ACADEMIC STUDIES

IN ARCHITECTURE, ENGINEERING PLANNING AND DESIGN

Editors
Rıdvan KARAPINAR

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FREFACE

The book ‘Academic Studies in Architecture, Engineering Planning and Design’ is serving an academic forum for both academics and researchers working in such fields. Architectural research is an interdisciplinary by nature. So it covers several fields such as technical sciences, social sciences and environmental sciences. Besides, architecture and engineering have been used as a research method for the contemporary issues relevant to architecture. In this book, the academics working in different fields share their results with the scientific community. Thus more researchers will be aware of these studies and have some new ideas for their future studies. The selected articles have been reviewed and approved for publication by referees. It is hoped that the book will be of interest and of value to academics and researchers.

Rıdvan KARAPINAR

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LANDSCAPE DESIGN AND APPLICATION PROCESS IN URBAN OPEN GREEN SPACES: THE CASE OF TRABZON ECOPARK

Emrah YALÇINALP[*] & Doruk Görkem ÖZKAN[**]

1.Introduction

The changes that were experienced in urban centers after industrialization led to a gradual decline in urban open green spaces and transformed these spaces into dysfunctional areas that could not interact with users. Especially with economic and technological advances, the increase in mobility and the studies that mainly take functional and technical problems into consideration instead of producing spaces for individuals led urban open green spaces to turn into unused dead spaces. Changes in urban living conditions and migration to urban centers were the factors that made it difficult to preserve the social, economic and ecological balance in Turkey and globally. These factors that threaten sustainability are mainly experienced in urban centers. Thus, non-ecological programming and practices in urban centers negatively affect human health, quality of life and social structure.

Open green spaces have an important role in improving urban living conditions. Thus, the relationship and balance between the architectural buildings and the open-green spaces that create the general urban character became one of the concepts that should be emphasized especially today. The physical and social features provided by ecological open green spaces designed with the user needs in mind are important to allow the integration between the individuals and the space. In this context, the local governments in developed countries aim to plan livable urban spaces that meet the needs of the people. Therefore, the planning and the design of urban open spaces should be based on activity spaces that satisfy user needs and requirements, and ecological spatial organizations that would allow for these activities. Thus, the interaction between the user and the environment is established, creating vibrant, livable designs where the users are satisfied with their environment (Whyte, 1980; Marcus and Francis, 1997). Literature review demonstrated that the majority of the previous studies included either theoretical approaches to urban open green spaces or

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provided assessments of existing open green spaces. Thus, the present study intended to consider the design and application process of a livable urban open green space that would provide integration with the users based on the present "Trabzon Eco Park".

2. Definition and Functions of Urban Open Green Spaces

The origins of the term green space dates back to the urban nature preservation movement and the European idea of green space planning (Swanwick et al., 2003). The green areas includes all public and private open areas in the urban space, which are mostly covered with natural or artificial plants including trees, bushes and grass that could be used directly or indirectly. Urban open green spaces are places that people access and with different purposes, functions and forms, including a spectrum from a simple playground to a natural landscape. Urban green areas are increasingly recognized as possessing a key role in promoting environmental sustainability and quality of life in cities today after various social, cultural, aesthetic, functional, economic and ecological functions are defined (Madureira, 2018). Urban green areas contribute to the development of psychological and physical health by balancing social interaction and economic integration, as well as providing ecological effects such as ecological prevention of air pollution, reduction of the heat island effect, protection of biodiversity, and noise reduction (James et al., 2009). In these dimensions, urban open spaces and green spaces are considered as the parts of the green infrastructure system (Kondo et al., 2018). Green spaces assume functions such as green spaces, urban parks, public gardens, playgrounds, green corridors, local parks, squares, pedestrian walkways, cemeteries, monuments, school gardens, urban forests, roof gardens and recreation areas as parts of the green infrastructure system. Based on these functions, urban planners, architects, landscape architects and ecologists search for new strategies that would balance ecological, economic and social sustainability (Wolch et al., 2014).

