri Demirağ
Source: Gazete Bilkent, 2014.

Having passed from being major railway constructor to aviation industry, entrepreneur Nuri Demirağ (1886-1957) had to have a number of facilities to be built which were required to start on aviation industry. In this context, having aimed to establish an aircraft facility in Beşiktaş, Nuri Demirağ investigated the facilities in the West (in Europe and U.S.) as a model. Indeed, development of aircraft facilities in the West from 19th century to the first decades of 20th

century was considerably quick. The wooden workshops of 18th century began to give place to iron and after that steel technologies enabling large spans, providing work spaces that could be encompassed without intermediary support since the mid of 19th century. At the end of 19th century and beginning of 20th, reinforced concrete came forth as another constructional material and this innovation enabled creation of new forms for facilities and hangar structures. This technology along with the developments in production technologies and scientific management (Taylorism) enabled the integration of structure with machine aesthetics internally and externally (Giedion, 1948). In a short while, the process (serial production) developed for automobile industry by Ford was adapted to aircraft production and its plants.

Development of aircraft manufacturing technology inspired architecture of aviation. As larger and heavy aircrafts were developed, these designs affected the architecture of its facilities and accordingly, alternatives for production with detailed solutions were sought. When it comes to facility structures and machine aesthetics of early 20th century in the history of architecture, German Peter Behrens (1868-1940) as one of the founders of modern architecture and Walter Gropius (1883-1969) as one of the founders of Bauhaus School come to mind, yet American architect Albert Kahn (1869-1942) being contemporary of Demirağ, comes to mind when it comes to design of aircraft factories. His industrial facility designs are the important references of aviational architecture on which machine aesthetics was reflected. The factor that makes Kahn important in design of facilities is his experience on industrial buildings. He developed new systems and details in this field. Kahn reviewed the architecture of iron bridges in Europe and developed systems for roof trusses for aircraft factories and hangars. Kahn designed roof solutions having spans that encompass large spaces (Nelson, 1939). He designed airport facilities such as Willow Run bomber plant for Ford and Glenn Martin Aircraft Assembly Building devising novelties on aviation architecture in the USA. Aircraft factories were constructed along with hangars and airports (Figure 6).

Figure 6 Ford Airport and Aircraft Factory, architect: Albert Kahn, 1926-27, Dearborn, Michigan
a, terminal building; b, aircraft factory and hangars; c, general view of facilities
Source: Eggebeen, 2007, p.308.

In the period characterized as “Golden Age” of aviation in the West in 1920s and 1930s, parallel works were made in the Republic of Turkey. In this sense, the facilities constructed by Nuri Demirağ in Beşiktaş (Nu.D. Beşiktaş) and Yeşilköy (Nu.D. Yeşilköy) as two districts in Istanbul were pointed out in this article based upon the documents of Prime Ministry Republic Archive (BCA), and the written information together with the images of that period. In this context, Nu.D. Beşiktaş Aircraft Factory and Nu.D. Yeşilköy Facilities are reviewed.

Nu.D. Beşiktaş Aircraft Factory

Nuri Demirağ Beşiktaş Aircraft Factory can be reviewed in two categories as selection of location and architectural features of the premises.

Selection of Location

The first urban and architectural regulations regarding the area on which Nu.D. Beşiktaş Aircraft Factory was established were from 1911.The maps dated 1912 and 1915, 1/1000, 1/1500-scale of the area are available in Atatürk Library Map Archive. The previous functions of the area in the maps show that this area was reserved for warehouse-storehouse-market production and housing functions. The existence of various piers marks the importance of water transportation in the district (Figure 7).

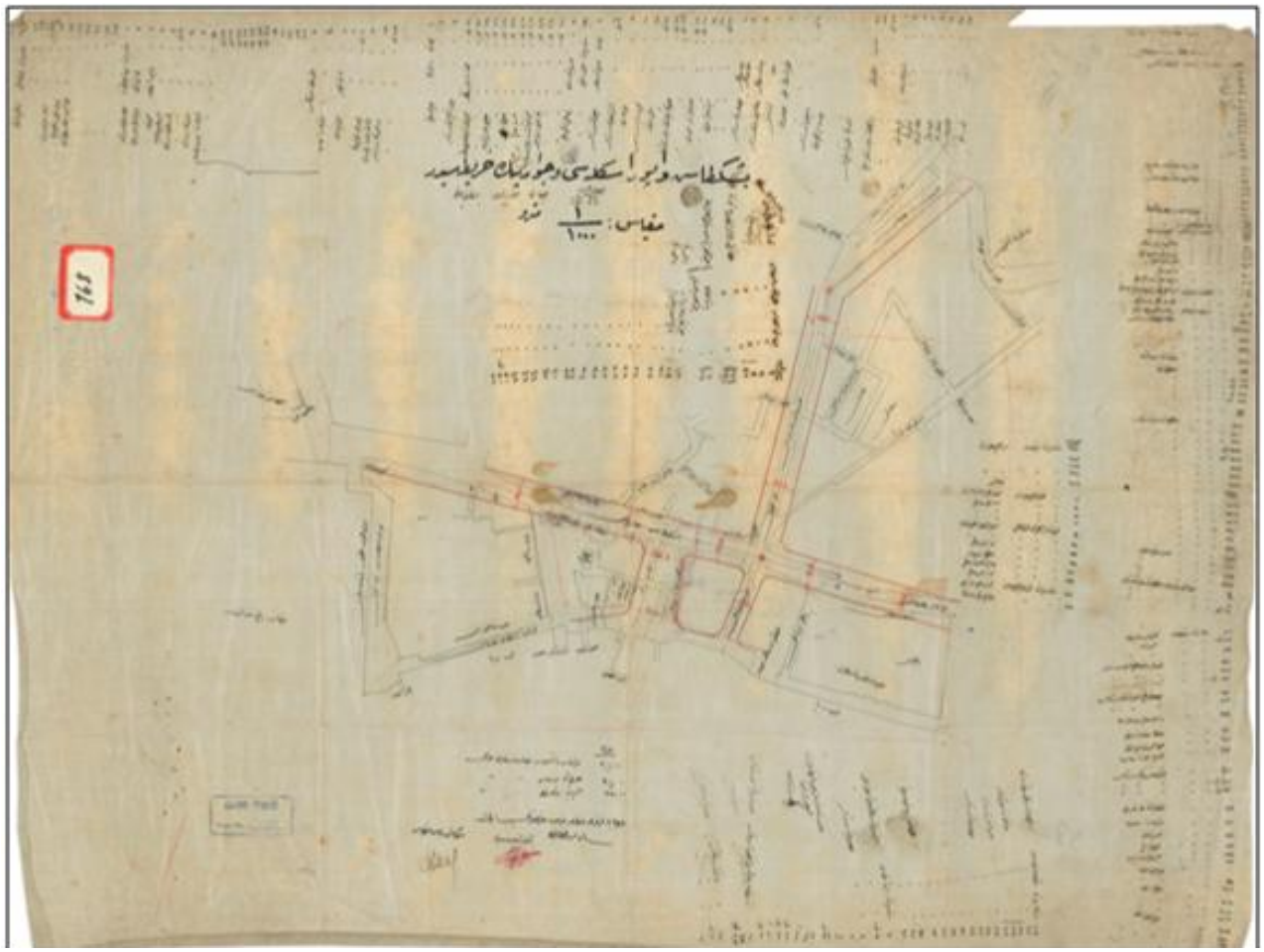

Figure 7 Beşiktaş Square Map related to 1912, scale: 1/1000
Source: Atatürk Library Map Archive, (HRT.NR. 5081)

The reason why Demirağ selected the seafront field in Beşiktaş as the establishment location of the facility could be most probably that there were iron structured facilities on the site such as Astro Tobacco Warehouse previously. On the map dated 1928 in Atatürk Library Archive, Nuri Bey's personal pier can be explicitly seen in Beşiktaş coastal side. In the document belonging to Heyeti Fenniye Istanbul, dated 17 March 1928, the area of dock drawn and specified with red line and of which reconstruction was requested, Nuri Bey's personal pier was also stated. Hayrettin Pier Street and the field in front of Hayrettin Pier were related to Austria-Turkish Tobacco Company and Astro Tobacco Warehouse Building was constructed herein one year later (Figure 8).The function of construction plot began to be shaped accordingly; it was

constructed towards warehouse-workshop/facility, material loading-discharging area in 1930s and 1940s. It must have been considered that facility site-on-sea could be advantageous for easy round trips of materials.

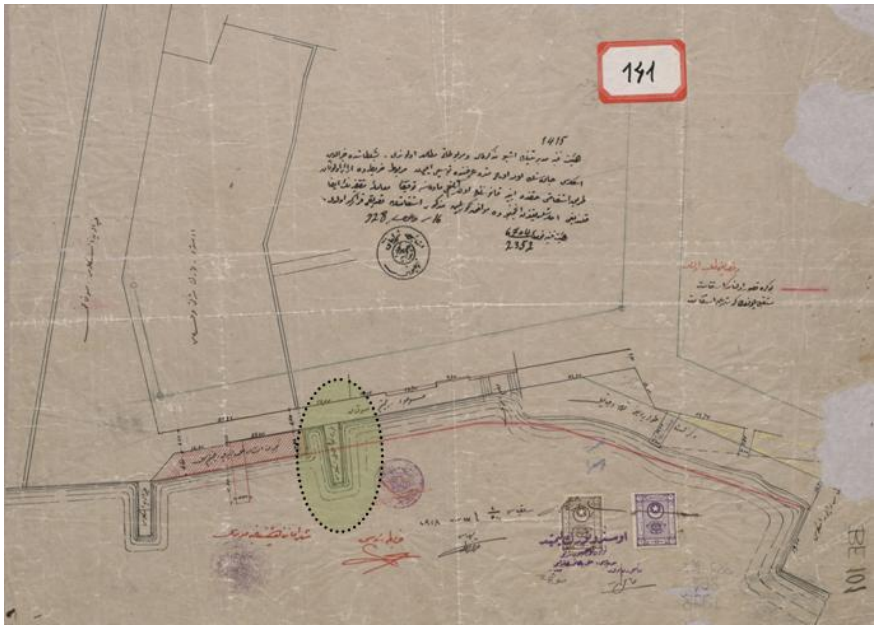

Figure 8 It is a map showing Nuri Demirağ's personal pier and extension of Beşiktaş coastal side (17 March 1928, Scale: 1/500)
Source: Atatürk Library Map Archive, (HRT_Gec_001093)

Another possibility being considered in relation to the selection of location is that starting service of watercraft trips by Italian AEI Company at Büyükdere situated in Bosporus during 1920s before Nuri Bey. It is not a clear issue whether production of watercraft/aquaplane in the workshop (hangar) of Vecihi Hürkuş at a seaside field in Kadıköy situated on Anatolian side in the beginning of 1930s affected his selection of facility on Beşiktaş coast, while establishing in 1936. This leads one to think whether Nuri Bey's next plan aimed production of watercraft as a popular luxury vehicle of that period.

Nuri Demirağ started the first foundations of aviation industry in 1936 by preparing a plan covering a 10-year period. Based on this plan, he opened Beşiktaş Aircraft Facility on 17 September 1936 in Beşiktaş near Barbaros Hayrettin Pier, in the field adjacent to the old Astro

Tobacco Warehouse which was selected with probable reasons discussed above. This facility was active until 1943.

On the other side, a wide zoning action was undertaken in the district of Beşiktaş at the end of 1930s, during the period of mayoralty of Lütfi Kırdar (8 December 1938-24 January 1949). In accordance with the governing plan prepared by French urban planner Henri Prost which was put into effect in 1939, a wide change was undertaken in the city, and Beşiktaş district was considerably affected from this transformation. The innovations in basic municipality services can be summarized as expanding and regulating existing roads, opening boulevards, creating squares, recreation areas and green areas, gaining monumental structures as symbols of the Republican ideals in the city (Akbayar, 1998).

Nu.D. Aircraft Factory Facilities: (1936-1943)

The name of the facility made by Nuri Demirağ in Beşiktaş were differently named in various documents of Prime Ministry Republic Archive (BCA); for example in the document dated 27.03.1928, it was named as "Nuri Demirağ Aircraft Factory and Beşiktaş Aircraft Workshop"; in the documents dated 27.11.1939 and 11.06.1949, it was named as "Nuri Demirağ Aircraft Factory" and in the document dated 28.06.1948, it was named as "Nuri Demirağ Aircraft Repair and Maintenance Workshop". The amount spent for this facility exceeded 10 million liras with the monetary value of the period (Deliorman, 1957; Yalçın, 2013).

In the plans of projects of the file with location no 30-10-0-0 / 59-397-6 in BCA, it is understood that the premises were consisting an assembly workshop, carpenter's shop, factory (for motor and propeller), foundry, material inspection and technical laboratory; and those premises were accommodated by both using the existing structures and by constructing new ones. The facility can be classified as preliminary buildings (on the coastal side) and assembly workshop behind. The preliminary buildings were comprised of a hangar, warehouse / storehouse and a four storey office building. It is understood from BCA documents and images of the period that a residence building on coastal side were bought and added to the facility (Figure 9). The areas of these buildings on preliminary group were approximately 2100 m² in total. Total ground floor area of the facilities including the assembly workshop behind was approximately 4110 m². There are plans, section and view/perspective from sea front in the project drawings. Furthermore, a pier related to "factory assembly location" is seen in the drawings. This pier, as mentioned

among the reasons of selecting the Beşiktaş district as seen along with old maps above, became Demirağ's private indicating the importance given to sea transportation by him (Figure 8).