Urban parks are social locations that enable the integration of users with the physical and social characteristics they provide, enhance the feeling of satisfaction, improve social health, and enable social relations among users within the context of urban open spaces. In Turkey, the urban open spaces that were not able to sustain their functions are redesigned to create a balance between the social, economic and ecological urban sustainability. In addition to these purposes, the functions that the parks should provide could be summarized as preserving basic ecological functions and biodiversity, shaping urban forms and adequate uses, providing economic benefits, improving public health, reducing air pollution and providing social benefits. In this context, urban open green spaces such as national gardens, ecological parks, hobby gardens and spaces where people can

conduct outdoor activities have been designed in Turkey during recent years. In order to provide these functions, it is first necessary to focus on the design and application process of urban open green spaces. The present study aimed to discuss the design and implementation process of an urban open space that has lost its functions.

The design process in landscape architecture can be described as a series of feed-forward and feedback steps or approaches. Lynch and Hack (1984) defined this process as the problem definition, user and area analysis in programming, schematic design, development of the design, application and occupancy processes. On the other hand, Preiser (2005) defined this process, in the most general sense, as programming, design, implementation, occupancy, evaluation, modification and re-occupancy processes.

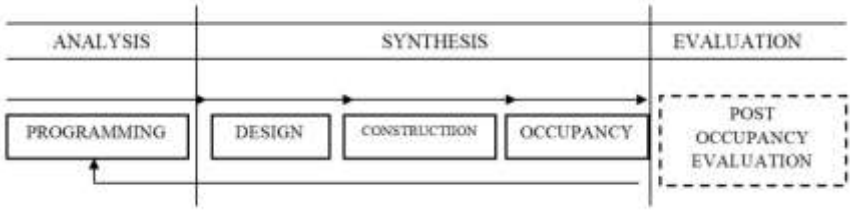


Figure 1. Design and Application Process (Developed using Lynch and Hack, 1984; Preiser, 2005)

The objective of the present study is to demonstrate the design and application processes in the construction of the "Eco-park" project in Trabzon city to re-establish the functions of open green spaces that include important ecological, economical and social functions.

3. Material and Method

The study material included "Eco-park" located in Beşirli neighborhood in Trabzon central district Ortahisar (Figure 2). This park, which has a surface area of 12300 m2, was designed in 2014 and the construction phase was completed in the second half of 2015. This area, which had lost its functions and could not provide any recreational facilities, was redesigned with ecological, economic and social benefits in mind in order to satisfy the urban open green space requirements of the users.

Figure 2. Location of the study area

The study method included the analysis of the project, where the design and construction processes were completed, based on the programming, design, construction and occupancy processes (Figure 3). Since the present study aimed to explain the redesign and application processes in landscape architecture based on the said project, the process of "post-occupancy evaluation" was not included.