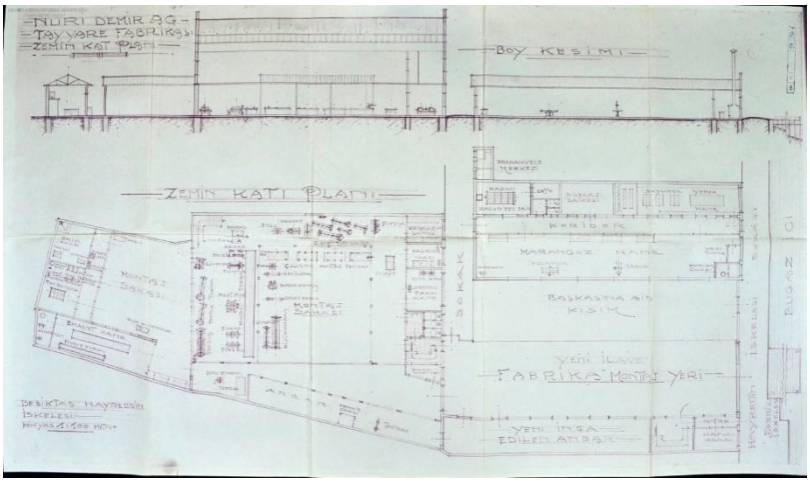

Figure 9 Nuri Demirağ Aircraft Facility, plan and section
Source: The Prime Ministry Republic Archive, Location no: 30-10-0-0 / 59-397-6

Resources state that Nuri Bey established his aircraft facility by having studies on foreign companies and by visiting them. Regarding Beşiktaş facilities, there were no company names and seals on the project of the drawings in BCA documents. Notes in Turkish written with Latin letters can be seen on the drawings. There is a ground floor plan drawing and ground section of Aircraft Facility on 16th page of the documents with location no BCA 30-10-0-0 / 59-397-6 (Figure 10). It also can be seen that the facility had a pierin the sea front for transportation and material shipment (Yusufoglu & Kara Pilehvarian, 2017; Yusufoğlu, 2017) (Figure 11). It has been stated by the people who witnessed the facility that there was a black dyed Nu.D. logo on the front that could be seen from the sea. The structure of the factory's interior and process (working order) are clearly seen in pictures (Figures 12 and 13). The situation of the factory and Beşiktaş Square in 1950s can be seen on the image found from Beşiktaş Naval Museum Archive (Figure 14).

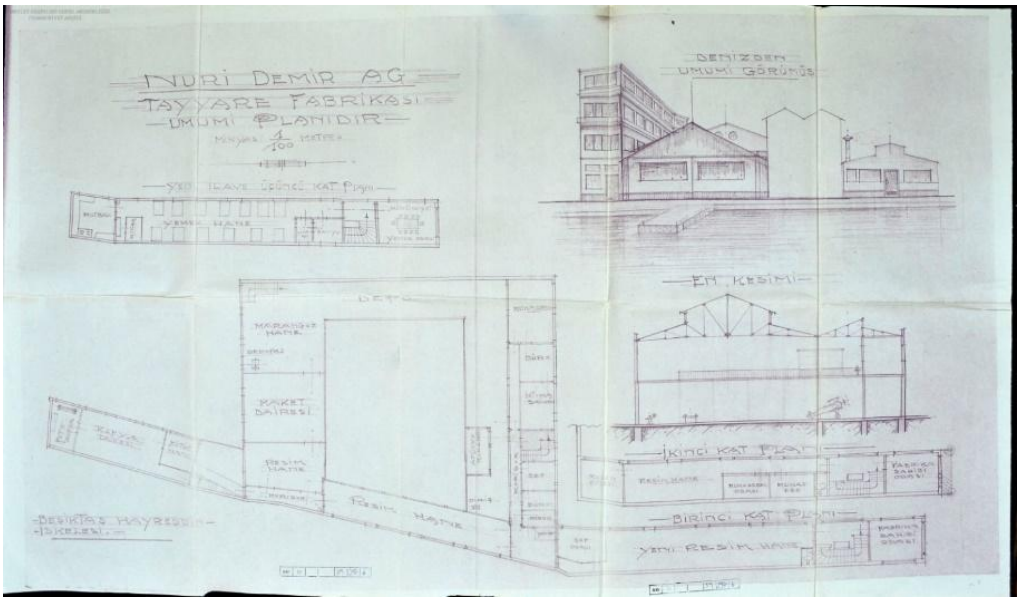

Figure 10 Nuri Demirağ Aircraft Factory, plan and section
Source: The Prime Ministry Republic Archive, Location no: 30-10-0-0 / 59-397-6

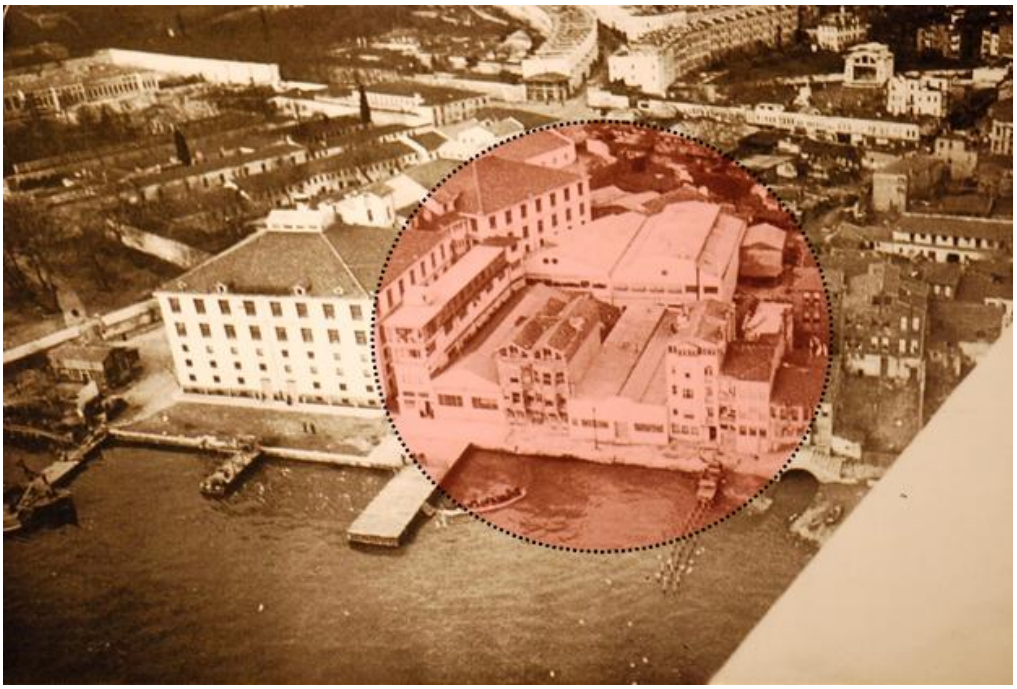

Figure 11 Beşiktaş Aircraft Facilities
Source: Beşiktaş Naval Museum Archive

Figure 12 Nuri Demirağ Beşiktaş Aircraft Factory, general view from manufacturing workshop
Source: Air Force Museum Archive

Figure 13 An inner view from Beşiktaş Aircraft Factory
Source: Nuri Demirağ, n.d.

Figure 14 The years of 1950s, Beşiktaş Square and Nuri Demirağ Aircraft Factory (the upper left)
Source: Beşiktaş Naval Museum Archive

Nu.D. Yeşilköy Facilities and Sky School:

In lieu of his achievements in the industry, Nuri Demirağ enlarged and extended his interests, which he had to, from his plant in Beşiktaş to Yeşilköy quarters where he constructed additional hangars and workshops and a Sky School in front of an airfield used but abandoned previously in the Ottoman era.

Yeşilköy Facilities and Sky School could be discussed in two parts, as selection of location and as architectural features of the premises.

Selection of Location

Along with Aircraft Facility in Beşiktaş, Nuri Demirağ selected Yeşilköy in which the foundations of aviation were laid in Late Ottoman period in order to work together with Beşiktaş factory and to construct new facilities. In the selection of area, its location close to light railway line connecting Istanbul to Edirne, aviational history of the site, facilities of foreign civil and commercial aviation companies (such as French CFRNA/CIDNA) were influential. In addition to that, this location was flat and considerably wide area. Demirağ carried out works covering other required facilities such as a runway, hangars, school, airmen's and students' dormitory for trial and test flights. For this purpose, he purchased Elmas Palas farm in Yeşilköy to make it an

aircraft station, and constructed 1000x1300-meter flat flight area/runway on a wide site with 1559 decare (approx. 400 acres).

Facilities

As in the reference of Beşiktaş factory, Nuri Demirağ plotted Yeşilköy aviation facilities again by studying foreign references and visiting them. For the drawings of facilities in Yeşilköy which were scheduled to be operated together with Beşiktaş factory, German language was used and dimensioning system was metrical. Seemingly this time drawings were made by a foreign architect (T. G. Key) and a Turkish architect working in cooperation with him.

On the 17th page of the documents with location no BCA 30-10-0-0 / 59-397-6 dated 25.9.1939, there is a 1/5000-scale map of "Nuri Demirağ Yeşilköy Aircraft Station" and the locations of the facilities. The area was selected in a location next to the structures established before as the base of military aviation in Ottoman period. Yeşilköy station close to Yeşilköy coast, military hangars, division, airway rooms, airway military shipment buildings can be seen on the map, “Yeşilköy Airway Aircraft Station” – lower part of Ayamama farm, was marked within a large area on its upper part. The area selected by Nuri Demirağ corresponds to upper left part of this airfield - the part on new farm. In a rectangle area with almost identical size, hangars (part of repair, assembly part specified), runway, shelter, gas tanks, macadam roads, roads and light railway lines can be read. Personal signs were specified on the legend on right edge of the layout: Border of square, railway, building, hangar, trail, macadam road, road and light railway line, altitude were stated in the legend (Figure 15).

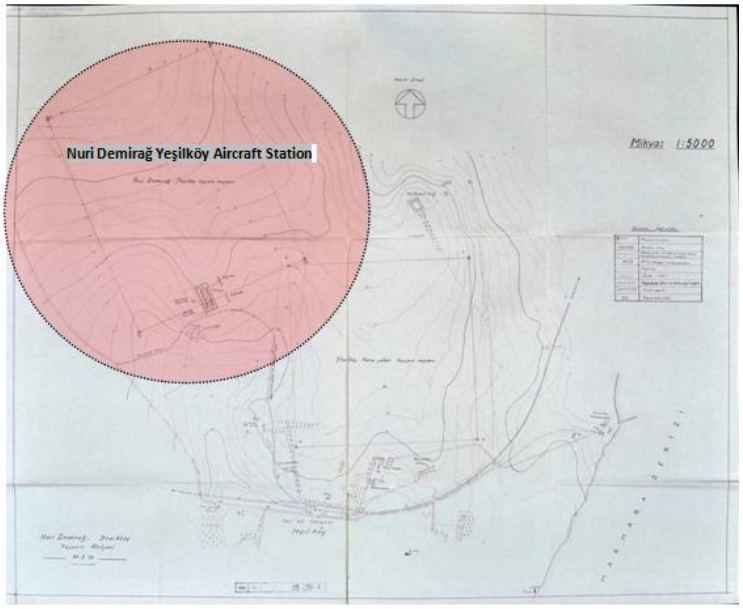

Figure 15 Map of Nuri Demirağ showing 1/5000-scale Yeşilköy Aircraft Station
Source: The Prime Ministry Republic Archive, Location no 30-10-0-0 / 59-397-6

Demirağ made an aircraft repair workshop and hangars built on the station. 33th and 34th page of the documents with location no BCA 30-10-0-0 / 59-397-6 comprises the drawings of Aircraft Hangar in Yeşilköy and ordered to Germany. The modern/rationalist style of the era can be seen in the project drawings. The drawing contains a plan, section and views. While the area with large spans in the central part of the ground floor plan is “assembly location” (there are two different sized versions of the same building as 2940 m² and 1470 m²- only the sizes of assembly location area in the center is different), the adjacent areas are planned as atelier, storehouse, health care department (including doctor room, infirmary, pharmacy), pay-office, workers' waiting room, doorman, entrance hall and toilet. Mezzanine plan comprises of workshop, drawing office and offices. The smaller version of the building has sizes of 42 m x 82 m x 9 m (h). The center line of inner steel column is 7 m and net size of inner height of the building is 7 m. In addition, there is steel roof truss system with 7-m height, roof windows, mezzanine and other details. In the elevation, there are doors with the sizes of 2.5 m x 3 m (h), a rhythmic front with windows having sizes of 2.5 m x 1.5 m (h) plus roof windows. This hangar was ordered, yet it is not certain whether the hangar was constructed or being matched with this drawing, as it is not available today (Figures 16, 17, and 18).

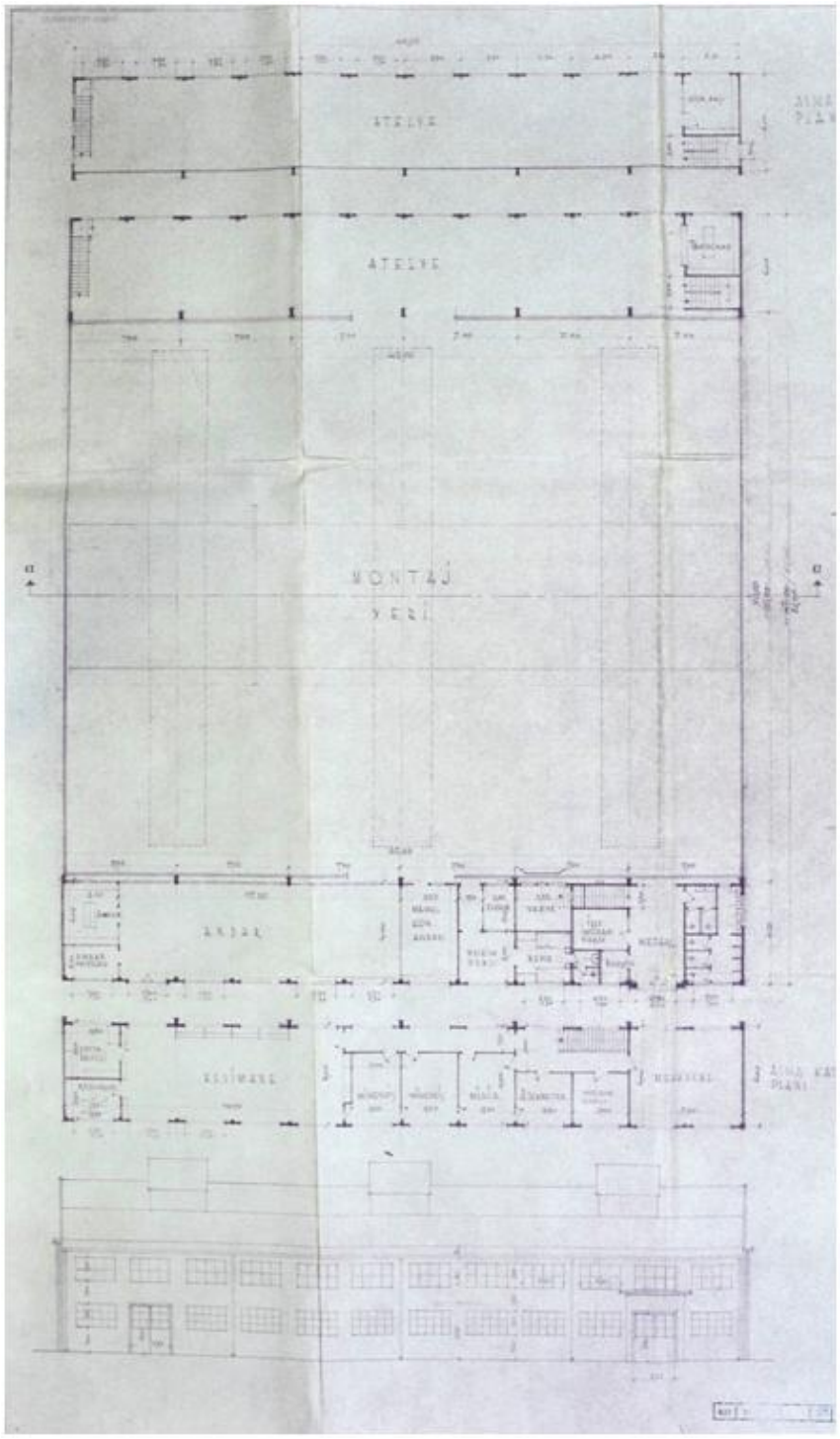

Figure 16 Aircraft Hangar ordered to Germany, plan drawing
Source: The Prime Ministry Republic Archive, Location no 30-10-0-0 / 59-397-6

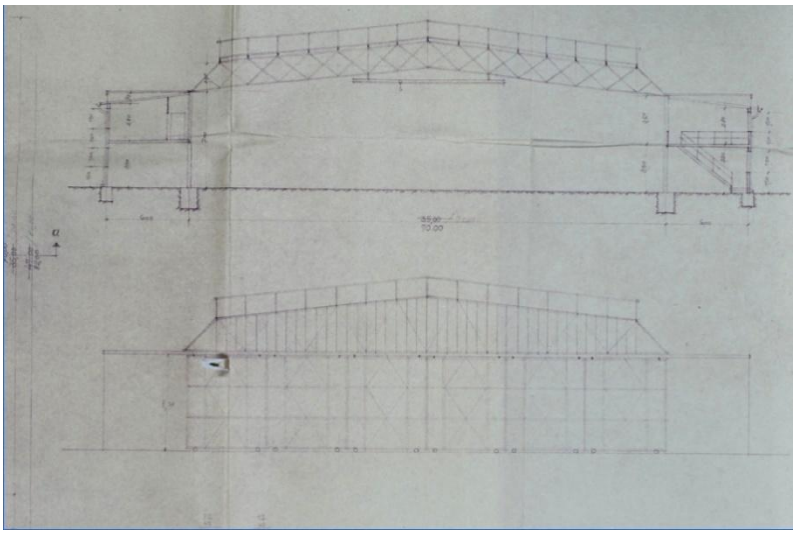

Figure 17 Aircraft Hangar section drawing ordered to Germany
Source: The Prime Ministry Republic Archive, Location no 30-10-0-0 / 59-397-6

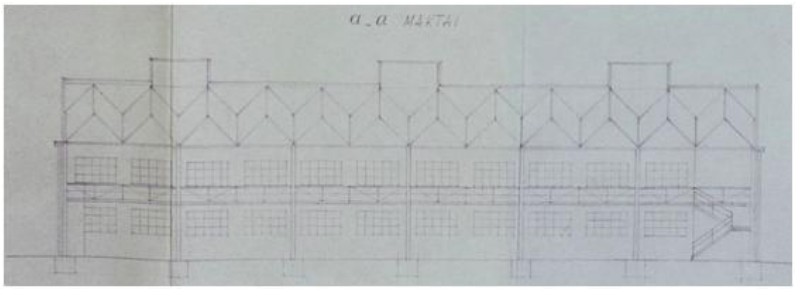

Figure 18 Aircraft Hangar ordered to Germany
Source: The Prime Ministry Republic Archive, Location no 30-10-0-0 / 59-397-6

On the 26th and 27th pages of the documents location no BCA 30-10-0-0 / 59-397-6, there is an inscription as “Nuri Demirağ Aircraft Repair Workshop/Yeşilköy, Concept Project, 1/200 scale”, dated 9.9.1939. Nuri Demirağ is written down as contractor of the building and the architect is written as T. G. Key on the layout plan. It could be deduced that there was a Turkish architect working in cooperation with T. G. Key since drawings are in Turkish (location names and metrical dimensioning system). In the concept project, there are system plan, façade, lateral façade, roof truss sections and drawings of shelter shields for 50 persons (each 1/200 scale). Steel roof solution with diagonal spacers reminds the roof structure in Sümerbank factory, a popular solution of the era. Net internal height of the building with the sizes of 82 m x 42 m x

13.5 m (h) is 10 m. The roof windows with considerably basic arrangement are designed in order to receive maximum daylight (Figures 19 and 20).

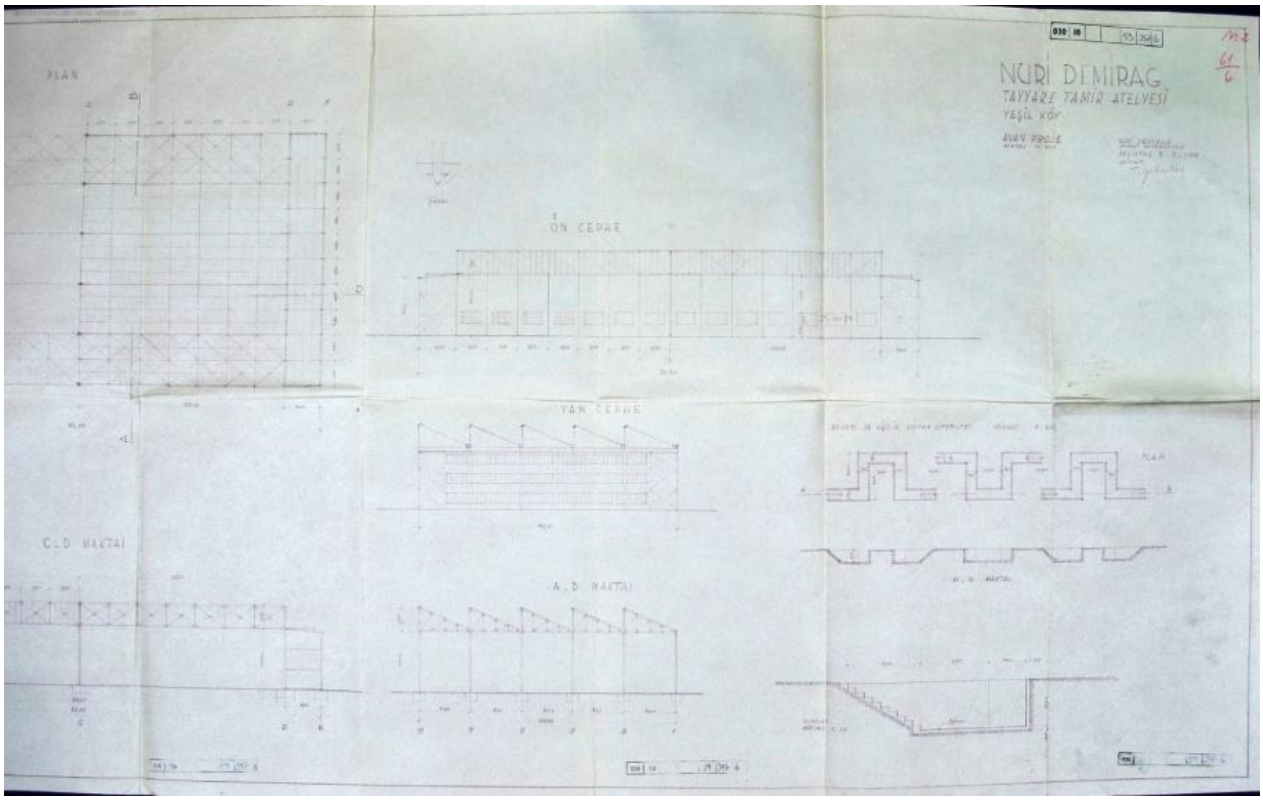

Figure 19 Nu.D. Aircraft Repair Workshop- Yeşilköy
Source: The Prime Ministry Republic Archive, Location no 30-10-0-0 / 59-397-6, p.27

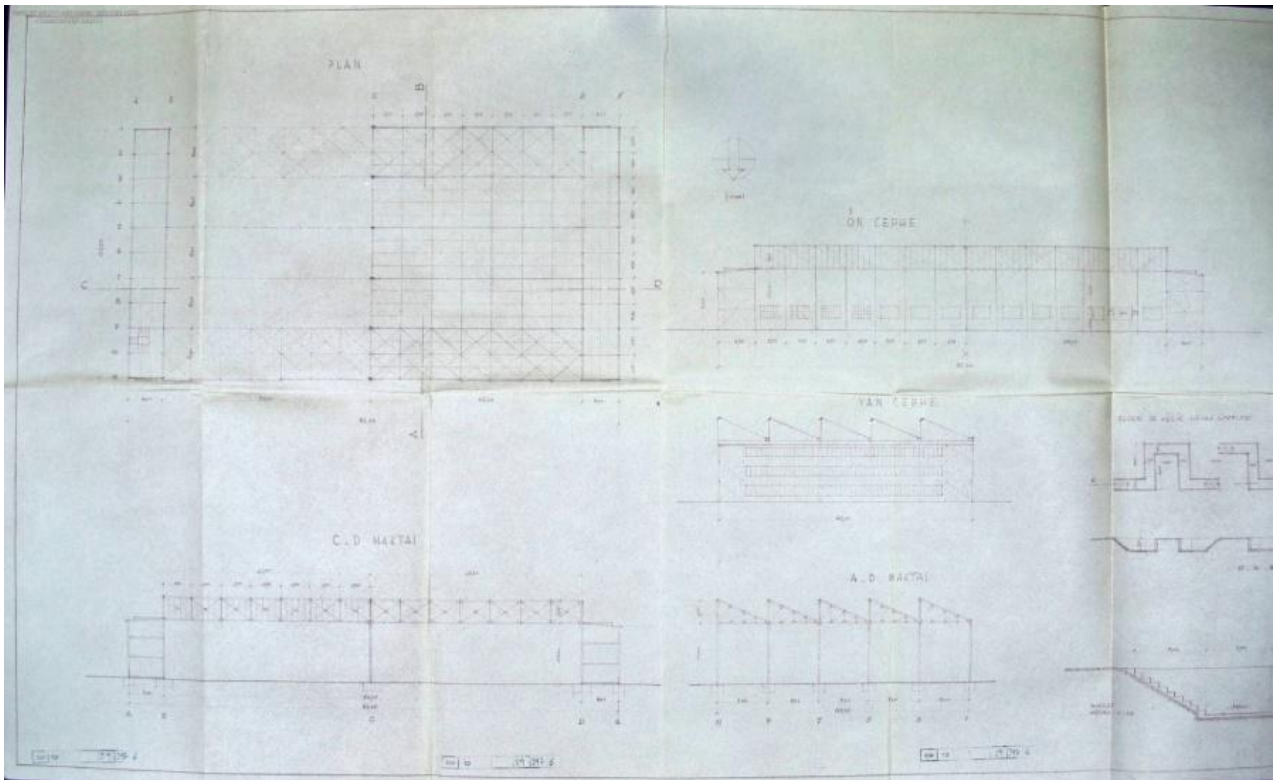

Figure 20 Nu.D. Aircraft Repair Workshop – Yeşilköy
Source: The Prime Ministry Republic Archive, Location no 30-10-0-0 / 59-397-6, p.26

The 22nd, 23rd and 24th pages of drawings in the same file are the drawings of "motor vehicle storehouse/warehouse" (kraftwagenschuppen) and connected to hangar no: 1 and hangar no: 2. The L-shape plan has sizes of 42.90 m x 110.30 m. There are the roof plan and bearing system, sections and views in the document. Inner height is 4.70 m. The elevation shows window openings, folding door opening and detail. The roof window solutions can be seen, the statements are in German language and sizes are metrical (Figures 21, 22 and 23).

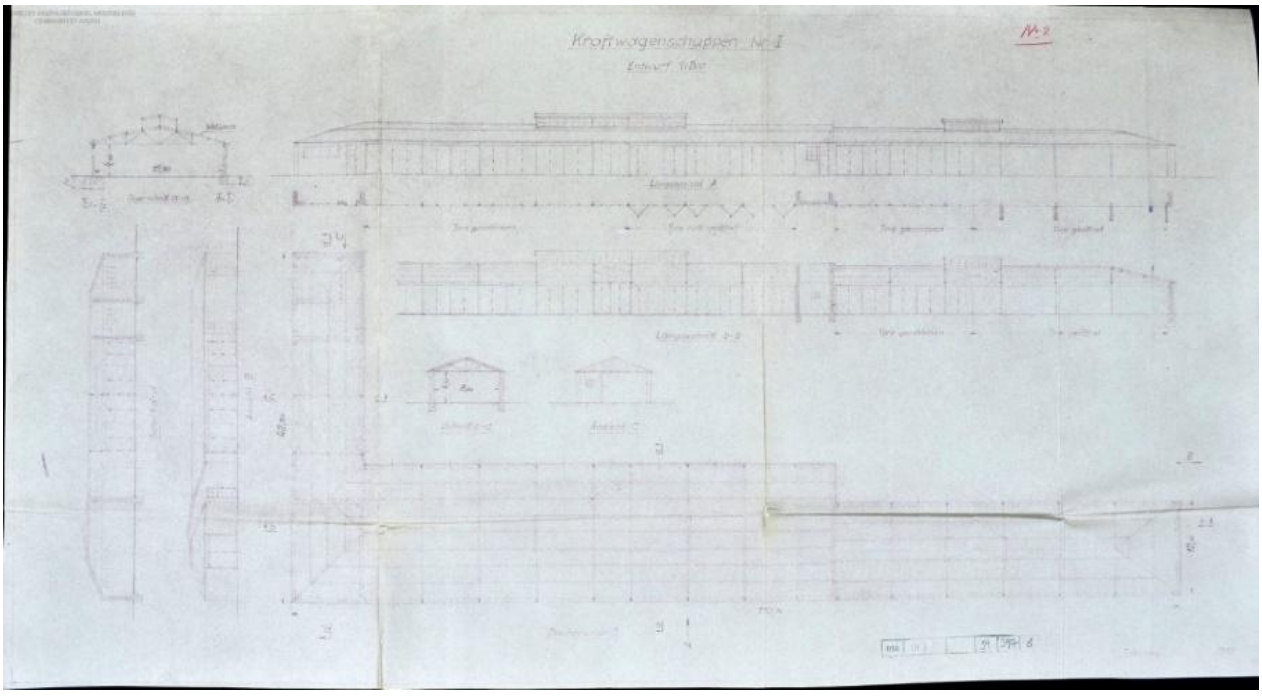

Figure 21 Motor vehicle storehouse/hangar, no: 1
Source: The Prime Ministry Republic Archive, Location no 30-10-0-0 / 59-397-6, p.22