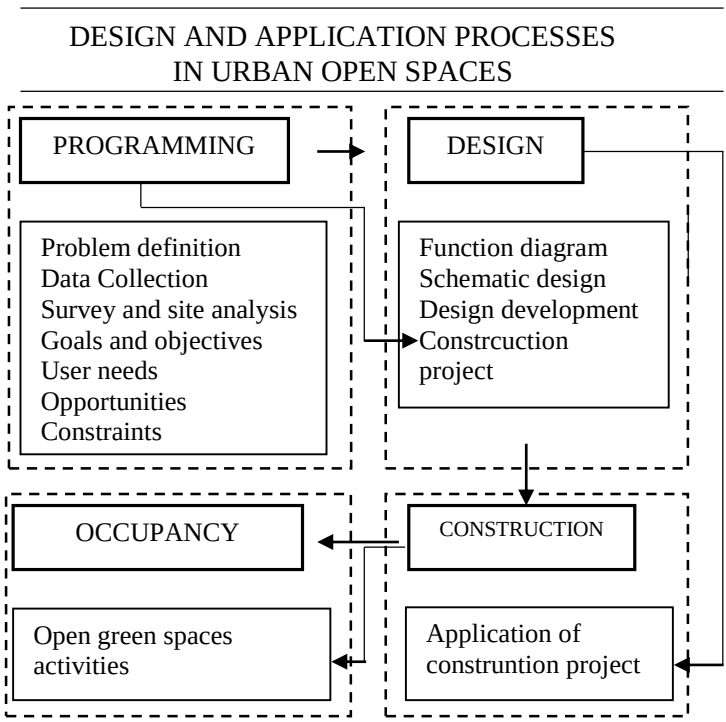


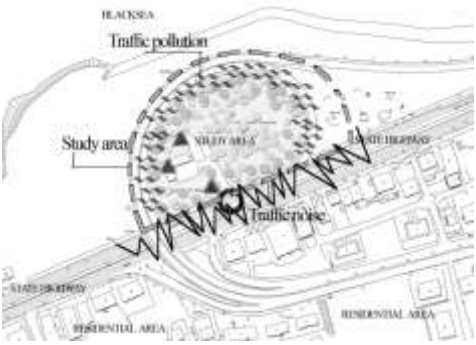
Figure 3. Urban open space design and application processes

4. Design and Application Processes in Urban Open Green Spaces

4.1. Programming Process

In the process of urban open space design, the most necessary stage for the design and development of living spaces is the programming phase (Preiser, 1991; Özkan, 2011; Özkan et al., 2017). The programming stage is the phase where the information that guides the design are collected. Pena (1977) stated that the programming phase is not a design, but an introduction to design. Programming stage includes the determination of the problem, gathering the information, analysis of the field, user needs and requirements, opportunities and constraints, and collection of the pre-design information (Sanoff, 1977; Preiser, 1985).

Table 1. Survey, site analysis, opportunities and constraints

Survey

Site analysis / Opportunities / Constraints
· The plant texture of the site should be considered and included in the design. · Buffer green areas should be included to prevent noise and vehicle pollution since the site was surrounded by roads. · Solution proposals that reduce the congestion in the site should be considered due to the presence of tall plants and small size of the site. · Activities that would fulfill user needs should be planned and the site should be assigned new functions.

Similar to every design project, the most important stage in the urban open green space design is the programming phase. Another factor that makes the programming phase significant is the fact that this is the stage where the designed and constructed projects are reprogrammed to minimize the problems that occurred during occupancy. As summarized

above, during the programming phase that provides the design data, initially, the problem that needed to be addressed in the open green area in Ortahisar Beşirli coast was determined, information about the study site was collected, survey and field analyses were conducted, user needs and requirements were analyzed, and finally, the possibilities and limitations of the location were identified (Table 1).

After the survey and site analysis were conducted and possibilities and limitations of the site were determined, the planning of the ecological, economic and social activities in the open green area should be planned to assign new functions for the site (Table 2).

Table 2. Programming the functions of open green areas

Ecological	**Economic**	**Social**
Pollution control	Energy saving	Environmental education points
Biodiversity	Property value	Recreational activities
Nature conservation	Human health	Aesthetic value
Biological pond	Tourism opportunities	Nature experience
Bee hotels	Job opportunities	Physical and Psychological Wellbeing
Oxygen production	Hedonic housing prices	Social interaction opportunities
Urban heat island	Production functions	Playgrounds
Noise reduction		Sense of community
Rainwater retention		

4.2. Design Process

Design is a form of research based on questions and the search for forms that seek answers to these questions (Steinitz, 1995). The design process and design approach involve the mental and cognitive techniques required for creative problem solving and productivity (Lawson, 2006). After the site analysis and determination of user needs in the programming stage, the design phase is initiated. The design process includes the stages of conceptual design, functional diagram and schematic design (Figure 4), design development (Figure 5), construction project and model (Figure 6), and final render (Figure 7). At this stage, the process up to the drawing of the final construction project includes the social, ecological and economic design requirements. In this phase, initially, the functional diagram and schematic design are created with the data obtained in the programming phase, and then the construction project and renders are developed.