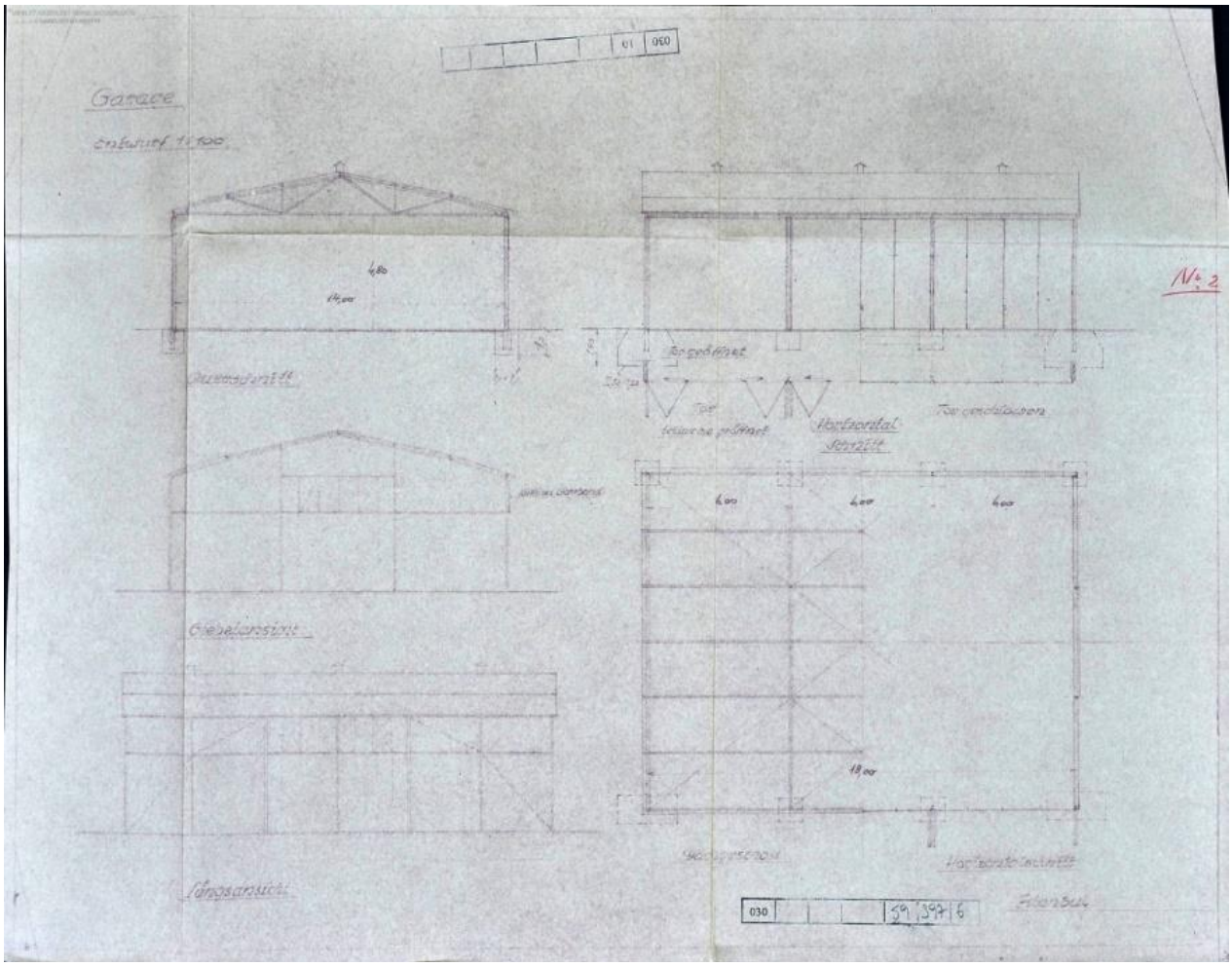

Figure 22 Motor vehicle storehouse/hangar, no: 1

Source: The Prime Ministry Republic Archive, Location no 30-10-0-0 / 59-397-6, p.23

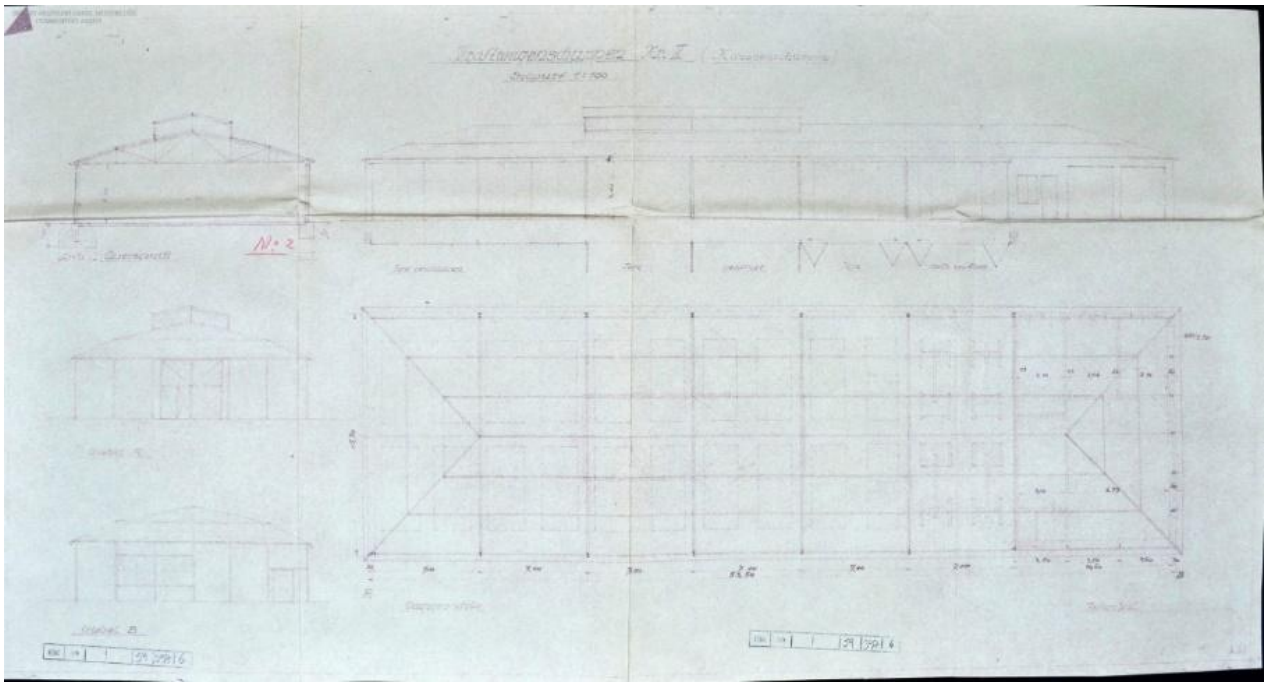

Figure 23 Motor vehicle storehouse/hangar, no: 2
Source: The Prime Ministry Republic Archive, Location no 30-10-0-0 / 59-397-6, p.24

On 14th and 15th pages, there are Yeşilköy Sky School dormitory and hangar drawings. The dormitory building for 150 students has 3 floors. There are 1/250 scaled T-shape layout plan, 1/50-scaled basement floor, 1st and 2nd floor plans and elevations. The bearing system of the building designed to modern taste is of reinforced concrete and has an ~500 m² floor area in total. The building can be discussed under 3 blocks; even though the location names of two thin and long rectangle blocks joining to a central square block by their ends were not written on the project, it is understood that it was the dormitory. At the end of flanking blocks, were stairs with square settings. It is understood from the images that the buildings were expanded sideways within time and 2-storey additions were made (Figure 24). The medium-sized square hangar has a saddle type roof and is joined to two 2-floor thin and long rectangle blocks. The completed version of the facilities can be seen in the aerial and other images of the era (Figures 25, 26 and 27).Demirağ placed signboards to some previous residence buildings around and seemingly used them for Sky School (Figure 28).

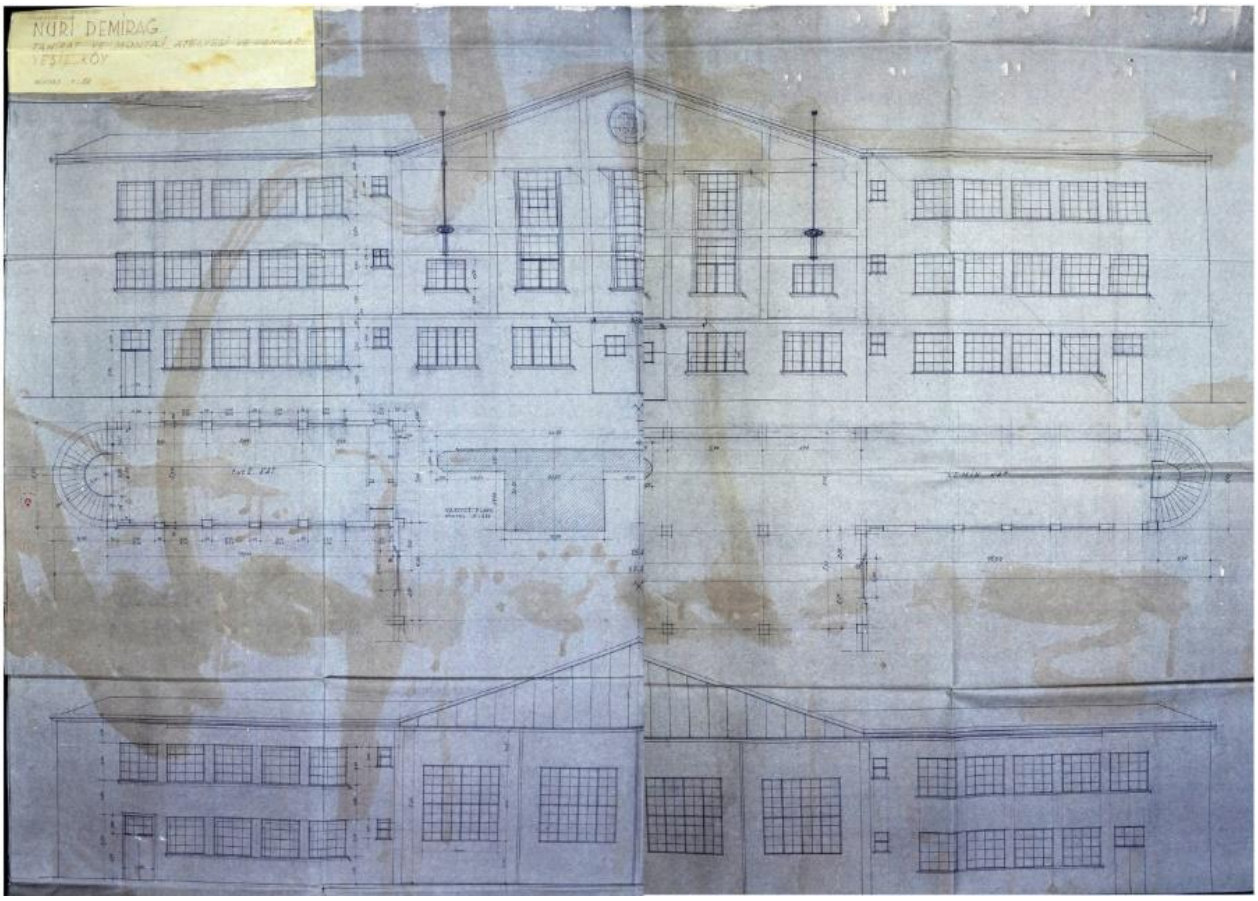

Figure 24 Nu.D. Yeşilköy Sky School Dormitory Building and hangar drawings, scale: 1/50
Source: The Prime Ministry Republic Archive, Location no 30-10-0-0 / 59-397-6, the drawing no 14, 15

Figure 25 Nu.D. Yeşilköy Sky School Dormitory Building, aerial view
Source: Yalçın, 2013

Figure 26 Nu.D.Yeşilköy Sky School Dormitory Building
Source: Nuri Demirağ Fotoğraflar, n.d.

Figure 27 Visit of young scouts to Nu.D. Yeşilköy Sky School and hangar
Source: Nuri Demirağ Fotoğraflar, n.d.

Figure 28 Nu.D. Yeşilköy Sky School, before 1940
Source: Teyyareci Arşiv, n.d.

Having founded the first civil air station with the name of “Sky School” (Ergin, 1952) in Yeşilköy, Demirağ opened these facilities in 1941 and aircraft manufacturing and aviation trainings were initiated. 16,000-hour flights were made in Yeşilköy Sky School until 1943 and 290 pilots were trained. Demirağ also founded a parachute manufacturing facility in Bursa (Deliorman, 1957; Dervişoğlu, 2011).

According to Nuri Bey, the aircraft being manufactured in Europe and the United States could be manufactured in Turkey as well. He understood the importance of aviation and accordingly, focused on giving significant importance and made investments. He aimed at founding the primary large manufacturing facility and Sky School in his homeland Divriği as a county of Sivas. Apart from aircraft workshop in Beşiktaş on 17 September 1936, the foundations of “Large Sky School” were laid in Divriği. Nuri Bey thought about establishment of a motor factory herein. According to his plan, while prototype reference aircrafts were being manufactured in Beşiktaş workshop, the aircrafts as serial production would be manufactured in the primary factory situated in Divriği (Şakir, 2011).

The government explicitly supported Demirağ in terms of his investments to aviation industry (Deliorman, 1957; Yalçın, 2013). Turkish Air Association (THK) ordered 10 school aircrafts and 65 gliders between 1937 and1938. The aircrafts would be delivered within 8 months, the inspection would be situated in Yeşilköy and item price of each aircraft would be 11,500 Turkish Liras (Yalçın, 2013). While these orders were being manufactured, a new type by completely Turkish engineering and workers with their all features emerged. In this period, a MMW-1 double seat training aircraft of which the prototype was manufactured by Selahaddin ALAN in Eskişehir was developed. Twelve ALAN-2 prototype was prepared and produced during the period under Nu.D.-36 code (Yavuz, 2013). In 1938, a double engine aircraft with aluminum fuselage accommodating 6 passengers were designed under Nu.D.-38 code, with the contributions of Aircraft Certified Flight Engineer. He carried out his first flight successfully in 1938 between Istanbul-Ankara-Izmir (Şakir, 2011) (Figure 29 and 30).

Figure 29 Nuri Demirağ, landed in Nuri Demirağ Airfield with Nu.D.-38
Source: Nuri Demirağ, n.d.

Figure 30 Double pilot-operated Nu.D.-38 with the capacity of speed of 235 km/h, flying up to 5000 feet and 1000 KM, taking off
Source: Nuri Demirağ, n.d.

The developments made a tremendous impact in Sivas and Istanbul newspapers and announced to the society. Kandemir as the journalist of Tasvir-I Efkar newspaper dated 17 August 1941 asked to Demirağ, “How did you establish this facility?” and Demirağ replied as:

> After believing that our future, independency and honor is on sky, we made visits and long investigations almost everywhere from Moscow to London with the expert young people continuously for 5-6 years. We went to all aircraft factories and aviation institutions of Europe day and night. Consequently, we selected the perfect ones from the ones that we have seen and established here. (Demirağ, 1941, p.2)

In the same interview, he replied to the question of “What are your opinions for the future?” of Kandemir as:

> First of all, to expand this institution in a perfect way, to establish Yeşilköy Sky High School that will cost 1 million two hundred thousand liras... It will contain thousands of young people in Divriği; to establish Gök University which will comprise of twelve branches such as wireless operation, engine system, piloting, engineering, parachuting. And...while I am drinking coffee with tranquility and happiness with people who attained their desires along with this meadow, to see hundreds of aircraft tailing off immediately with one sign" (Demirağ,1941, p.2) (Figures 31 and 32).

Figure 31 1940s Yeşilköy Nu.D. Airfield; hundreds of people were visiting Demirağ airfield to celebrate "Sky Holiday" that was held by Nuri Demirağ each year
Source:Nuri Demirağ, n.d.

Figure 32 The aircrafts of Nu.D.-36 and Nu.D.-38 were carrying out fly past in Sky Holiday held by Nuri Demirağ each year traditionally and the society was watching national aircrafts with a great curiosity
Source: Nuri Demirağ, n.d.

In parallel with these attempts, the works towards establishment of aircraft branch in order to raise aircraft engineer were initiated in the department of Machine Department of Certified Engineer School (İTÜ) with the persistence and efforts (Tayhani, 2001). He also wanted to raise his children as aircraft engineers in this school (Dervişoğlu, 2011). Raising aircraft engineers was proposed by THK to the Prime Ministry in 1941 and was found appropriate, the works were initiated by the relevant ministries. It was requested to work in coordination with THK during these works. In this context, the efforts of Nuri Bey related to open aircraft department and to raise aircraft engineers was a much foresighted step for that period. A statement of Nuri Bey to his relatives that he was living 30 years ahead of his time confirms this foresighted step.

The first national Turkish aircraft manufactured in Beşiktaş İstanbul flied to and back from Divriği as the birth place of Nuri Bey (Dervişoğlu, 2011). The fleet with 12 aircrafts flew in the route through Bursa, Kütahya, Eskişehir, Ankara, Konya, Adana, Elazığ and Malatya in September 1941 (Yalçın, 2013). During the period the activities of aircraft facility and aviation school of Nuri Demirağ, American Aircraft Manufacturers Union sent Chairman Mr. Todd. He came to Turkey for the observations (Deliorman, 1957). In the assistance agreement of the U.S. for Turkey following the report prepared by Mr. Todd (Marshall Plan/Assistance), it was stipulated that Turkey would not manufacture aircraft but purchase from the U.S. instead (Yalçın, 2013).

One of the Nu.D.-36 aircraft had a crash by stumbling on the runway hole while landing at Yeşilköy, and Selahaddin Alan (Adıgüzel, 2006; Hürkuş, 2014; Yalçın, 2013) as its pilot died due to the crash. He was flying from Istanbul to Eskişehir İnönü. After this, THK suspended and cancelled its contract with Demirağ due to this incidence; thus the company which was newly established with large investments encountered a challenging trouble. Failure of interest to Nu.D.-38 type which was manufactured in a similar way for Turkish Airlines was the second major impact against the company. Upon the lack of order from government institutions as the largest customer of Demirağ while entering into aviation industry, the productions were suspended. Nuri Demirağ runway and facilities in Yeşilköy were expropriated to generate a new airport (today's Yeşilköy Atatürk Airport) in 1944 and accordingly, the adventure of national aircraft manufacturing ended with a bankruptcy during such a period on which it would bear fruit (Adıgüzel, 2006; Tayhani, 2001). Certain aircrafts manufactured and not delivered were used for a particular time in the trainings of pilots in Sky School, some of them were requested by Spanish but it was not allowed to sell these aircrafts. In the claims filed, the expert reports decided in favor of Nuri Demirağ, yet the proceedings were concluded against Demirağ.

Despite the adjudications against him, Nuri Bey continued his works towards aircraft manufacturing and completed manufacturing of Nu.D.-38 type aircraft in 1944 (Adıgüzel, 2006; Yalçın, 2013). The model of aircraft was designed by Turkish engineers. All parts excluding engines were produced by Turkish technicians and workers. Test flights were completed successfully. Even though State Airlines was expected to accept the aircraft, this never happened. Yet, Nu.D.-38 type aircraft carried out its flight from Istanbul to Ankara on 26 May 1944 (Adıgüzel, 2006; Yalçın, 2013).

Having ended its activities in 1943, Nuri Demirağ Beşiktaş Aircraft Factory was expropriated in 1949. Beşiktaş Aircraft Factory was removed from Minute Book no 2/12060 on 11.06.1949. The activities of facilities and Sky School in Yeşilköy which were aimed to work with Beşiktaş Aircraft Factory were ended. The remaining aircrafts were not transferred but sold to junk. Maybe not Beşiktaş, but Yeşilköy is still a district in which civil, commercial and military (Air Force Academy) activities are currently continuing.

Conclusion

Having come out on top in a period characterized as “Golden Age” of aviation in the West in 1930s, aviation architecture also brought the result of emerging new structural types. Even though Ankara was selected as the capital of the newly established Republic of Turkey, Istanbul became one of the places selected for investments of international and national attempts with its population, history and geographical advantages. In this context, as reviewed in the article, Nuri Demirağ, as one of the national entrepreneurs, established aircraft factory in Beşiktaş situated in European side of Istanbul and several facilities in terms of aircraft maintenance services. The facilities situated in Yeşilköy had amenities such as test, storage, maintenance, repair and a runway. Additionally, he founded a “Sky School” and dormitory built for training of pilots. The facilities both in Beşiktaş and Yeşilköy have distinctive importance as being the first national civil aircraft structures of the era. These facilities are the concrete indicators that Western technologies of that era and accordingly aircraft industry as a new industrial branch have been followed in the country. The location of Beşiktaş factory at seafront, as discussed in the article, associates with the idea that manufacturing of watercraft (the popular luxury transportation vehicle of that era) was considered to be carried out in the future. “Marshall Plan” of the United States under the name of “assistance”, the policies aircraft supply without charge, to be long questioned, was effective in closing of this facility.

As understood from the documents founded in Prime Ministry Republic Archive (BCA) and the projects in the other documents, both Beşiktaş and Yeşilköy Nu.D. facilities have almost identical features with foreign references (with aircraft industrial structures of the age). Being in conformity with the style of New Architecture (Contemporary Architecture or International Style) of the period, they can be assessed as modern industrial facilities for which reinforced concrete and steel were used as new materials. These facilities are explicitly reflecting the new objectives of a new state (the ideal of being among the leading states), while geometrical basic forms show the influence of Bauhaus and Art Decoas the common tendencies in the West (Europe and the Unites States) of that period. Industrial facility/machine aesthetics attracts the attention in the images of that period. These facilities have a nature of important “industrial heritage “due to the effort of establishing the first references of aviation architecture in 1930s. Alas, they are no longer present.

The effort of Nuri Demirağ for establishing the first references of aviation architecture ascribes a meaning to these facilities. Based upon the idea of Atatürk formulated by him as “Future is in the skies" and aviation, the thoughts of establishing aircraft facility with “serial production” in Sivas Divriği were the attempts in conformity with the futuristic spirit of the era. These facilities gained a new identityto the districts of both Beşiktaş and Yeşilköy. These districts were being shaped with the structures as the symbols of renewed image of the Republic of Turkey.

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Color Perception in Correlated Color Temperature of Led Lighting

Saadet AKBAY YENİGÜL*, Ayşe Nihan AVCI**

Abstract

Color and light are inseparable entities that are the essential design factors in the field of interior architecture. When the light changes, the perceived color appearance of a surface within an interior environment also changes. The change in color perception is not only related to the type of a light source or the intensity of illumination, but also to the correlated color temperature (CCT) of a light source. The aim of this study is to understand how different CCTs of light-emitting diode (LED) lighting influence the color perception. A study is conducted to compare the perceptive color tendencies for inherent colors under two different CCTs of LED lighting, i.e. warm (2700º K) and cool (4000º K). In the study, Natural Color System (NCS) is utilized as a color notation system to reveal the possible tendencies and patterns concerning the relationship between the inherent and perceived colors. The general tendencies for the perceived colors revealed similar patterns in the nuance (i.e. blackness and chromaticness) color area for each inherent color and showed dispersion on the hue color area under the CCTs of both 2700º K and 4000º K LED lighting.

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Anahtar kelimeler:
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LED Aydınlatmanın Farklı Korelasyonlu Renk Sıcaklığındaki Renk Algısının Değerlendirilmesi

Saadet AKBAY YENİGÜL*, Ayşe Nihan AVCI**

Öz

Renk ve ışık, iç mimarlık alanında tasarımın temel unsuru olan ayrılmaz nesnelerdir. Işık değiştiğinde, algılanan iç mekânın yüzey renk görünümü de değişir. Renk algısındaki bu değişim, yalnızca bir ışık kaynağı türüne veya aydınlatma yoğunluğuna değil, aynı zamanda bir ışık kaynağının renk sıcaklığına da bağlıdır. Bu çalışmanın amacı, LED aydınlatmanın farklı renk sıcaklığındaki renk algısını nasıl etkilediğini anlamaktır. LED aydınlatmanın iki farklı sıcak (2700º K) ve soğuk (4000º K) renk sıcaklığı altında asıl renkler ile algılanan renk eğilimlerini karşılaştırmak amacıyla bir çalışma yürütülmüştür. Bu çalışmada, asıl renkler ile algılanan renkler arasındaki olası eğilimleri ve kalıpları ortaya çıkarmak için Doğal Renk Sistemi (NCS), bir renk notasyon sistemi olarak kullanılmıştır. LED aydınlatmanın her iki 2700º K ve 4000º K renk sıcaklığı altında algılanan renkler için genel eğilimlerde, her bir asıl renk için nüans (rengin değeri ve doygunluğu) renk alanında benzer desenleri ortaya çıkarmış ve renk türü renk alanında dağılma göstermiştir.

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Introduction

Color is a property of light. Without light color does not exist, as Porter and Mikellides (1976) claimed: “color is a sensation conveyed through the medium of energy in form of light radiations within the visible spectrum and without an observer these rays do not, in themselves, constitute color.” (p. 78). For color to become visible, there needs surfaces to be present from which the various wavelengths of light are reflected. Color is considered a complex perception that is simply the interaction of a light source, an object, and an observer (Berns, 2000).

Color and light are inseparable entities; they not only create the image of the space mentally, but their interactions also make space perceivable (Klarén and FridellAnter, 2011). Within an interior environment, light and color meet people in the form of natural and artificial lighting through sources, and according to the reflective properties of the surfaces under certain lighting conditions, this light and surface interaction modulate the colors to be perceived (Poldma, 2009).When the light changes, the perceived color of a surface within an interior environment also changes (Lauer and Pentak, 1995). The change in the color perception that is mediated through the lighting conditions influence the feelings, mood, comfort, performance, motivation, productivity, health and physiological well-being of people in that interior environment (Klarén and Fridell Anter, 2011; Öztürk, Yilmazer and Ural, 2012).Therefore, the experience of colors within an interior environment is not only perceptive but also cognitive, as well (Klarén and Fridell Anter, 2011).

With the development of technology, LED (light-emitting diode) has been widely used in interior environments as artificial light sources. Although LED is a relatively new area in the lighting technologies, it has been preferred to be utilized in interior environments because of its high efficiency, low power consumption, long lifetime expectancy, high luminous efficiency, and good color rendering over the other artificial light sources (e.g. incandescent lamps, fluorescent lamps, halogen lamps, and etc.) (de Almeida et al., 2014).Studies showed that LED lighting influences the color appearance of surfaces that resulted in an increase on the visual comfort and well-being of people in interior environments (Hong et al., 2017). Color appearance as a discipline aims to describe colors in different illumination, viewing and cognition within an environment (Berns, 2000). Briefly, color appearance is defined as an “aspect of visual perception by which things are recognized by their color” (Berns, 2000, p. 27). Shevell (2003) stated that the color appearance of surfaces is related to the perceived color which is a mental and not a physical phenomenon. The source of light that illuminates the surface and the correlated color temperature (CCT) are both important for the color appearance of surfaces. This is because the CCT also describes the color appearance of a light source, which is defined as Kelvin (K). For instance, a light that has a low CCT of 3500º K, is called warm light with an orange-yellow appearance and is referred to as a warm color. On the other hand, the light

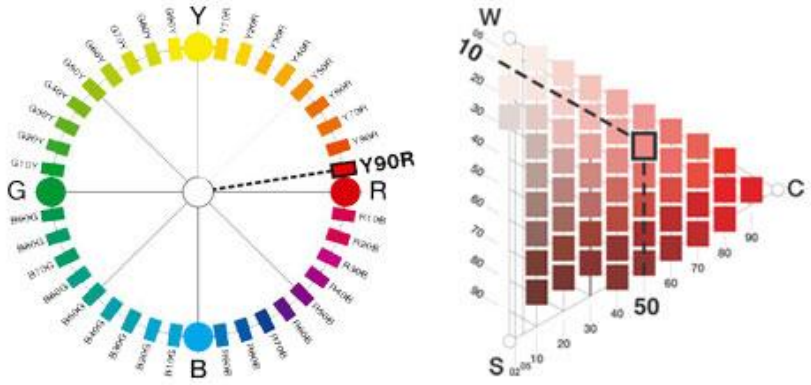
which is 4000º K and higher, is called cool light with a bluish white appearance and referred to as a cool color (Park and Farr, 2007).In her study, Hårleman (2007) indicated that the perceived color changed as the intensity of illumination and the correlated color temperature of the light changed. The CCT is considered as one of the most fundamental quantitative lighting characteristics that influences the perception and behavior of people. Hong et al. (2017) claimed that in order to get an effective color appearance of the surfaces with in interior spaces, the CCT ratings of the LED lighting should be well specified.