Figure 4. Functional diagram and schematic design in landscape design process

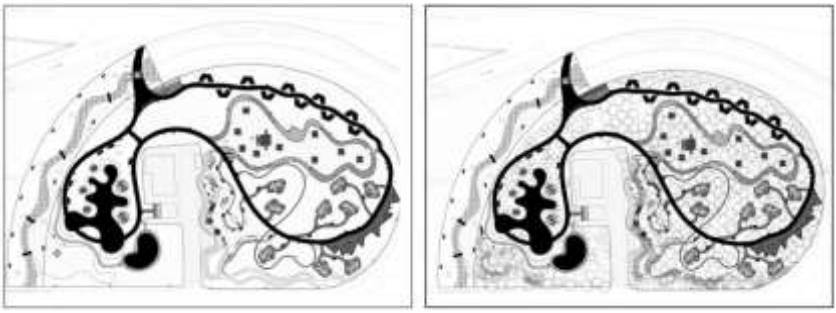


Figure 5. Development of design in landscape design process

The data obtained in the programming stage, the possibilities and the limitations of the site are the inputs of the design phase, and this input was initially constructed in the functional diagram. The ecological, economic and social dimensions were considered in the functional diagram, and the activities and the relationships among these activities were determined. Thus, walking axes, sitting-leisure-viewing spots, the biological pond, barefoot walking path, routes of learning in nature, skywalk, foot and beverage units, children's playgrounds were developed. The activities and their relationships that were determined at this stage were transformed into the scheme board based on the scale and form. After the base was constructed on the scheme drawing, the design options were developed and finally the construction drawing was completed at the required scale. Following the construction drawing, the architectural model of the site and finally, the renders were generated, and the design process was completed.

Figure 6. Construction project and model in landscape design process

Figure 7. Final renders in landscape design process

4.3. Construction Process

Following the completion of the programming and design processes in 2014 and delivery of the products to the relevant institutions, the process of construction began in 2016. Construction activities commenced after the grading and drainage of the site based on the structural, vegetative, scaling, lighting, infrastructure drainage, irrigation, electricity and detail projects that were developed within the scope of the construction project (Figure 8).

Figure 8. Construction process

4.4 Occupancy Process

Eco-park was opened to public after the completion of the design and construction processes in 2016. In this process, human-environment interactions are established, and people demonstrate behavior based on the extent to which the environment fulfill their needs. In spaces where user needs are met, extended periods of occupancy are observed, while in spaces that cannot fulfill these needs, short-term occupancy is observed, or the spaces become unoccupied spaces. The main factor that reflects the success of the design is the occupancy factor. In the persent study, the reactions of the users to the spatial organizations developed based on the ecological, economic and social dimensions were analyzed within the scope of "the occupancy process". Although there are limitations of accessibility and transportation concerning the eco-park project site, it was observed that the diversity of activities provided by the spatial organizations (skywalk, hiking trails, learning in nature routes, barefoot trails, children's playground, biological pond and surroundings, sitting-leisure-viewing areas) were integrated with the users (Figure 9).

Figure 9. Occupancy process in Ekopark Trabzon

5. Discussion and Conclusion

The significance of urban green spaces for urbanites who experience the pressures of increasing construction in urban centers is very high. In addition to the ecological and economic benefits provided by urban green spaces, the social dimension has become increasingly important today, as social interaction and sense of community gradually decline. Facilities such as recreational activities, experiencing the nature, spatial organizations that allow for social interaction, children's playgrounds, and constructs for learning in nature in urban green areas are highly influential on the physical and mental well-being of users and their satisfaction by allowing the users to experience open green spaces. In urban open green spaces where the design and construction processes are successfully completed, the interaction between the user and the environment leads to a sense of satisfaction for the user, and thus social spaces where there is a sense of society are created.