The fundamental question of this study is what colors do individuals see in different correlated color temperature of LED lighting? The aim is to understand and evaluate how different CCT of LED lighting influences the perception of color. A study is conducted to compare the perceptive color tendencies for inherent colors under two different CCTs of LED lighting, i.e. warm (2700º K) and cool (4000º K). The determinations of color appearances and their specifications are made with the NCS (Natural Colour System) color notation system. The tendency patterns that are found in this study would guide the designers for practical use of color in interior architecture.

Color Terminology

The NCS is a color standard that is a universal language of color communication. This study uses the NCS as a color notation system, it color terminology and the colors from the NCS glossary.

The NCS is a color ordering system that depends on six *elementary colors*. The system orders colors according to their perceptual *elementary attributes*. All colors are described in the system by their degree of visual resemblance to these elementary colors and to these elementary attributes. The elementary colors and their interrelations are represented by a three-dimensional imaginary color space in the NCS. This color space is a double cone- like model that consists of the *NCS Hue*, *NCS Blackness* (or NCS Whiteness), and *NCS Chromaticness* scales (Berns, 2000; Bergström, 2008). To understand a color notation in the color space, the double cone model is divided into two two-dimensional projections; the NCS Color Circle and the NCS Color Triangle (Hårleman, 2007) (Figure 1).



a. NCS color circle Notation of hue Y90R.

b. NCS color triangle Notation of nuance 1050.

Figure 1 Two-dimensional projections of the NCS color notation system: a. NCS color circle and b. NCS color triangle

Elementary Colors: There are six elementary colors in the NCS, four chromatic colors, Yellow (Y), Red (R), Blue (B), and Green (G), and two achromatic colors, White (W) and Black (S, swarthy). The appearance of an elementary color is described with reference to itself. For instance, R is a color that has not any resemblance to other elementary colors (Taft, 1997; Fridell Anter, 2000).

Elementary Attributes: The elementary attributes are the quantifiable characteristics of the perceptual similarities of the elementary colors. They are represented by lowercase letters that are whiteness (w), blackness (b), yellowness (y), redness (r), blueness (b), and greenness (g) (Fridell Anter, 2000).

NCS Hue: The NCS hue is briefly the relationship between two chromatic elementary attributes. It expresses the degree of the resemblance between one or two chromatic elementary colors. For instance, the numerical value for hue "Y90R" that is presented in NCS color circle in Figure 1 represents the chromatic elementary colors of Y and R. Ninety indicates the degree of the resemblance between the two colors on a 100 graded visual scale. Thus, the hue Y90R has 10% perceived resemblance to yellow and 90% perceived resemblance to red (Fridell Anter, 2000; Hårleman, 2007).

NCS Nuance: The NCS nuance is the relationship between whiteness, blackness, and chromaticness of the colors. The chromaticness of a specific color is the quantifiable attribute that expresses the visual resemblance to the pure chromatic color of the same hue. The nuance is presented in the NCS color triangle; the corners of the triangle show the relative resemblance to the elementary colors W and S and the pure chromatic color C. For instance, the first two digits and the following two digits of a given nuance "1050" in Figure 1 expresses the numerical

value of the blackness and chromaticness of the hue, respectively. The same hue can have different blackness or chromaticness. The whiteness is calculated according to the equation s + c + w = 100. The nuance 1050 thus has 10% of blackness, 50% of chromaticness, and 40% of whiteness (Berns, 2000; Fridell Anter, 2000; Bergström, 2008).

The specifications of the NCS nuance and the NCS hue together constitute the complete color notation of the NCS system. For instance, the NCS notation has the form of "1050-Y20R", the first is the nuance and second is the hue of the specific color (FridellAnter, 2000). The color space of the NCS system is illustrated by the NCS Color Atlas and Album containing 1950 standard color samples. The importance of the NCS system is that every color appearance of the *perceived* and *inherent* colors of surfaces can be placed and defined by an exact NCS notation (Hård et al., 1996; Hårleman, 2007).

Perceived Color: It is "the color that an observer perceives that an object or [a surface] has in any given light and viewing situation."(Fridell Anter, 2000, p. 31). As Hårleman (2007) stated a color percept is not a constant thing giving reference to a surface, but rather a perception that changes depending on the viewing conditions.

Inherent Color: It refers to "the color an object would have if observed in standardized observation conditions are denoted for NCS color samples in agreement with their specifications, i.e. with their color code." (Hårleman, 2007, p. 100-1). In other words, FridellAnter (2000) claimed that "to be able to describe how the perceived color varies between different situations there is however a need for a fixed point of reference among all the possible colors that the object [or the surface] can assume."(p. 23). This point of reference is called inherent color.

To identify the perceived color, Fridell Anter (2000) defined two methods: in determination method A, the observer is asked to make judgments depending on the degrees of resemblance to the elementary colors; in determination B, the observer is required to compare the colored surface with the color samples on the pages by using the NCS color atlas (Green-Armytage, 2006).

The Study

Aim and Objectives

The major aim of the study is to understand how different CCT ratings of LED lighting influence the perception of color. The study is carried out to compare the perceived color tendencies of

inherent colors under two different CCTs of LED lighting, i.e. warm (2700º K) and cool (4000º K). The objectives consist of:

- determining the differences of the given inherent colors to the perceived colors under warm LED lighting of CCT of 2700º K,
- determining the differences of the given inherent colors to the perceived colors under cool LED lighting of CCT of 4000º K,
- comparing the possible tendencies of the inherent colors with the perceived colors under the LED lighting with two different CCTs.

Participants

A total of ten participants volunteered to participate in the study. There were five male and five female participants who were the academic staff of the Faculty of Architecture, Çankaya University, Ankara, Turkey. The mean age of the whole group was 40.2, ranging from 27 to 61. All the participants were Turkish living in Ankara, Turkey.

Colors

In the study, four color samples in A9 size (52 x 32 mm) were utilized as inherent colors (see Table 1). The colors were selected from the NCS Album. The NCS album is a color design tool that contains detachable color samples showing all the NCS 1950 standard colors. The detachable color samples in the album not only help to define and match colors of different surfaces, but also most importantly, it enables the user to compare colors under different lighting conditions. In the NCS color system, colors are categorized according to their nuance attributes that are defined as blackness, whiteness, and chromaticness. Although each color in nature consists of the whole nuance attributes, a color might have a more dominant attribute (e.g blackness) among the whole nuance attributes resulting in the other two attributes being less dominant (e.g. whiteness and chromaticness) (Hård et al., 1996). In this study, the colors were selected from the nuance area where no color attribute was dominant. This indicated that the degree of blackness, whiteness and chromaticness of each color were similar. Table 1 shows the NCS notations of the four inherent colors used in the study.

Table 1 Four inherent colors with their NCS notations

Inherent Color	NCS Notation
	S 3030-Y50R
	S 3030-R50B
	S 3030-B50G
	S 3030-G50Y

The numerical value '3030' in Table 1 of each color designates the NCS nuance, and 'Y50R', 'R50B', 'B50G', and 'G50Y' specify the NCS hue of the inherent colors. The nuances of the colors indicate that each color has 30% blackness, 30% chromaticness and 40% whiteness. In the hue part of the NCS notation, '50' indicates the degree of the resemblance between the two chromatic elementary colors of Y and R, R and B, B and G, and G and Y. This means that the first color has 50% resemblance to yellow and 50% resemblance to red; the second color has 50% resemblance to red and 50% resemblance to blue; the third color has 50% resemblance to blue and 50% resemblance to green; and the fourth color has 50% resemblance to green and 50% resemblance to yellow.

Experimental Set-Up

The experiment was conducted in the Building Science and Environmental Control Laboratory of Faculty of Architecture, Çankaya University. The laboratory is approximately 20 square meters and has a façade window that faces north. To control the daylight and create a darkened experiment room, the window was blinded with the black curtain to block the natural light. The experiment was conducted with the utilization of DataColorColorMatcher® light booth, which is a property of the Building Science and Environmental Control Laboratory. The light booth was used to create a reliable viewing condition for colors to be perceived under different CCTs of LED lighting. The dimensions of the light booth are 79 x 107 x 68 cm. It has a Munsell N5 gray surround that corresponds to the uniform gray of L^* of 50. The light booth has a prismatic

diffuser at the inner top surface that includes built-in five different light sources (i.e. D65, TL 84 Fluorescent, TL 83 Fluorescent, Incandescent - 2800º K, and Ultraviolet A) for illumination. These different light sources provide a tool for visual color assessment when the color samples are viewed under different illumination. The light booth was placed on to a desk and the viewing distance between the participant and the color samples inside the light booth was about 70 cm. The illumination of the experiment room was only provided by the light booth.

Light Sources

Within the experiment, the two correlated color temperature light sources, 2700º K (warm) and 4000º K (cool), were selected in order to evaluate the possible tendencies of the inherent colors towards the perceived colors. Table 2 shows the specifications of the light sources used in the experiment.

Table 2 Specifications of the LED lamp

Brand and Model	Dimensions (in cm)	Lumen (lm)	CCT (K)	CRI (Ra)	Product
Philips Scene Switch Bulb E27	11 cm x 6 cm	806 lm	2700º K and 4000º K	≥ 80 Ra	

The light booth does not include LED light as one of the default five different light sources. However, the built-in incandescent luminaire of the light booth consists of four E27 bulbs that allow the user to change the luminaire to another light source. Thus, the intended LED lighting for the experiment was obtained by manually replacing the incandescent lighting of the light booth with the LED lighting. The utilized LED lights for the experiment were the switch bulbs with the two color settings (i.e. 2700º K and 4000º K). The color rendering index (CRI) of the LED lighting was measured 83 Ra for each CCT by using Konica Minolta CL-70F CRI Illuminance Meter. This indicates that getting a high color rendering index (CRI) from the light source (from 1 to 100 Ra) leads to obtain a better-perceived color appearance of the surfaces (Park and Farr, 2007). The illumination level was measured 1000 lux in the light booth for both CCT ratings.

Procedure

Each participant was led into the experiment room individually and was seated at a desk on which the light booth was placed with a viewing distance of 70 cm. Each participant was given a brief explanation on what was expected from the session. Due to the determination method used in the experiment; the participant was required to evaluate and match the inherent colors with the corresponding perceived colors among the samples on the pages of the NCS album. This determination procedure was done under two different CCTs of 2700º K and 4000º K LED lights, respectively. Each participant was asked to determine a color according to his/her own perception that corresponded to the presented inherent color sample in the light booth within a given interval of domain. Each inherent color had the numerical value of '50' (see Table 1) that indicated the degree of the resemblance between two chromatic elementary colors; this interval was defined by the researchers in between '30' and '70' hue areas on the NCS album. The NCS notation of the selected color that was determined by the participant was noted onto the data sheet. The duration for the procedure differed for each participant, ranging from 13 to 20 minutes; the average was 14.3 minutes.

Results and Discussion

Each participant determined a total of eight color samples and their NCS notations from the NCS album; the former four notations were obtained from the CCT rating of 2700º K, and the latter four were from the CCT rating of 4000º K. In total 80 NCS color notations were used as the data set for the study. The inherent colors were used as constant references to analyze the perceived differences under the two CCTs of LED lighting. Therefore, all corresponding perceived colors were compared to the inherent colors.

In order to evaluate the obtained data, color area (Fridell Anter, 2000) analysis was done by using the NCS circle and NCS triangle. In addition, the data was statistically analyzed by using descriptive analysis where the mean and standard deviation values were obtained to make some observations on the relationship between inherent and perceived colors under the two different CCTs of LED lighting, i.e. warm (2700º K) and cool (4000º K). The statistical analyses were done by IBM SPSS 21. To reveal the possible tendencies and patterns concerning the relationship between the inherent and perceived colors under the two different CCT ratings of the LED lighting, the nuance differences (i.e. blackness and chromaticness), and hue differences were evaluated separately to understand how various CCTs of LED lighting influences the perception of color.

For the CCT of 2700º K LED lighting, Table 3 displays the descriptive statistics of the differences in color areas between perceived and inherent colors. According to the results;

- The data set of the corresponding perceived color of the inherent color *S 3030-Y50R*, displays high dispersion in terms of the *chromaticness* (*M*: 36 *SD*: 10.75) and the *hue* (*M*: 48 *SD*: 11.35) color area. On the contrary, there is more cohesion within the distribution of the *blackness* color area.
- The data set of the corresponding perceived color of the inherent color *S 3030-B50G*, displays high dispersion in terms of the *hue* (*M*: 45 *SD*: 10.80) color area. Whereas, there are more cohesion within the distribution of the *blackness* and *chromaticness* color areas.
- The data set of the corresponding perceived color of the inherent color *S 3030-G50Y*, displays high dispersion in terms of the *chromaticness* (*M*: 30 *SD*: 8.16) and the *hue* (*M*: 60 *SD*: 8.16) color area. On the contrary, there is more cohesion within the distribution of the *blackness* color area.

Table 3 Descriptive statistics of the differences in color areas between perceived and inherent colors under the CCT of 2700º K LED lighting

Descriptive Statistics for 2700 K						
Inherent Color	Color Area	N	Min.	Max.	Mean	Std. Deviation
S 3030-Y50R	Blackness	10	20	30	23.00	4.83
	Chromaticness	10	20	60	36.00	**10.75**
	Hue	10	30	60	48.00	**11.35**
S 3030-R50B	Blackness	10	20	30	22.00	4.22
	Chromaticness	10	20	40	32.00	6.32
	Hue	10	40	50	47.00	4.83
S 3030-B50G	Blackness	10	10	30	21.00	5.68
	Chromaticness	10	20	40	29.00	5.68
	Hue	10	30	60	45.00	**10.80**
S 3030-G50Y	Blackness	10	20	30	23.00	4.83
	Chromaticness	10	20	40	30.00	**8.16**
	Hue	10	50	70	60.00	**8.16**
	Valid N (listwise)	10				

The above results indicate that the participants' selections upon their perceived colors show great distribution through the range of the *chromaticness* and *hue* color areas. Although the color *S 3030-R50B* seems to have a dispersion on the *chromaticness* (*M*: 32 *SD*: 6.32) color area, no remarkable dispersion was observed in color areas between the perceived and inherent colors.

For the CCT of 4000º K LED lighting, Table 4 displays the descriptive statistics of the differences in color areas between perceived and inherent colors. According to the results;

- The data set of the corresponding perceived color of the inherent color *S 3030-Y50R*, displays high dispersion in terms of the *chromaticness* (*M*: 35 *SD*: 8.50) color area. Whereas, there are more cohesion within the distribution of the *blackness* and *hue* color areas.
- The data set of the corresponding perceived color of the inherent color *S 3030-B50G*, displays high dispersion in terms of the *hue* (*M*: 48 *SD*: 7.89) color area. Whereas, there are more cohesion within the distribution of the *blackness* and *chromaticness* color areas.
- The data set of the corresponding perceived color of the inherent color *S 3030-G50Y*, displays high dispersion in terms of the *chromaticness* (*M*: 29 *SD*: 7.38) and the *hue* (*M*: 52 *SD*: 9.19) color area. On the contrary, there is more cohesion within the distribution of the *blackness* color area.

Table 4 Descriptive statistics of the differences in color areas between perceived and inherent colors under the CCT of 4000º K LED lighting

Descriptive Statistics for 4000 K

Inherent Color	Color Area	N	Minimum	Maximum	Mean	Std. Deviation
S 3030-Y50R	Blackness	10	20	30	25.00	5.27
	Chromaticness	10	20	50	35.00	**8.50**
	Hue	10	40	60	48.00	6.32
S 3030-R50B	Blackness	10	20	30	23.00	4.83
	Chromaticness	10	20	40	31.00	5.68
	Hue	10	40	50	47.00	4.83
S 3030-B50G	Blackness	10	20	30	23.00	4.83
	Chromaticness	10	20	40	30.00	6.67
	Hue	10	30	60	48.00	**7.89**
S 3030-G50Y	Blackness	10	20	30	21.00	3.16
	Chromaticness	10	20	40	29.00	**7.38**
	Hue	10	40	70	52.00	**9.19**
	Valid N (listwise)	10				

The above results indicate that the participants' selections upon their perceived colors show great distribution through the range of the *chromaticness* and *hue* color areas. No remarkable dispersion was observed in color areas between the perceived and inherent colors of the color *S 3030-R50B*.

The visual representation of the perceived tendencies pertaining to selected colors is shown from Figure 2 to Figure 5. Figure 2 and Figure 3 present the color areas of the tendencies of the selected perceived colors on the NCS circle and triangle under the CCT of 2700º K LED lighting, likewise Figure 4 and Figure 5 display the color areas at the CCT of 4000º K.

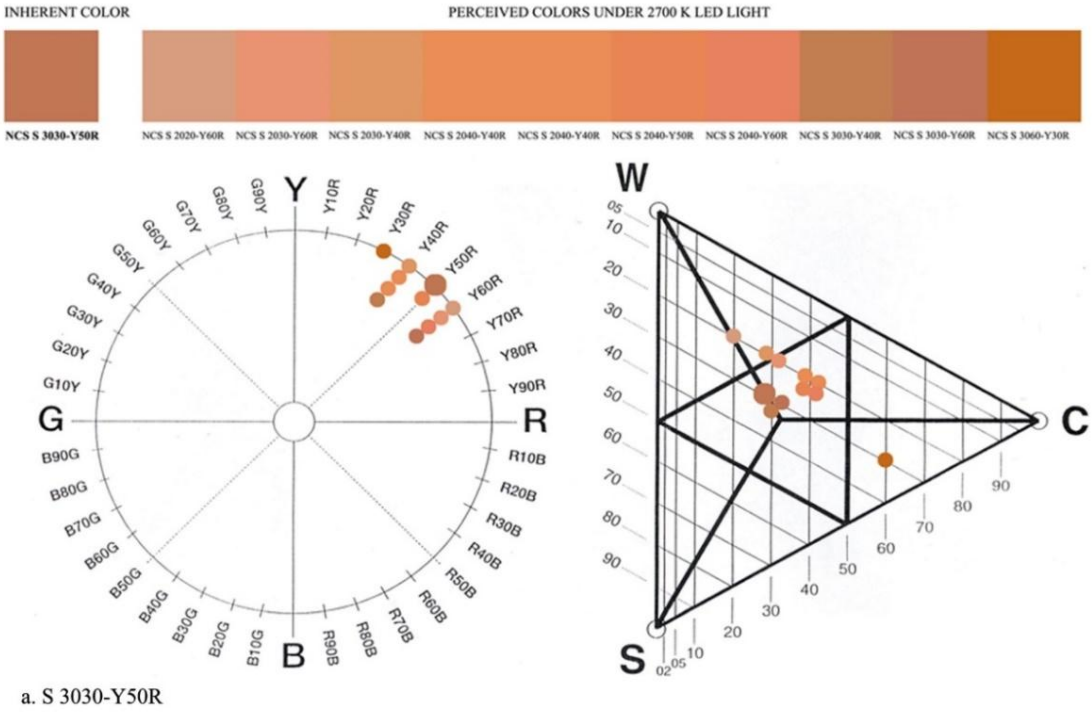
In these figures, the single colors on the left-hand side are the inherent colors and colors arranged side by side are the set of perceived colors selected by the participants. Additionally, the figures also show the color areas of the corresponding colors with their locations on the NCS circle and NCS triangle. The bigger circles on the NCS circle and NCS triangle indicate the positions of the inherent colors in the NCS system and the smaller circles demonstrate the perceived tendencies of the corresponding colors in the NCS system.

Regarding the color area analysis, the perceived tendencies of the corresponding colors and their result patterns are discussed by comparing the two different CCTs of LED lighting, i.e. warm (2700º K) and cool (4000º K). The findings are as follow;

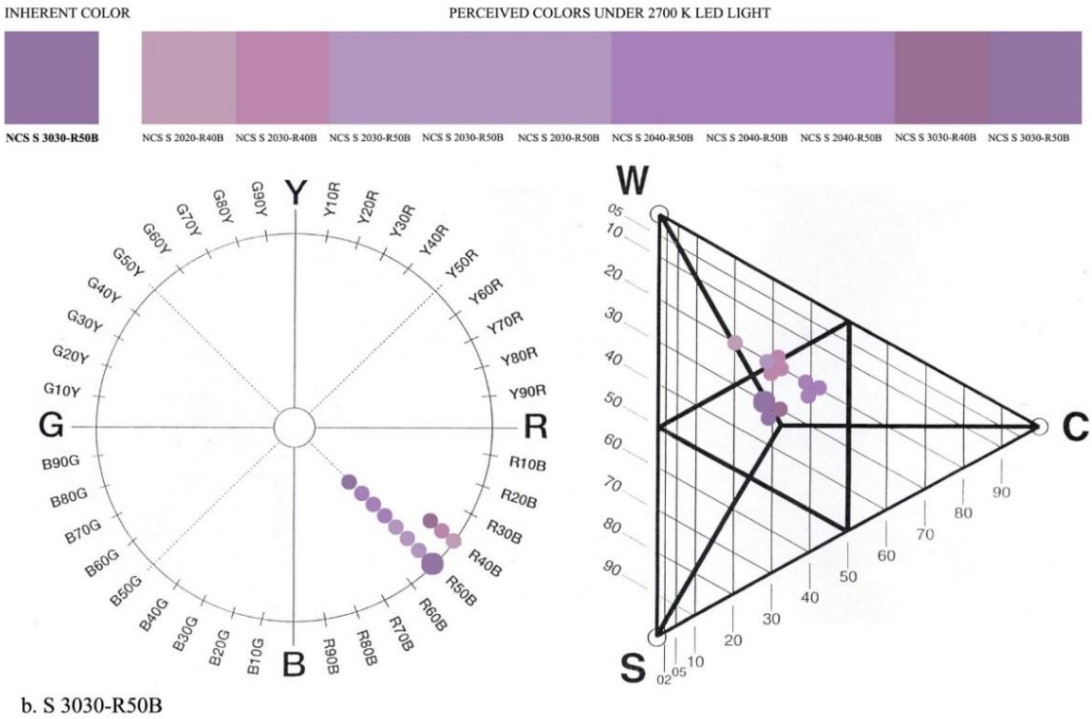
- For the inherent color *S3030-Y50R*, so-called *yellow-red* color: The distribution tendency patterns of perceived colors of *hue* color area shows more dispersion under the CCT of 2700º K LED lighting (Figure 2.a) when compared to 4000º K (Figure 4.a). Under the CCT of 4000º K LED lighting, the data set constitutes a pattern where the perceived colors of *hue* color area belong to the same hue family (i.e.Y50R) of the inherent color. The general pattern of the perceived colors have less *blackness* and more *chromaticness* under both CCT conditions of LED lighting.
- For the inherent color *S3030-R50B*, so-called *red-blue* color: The patterns of the perceived colors in terms of the *nuance* and *hue* color area under both CCT of 2700º K (Figure 2.b) and 4000º K (Figure 4.b) LED lighting are similar. This indicates that the general pattern where the perceived colors of the *hue* color area belong to the same hue family (i.e. R50B) of the inherent color. Additionally, the perceived colors have less *blackness* than the inherent color under both CCTs of LED lighting.
- For the inherent color *S3030-B50G*, so-called *blue-green* color: The distribution tendency patterns of perceived colors of *hue* color area shows more dispersion under the CCT of 2700º K LED lighting (Figure 3.a) when compared to 4000º K. Under the CCT of 4000º K LED lighting (Figure 5.a), the data set constitutes a pattern where the perceived colors of *hue* color area

belong to the same hue family (i.e.B50G) of the inherent color. In accordance, some of the participants show a tendency of perceiving colors more *chromatic* than the inherent color.

- For the inherent color *S3030-G50Y*, so-called *green-yellow* color: The distribution tendency patterns of perceived colors of *hue* color area shows great dispersion under both CCTs of 2700º K (Figure 3.b) and 4000º K (Figure 5.b) LED lighting. Although there exists a dispersion where the perceived colors divert from the inherent color, there is a greater measure of correspondence between the perceived and inherent colors at the CCT of 4000º K. The participants show a tendency of perceiving colors less *black* and more *chromatic* than the inherent color.

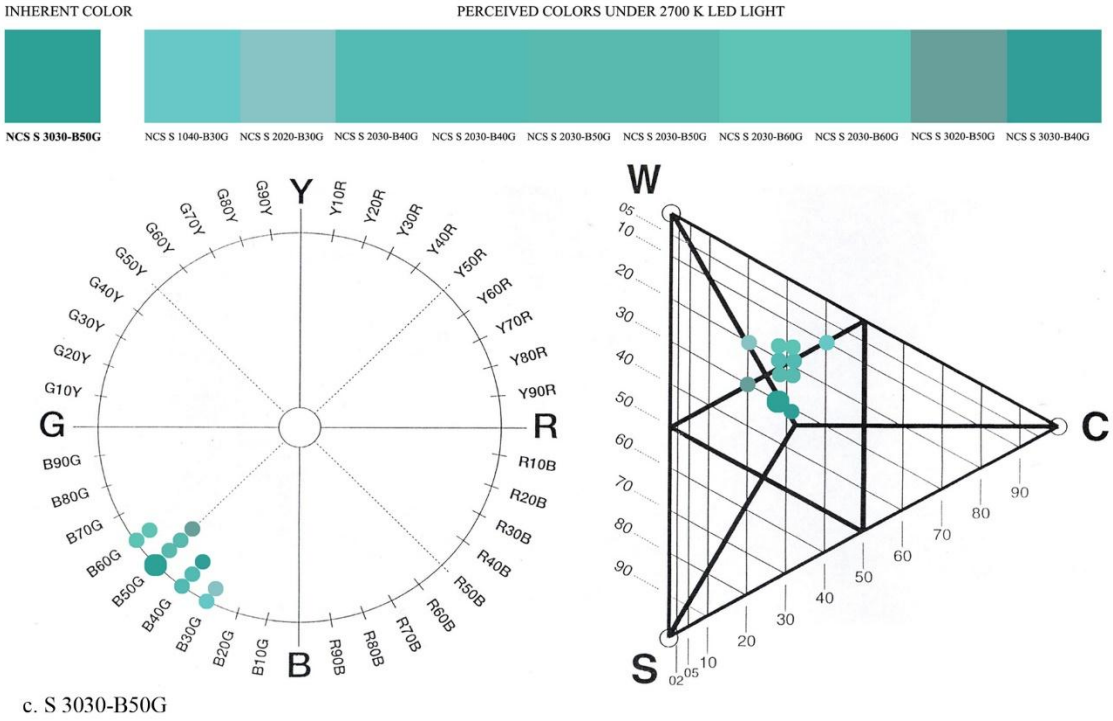


a. S 3030-Y50R

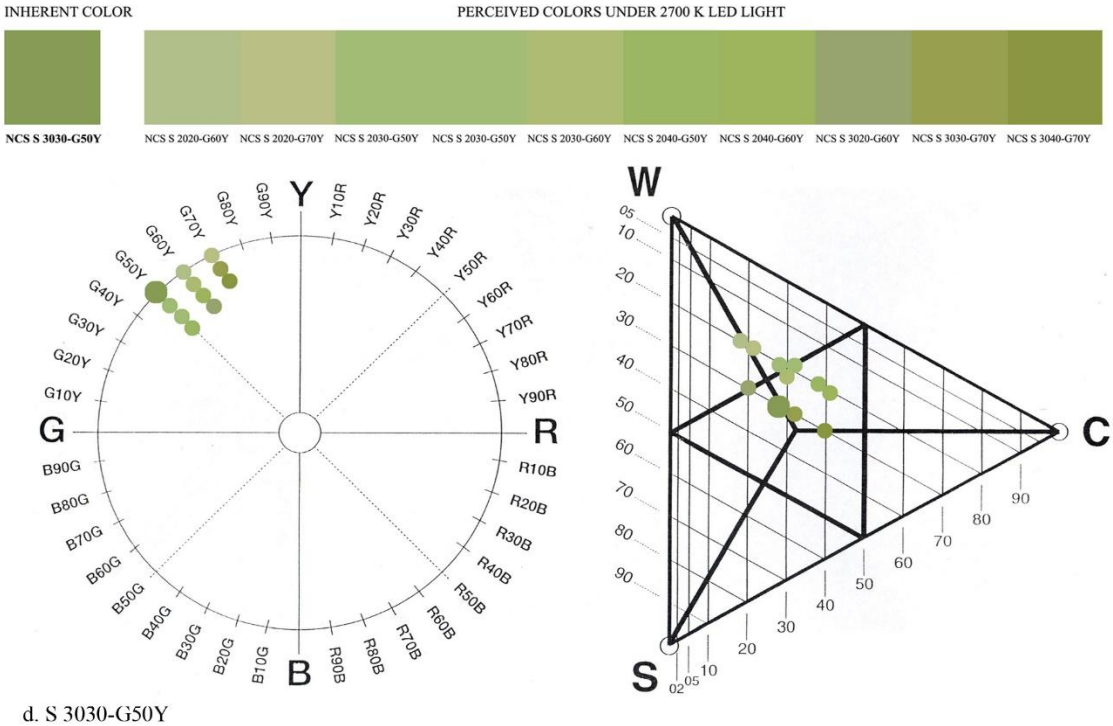


b. S 3030-R50B

Figure 2 Perceived color areas for the inherent colors; a. S 3030-Y50R and b. S 3030-R50B, at the CCT of 2700º K