The design and construction processes of the "Trabzon Eco-park" project, which was developed to rehabilitate and open dysfunctional open green areas for public use and regain their ecological, economic and social functions, was analyzed in detail based on the processes of design, construction and occupancy in the present study. The post occupancy evaluation process, where the data obtained from the occupancy process is evaluated, was not included in the present study, which only focused on the design process. Thus the emphasis was on the significance of the programming and design processes in order to acquire the expected benefits of open green spaces in the landscape design process. The present study is considered important for planners and administrators, whose duties include urban preservation and development and creating healthy environmental facilities for the users.

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THE EFFECTS OF USER NEEDS ON ARCHITECTURAL DESIGN IN "TRADITIONAL KULA HOUSES"

Neslihan YILDIZ*

1. Introduction

Culture is the entirety of values about material and nonmaterial elements; beliefs, norms, symbols, technologies, structures, processes, administrative and vital styles etc. that are received from the old civilizations by the societies and extant. On the other hand, culture described as the fact that involves the man-made art, design and architecture. As for social culture, it is the principles; accepted specific formations throughout the historical development, involves the qualification of the common society that still exist and creates the cultural legacy of that society. Emergence of this cultural legacy reveals the difference with other societies and makes it special. Thus, all abstract and concrete scopes of cultural legacy create the identity of society and cultural richness. On this basis, it can be said that each society has its own culture.

There is a great interaction with the urban and architectural identity and socio-cultural, socio-economical characteristics and cultural identities of societies. Thus, the most specific indicator of societies social, economic and cultural identity is "housing" and it is accepted as the smallest example of living space where community residing persons closely associated with each other when we address it all by itself. The space where community residing persons live in and the ways of using the space is affected by the cultural features of the society they live in rather than these persons physical and mental features. Housing, in time, showed differences in direct proportion to society and family structure and for this reason it has a different place in each society. Reflections of societies life style, rules, traditions and beliefs to a physical space are most commonly seen in traditional housing structures.

Traditional housing that has a mission to be the legacy and the bridge from past to present, has a great importance in historical, cultural and architectural respect. They are the housing types that Turks lived in throughout the history, they are the housings that Ottoman Empire handed down to present from generation to generation and date back to 17th century. This traditional housing type that is unique to its era, left its mark in every region where Turkish culture made a stride in the historical development process. It shines out with its dominant character among other

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housings that are belong to other cultures, it differs from them and pulls the wires.

In this study, the main purpose is to enhance the societies consciousness of protecting and sustaining the traditional life culture. Within the scope of this study, “Historical Kula Housing’s”; partaking in Manisa province, Kula province border, spatial organization, interior space setup, functionality, environmental factors and user needs has been observed and based on traditional housings, in the context of architectural design, effect of user needs on “Kula Housings” has been addressed. For the study, firstly, to provide the basic data and necessary documents, a literature survey has been done. Sources about “Traditional Housings” and “Historical Kula Housing’s” has been reviewed. Benefitted from municipality archive, Provincial Museum Directorate, various academic and different sources.

2. Traditional Kula Housings

Considered as an open-air museum, Kula’s traditional life style, its nature and architectural urban fabric that is survived until today without incorruption and by keeping its unique form, makes Kula and its traditional housings important. Also, this protection obtains Kula the qualification of monument city in respect of urban life and cultural continuity. Monument city, at the same time, reflects the social and economic integrity regarding both urban life and daily life in the last years of Ottoman Empire.

Foundation of its based upon the depths of history, the city of Kula, literally reflects all marks of the past to present with its streets, inns, Turkish baths, fountains, mosques, shrines, bridges, curating hot springs, volcanic hills and with its very common historical housings. Out of these structures, the traditional Kula Housings are wood structures also named as Turkish House which we see in the regions which are under cover of Ottoman Empire. Housings are successful housing models of the Ottoman era with their garish techniques like plan types and settlement, architectural function, interior space setup, facade features, hand carved decoration, herbal and geometric patterns, çarkıfelek motives etc., clearly displays its era’s characteristic city structure and features.