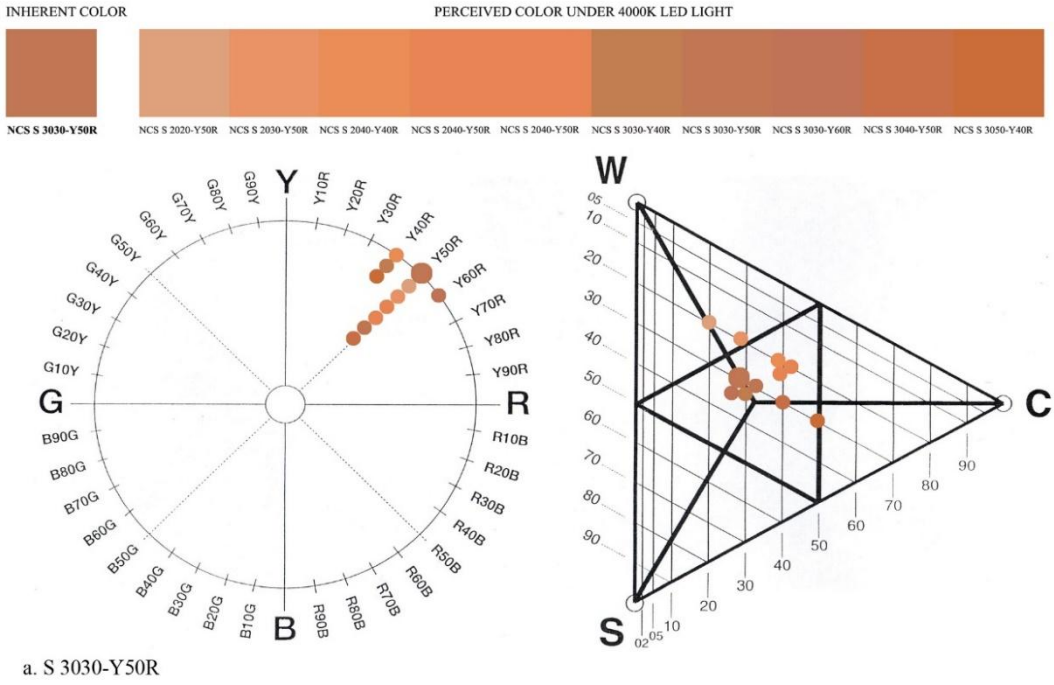


c. S 3030-B50G

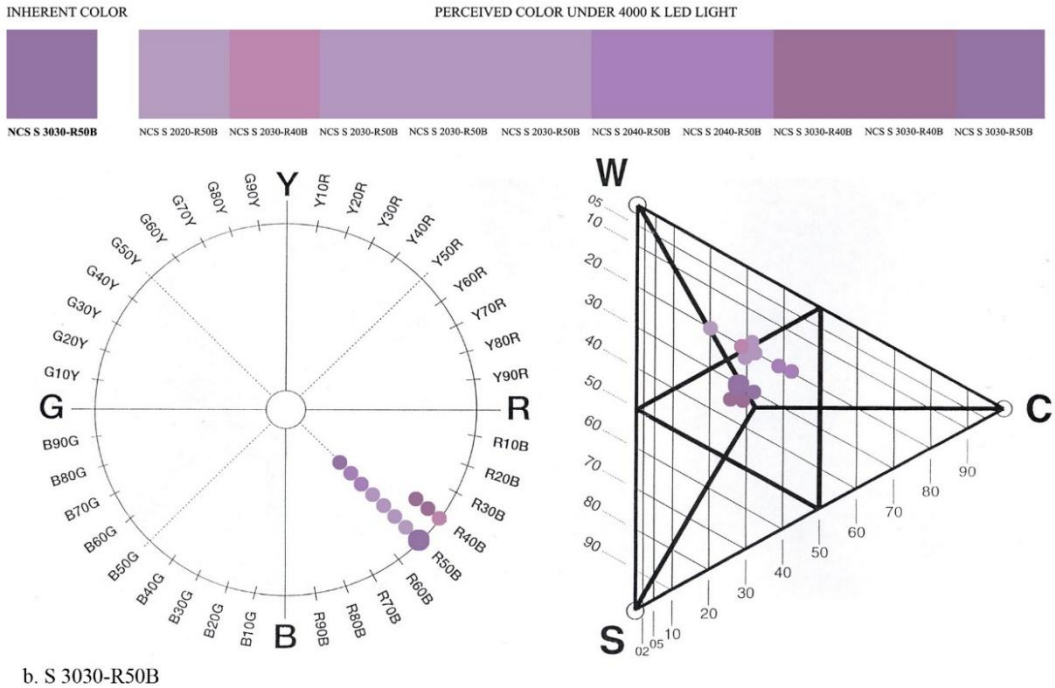


d. S 3030-G50Y

Figure 3 Perceived color areas for the inherent colors; c. S 3030-B50G and d. S 3030-G50Y, at the CCT of 2700º K

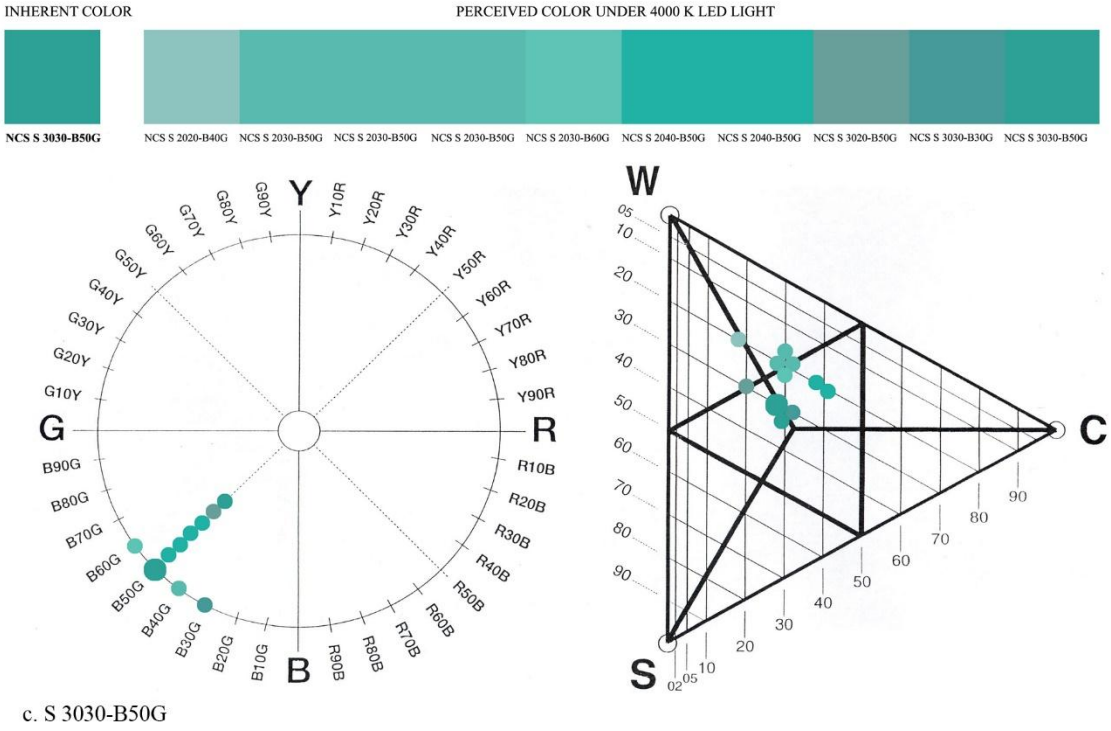


a. S 3030-Y50R



b. S 3030-R50B

Figure 4 Perceived color areas for the inherent colors; c. S 3030-Y50R and d. S 3030-R50B, at the CCT of 4000º K



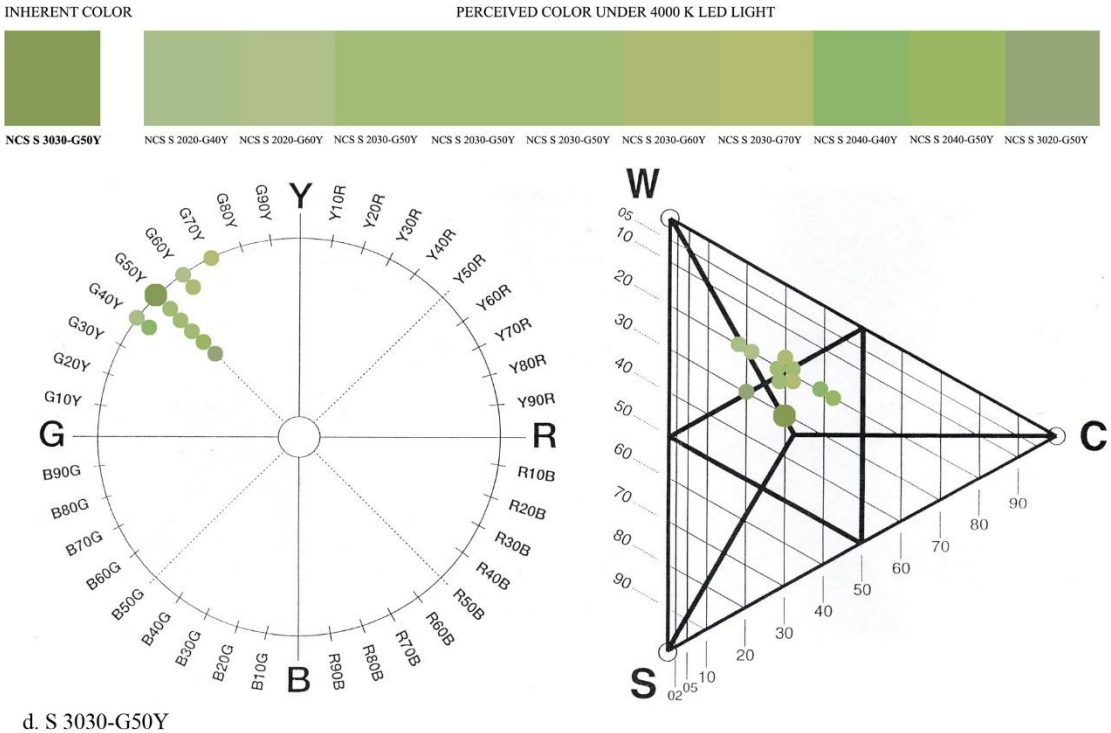


Figure 5 Perceived color areas for the inherent colors; c. S 3030-B50G and d. S 3030-G50Y, at the CCT of 4000º K

Conclusion

This study attempted to determine how different correlated color temperature of LED lighting influences the perception of color. An experiment was conducted to identify the perceptive color tendencies for inherent colors under the LED lighting with two different CCTs, i.e. 'warm' (2700º K) and 'cool' (4000º K). The participants determined colors according to their own perception that corresponded to the presented inherent color samples in the light booth at both CCTs of LED lighting. The NCS, a color notation system, was utilized as a color standard for the determination of perceived colors and their specifications. The inherent colors presented in this study were also selected from the NCS album. These colors were used as constant references to analyze the perceived differences under the two different CCTs of LED lighting. Therefore, all corresponding perceived colors were compared to the inherent colors. To reveal the possible tendencies and patterns concerning the relationship between the inherent and perceived colors, the *nuance* differences (i.e. blackness and chromaticness) and *hue* differences were evaluated separately.

Consequently, some definite findings were clarified through particular observable patterns. Regarding the findings of this study, the general pattern showed similar perceived tendencies of scattering on the NCS triangle for each inherent color, but showed differences of scattering on the NCS circle when LED lighting of both CCTs were compared. This indicated that, the tendencies for the perceived colors revealed similar patterns in the *nuance* (i.e. blackness and chromaticness) color area and showed dispersion on the *hue* color area under both CCTs of 2700º K and 4000º K LED lighting. The perceived color selections for *hue* color area constituted more incisive patterns and tendencies at cool LED lighting of 4000º K. However, no salient differences of perceived colors were observed for the *nuance* color area at both CCTs of LED lighting.

The distribution tendency of perceived colors with less *blackness* in comparison with the inherent colors were driven by both CCTs of warm (2700º K) and cool (4000º K) LED lighting. Under the warm LED lighting of 2700º K, the tendency of perceiving colors was more *chromatic* than the inherent color where the colors have resemblance to yellow. Additionally, the participants had more difficulties in being certain with selecting the corresponding perceived colors of S 3030-Y50R (yellow-red color) and S 3030-G50Y (green-yellow color) at the CCTs of both warm (2700º K) and cool (4000º K) lighting where both colors have resemblances to yellow, as well. The results in the perceived tendency of the inherent colors that have resemblance to blue were more distinguishable and incisive under the LED lighting of both CCTs. This result can also be seen on the color area analysis (Figure 2.b and Figure 4.b) of the color S 3030-R50B (red-blue color) where, the tendency at both CCTs of LED lighting showed similar patterns of scattering on the NCS circle and NCS triangle.

The tendency patterns that are found in this study could be a guide for the designers for practical use of color in interior architecture. Color and light are the crucial design factors in the field of interior architecture; therefore, further studies should be conducted using additional LED lighting with various CCTs under different illuminance levels with greater number of color samples and with more participants in order to attain more comprehensive outcomes.

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