2.1. Kula as a District and Its History

Kula, comes from the depths of history and brings up the marks of its era to present, keeps all architectural, ethnographic, archeologic, historical and visual values together, Kula is in the part of Central West Anatolia of Aegean Region, in Manisa province borders (Url-1). Kula comes from the antique era’s and carries its era’s marks to present, Kula is in where two important highways that connect İzmir to Ankara and İzmir to İstanbul

intersect. At the same time, it is chosen as the "The most Convenient Investment City of the Future in Europe" of 2004 by Financial Times, it gained importance in terms of agricultural, industry and commercial (Url-2).

Picture 1. : Kula, general view (Url-3).

"Katakekaumene" was the name of Kula and the volcanic area around it in the ancient times. Its meaning; "scorched region, burnt field" can be found in the work of some ancient authors (Demirelli, 2007). The environment which the terrain stands in is drouthy. It is thought that the fire outbreaks here is the reason why the terrain is so rocky and hilly. But some people linked it to the fire that generated owing to the underground explosions. The fact that whole of the region come to a state at a time makes little sense (Url-1).

It is proved that Katakakeumene is the region that is encircled by Gediz river in the north, today's Kula and Esenyazı in the south, Kollyda (İncesu/Gölde) in the east and Gökçeören/Menve (Maionia) in the west (Url-4). It is known that two cities in this region named Maionia and Kollyda are established on the world's first trade route, Royal road that goes towards to city of Suşa of Pers (Iran) state starting from Sardeis (Sart). Cities apart from these are respectively Thermai Theseos (Şehitlioğlu), Tabala (Güvercinlik) and Satala (Sandal). Also, numerous antique villages are established near Gediz river (Url-5).

It is thought that name of Kula was Opsikion which was one of Byzantium's military and administrative regions while it was under Byzantium directorship between 7 th-11th century (Kalay, 2013). There are lots of rumors about its name. Also, the word Kula that is accepted as a Turkish word, means "fortified" i.e. reinforced and thought to have a connection with the castle (Url-1). On the other hand, it is claimed that Giges, King of Lydia have a tower made for her sick daughter to heal in this region that has clean air and water and the settlement began with construction of numerous structures around the tower (Kadaifçioğlu, 2017). It is said that afterwards, the settlement expanded around the current

settlement location, back then a lake, and the name Kule transformed into Kula. Byzantines used this name for Kula after it is confiscated by Turks. But in 1306 Roger De Flor, attacked Phialdelpheia (Alaşehir) with Catalans at his command and then conquered Kula (Erman, 2012).

In the period of Anatolian Principalities, Germiyan Bey Süleyman Shah's daughter Devlet Hatun married Ottoman Sultan I. Murat's son Yıldırım Bayezit in 1381 and during their marriage he gave Kütahya and round to Ottomans as dowry. So, Süleyman Shah went to Kula, lived there and made it the capital (Çiftçioğlu, 2015). Also, in Süleyman Shah period, an increase in zoning and culture activities is seen in Kula. Gürhane madrasah can serve as a model (Demirelli, 2007; Akt: Url-1).

With the death of Süleyman Shah, Kula entered under Ottomans rule in 1402. Meanwhile, because of giving back the old lands of Anatolian principalities to them by Timur, for a while Kula entered under Germiyans principality's rule. But after a while, with the death of Süleyman Shah's son Germiyan Yakup Bey in 1428, again entered under Ottomans rule as a district of Kütahya province. Kula district remained bound to Kütahya until 1896 and then bounded to Manisa (Koca, 2012).

3. Importance of Determining the User Needs in Traditional Housings

There are some relevant social behaviors that lasting from the first civilizations in the history, unchanged throughout generations, also transferring the priorities and features of these civilizations. These behaviors, generated with the life style, has a mutual interaction with natural environmental factors, especially with physical environment. Thus, the natural environment that the community settled, and the social behaviors can't be thought as two separate concepts. In addition to these, these behaviors effect the architecture too.

Main purpose of the architectural environment is to address all needs of human anatomy. In the phase of architectural design, although the primarily the purpose is to have a grasp of spatial factors about exterior environment factors and using these correctly, user comfort matters as much as them. In this context, to have a grasp of environmental factors increases user comfort (Yüksel, 2018). Increase of user comfort ensures the user needs are met in the most appropriate way.

The least quality features that are necessary to be in the space to actively fulfil the needs of every individual in the community, creates the needs of the individuals in the space they are in (Kahraman, 2014). If appease even one of these features, user can't actively use the space and can't feel the comfort. In other words, the needs are expressed as; individuals designated

comfort conditions in the light of personal standards (Kahraman, 2014). Depending on the individual's instinct of continue their existence, properly fulfilling the user needs is the main purpose of human behaviors. With acts like resting, eating, working, cleaning and sleeping; people make these behaviors that we naturalized as user needs in architecture. I.e. in terms of users to make specific acts, it is the main condition for environment to have all opportunities (Aluçlu vd, 2006). Various researchers made different and wide range of classifications about user needs. Uzunoğlu and Özer (2014), gathered the user needs under two basic topics, **physical** and **psycho-social**.

In the architectural design process, designating the user needs is crucial to determine the sufficiency of the current structure in the use stage in the future. In the design stage, ruling out the user needs creates a situation that is against the use purpose and it doesn't guarantee to fix the generated problems later and make the design literally become functional again. In line with these, as (Aluçlu vd, 2006) conveyed, when we look at traditional housings it is seen that environmental factors- user needs-architecture-design relation is setup properly (Şener, 1977).

People must review the history to recall today. Cultural features that generate in different periods with community structures and with the aesthetic feelings about this, measuring the spatial quality will help to form and generate current environments. In this context, analyzing the effects of environmental factors and user needs on architectural design in Historical Kula houses has an importance on having a grasp of on the set up of this relation in today's housings.

- **Physical User Needs**

Spatial: Spatial proportions has been created based on human measures. Whole items in the rooms are in a place where you don't need any tool to reach and use. Also, even though the roofs of the rooms are not so high, luminousness and roominess has been ensured with top windows with plaster system. Rooms are rich in terms of functionality, also they are movable.

Thermal: Since the climate is between Mediterranean climate and continental climate, it is variable. It is usually rainy and mild, some years it is cold and arid. Adobe, a regional material which is used in the making of walls, is a hot material. Thus, interiors of the structures made with adobe are fresh in the summer and hot in the winters. In addition to this, thick ground floor walls made of rocks, help to stop the wind and cold. Also, entering the house by courtyard in the winter reduces the effect of cold wind.

Audial: Made of adobe as applicable to climate conditions, being both thick and have a great audio isolation feature, walls are noise proof and provide audial comfort.

Visual: On the two facades, facing the street and the courtyard, the batten fences, vertical rectangular windows with wooden shutters, and the top windows placed in the upper plaster system create a common rhythm in the standard dimensions, adding a unity to the house, the town and the city.

Health: Hence the houses are local and made of compatible materials to the region's climate, they are healthy. Also, toilets are outside of the house in the courtyard, therefore they provide the health conditions.

Security: Even tough life in Kula is in relation with the street, houses are in a settlement that is inside of a castle and the courtyard is usually surrounded with heightened walls, thereby security conditions are complete. Also, security is provided with the iron and wood railings that are on the lower floor windows. In addition to this, it is seen that batten fences are used in all windows against robbery.

- **Psycho-Social User Needs**

Privacy: Entrance from exterior space (street) to interior space (house) is via the courtyard. Therefore, the entrance isn't directly connected to the street because of privacy reasons. Also, windows of the houses that are in a narrow street, facing each other, first floors are reserved for daily life, upper stories are reserved for bedrooms. For the favor of privacy of the living in the rooms, beside entrance doors, the rooms are directly connected for transition from room to room. Man of the house, entertains stranger male guests in the most precious part of the house; the baş oda, to not let them see the women in the house. This is a sign of women and men sit separately practice. Likewise, having a bathing cubicle in the parts called 'seki alti' in the rooms next to cupboards, is a result of when a stranger is in the house, bathing activity requires privacy.

Behavioral: Housing, offers family members a sociologic environment by improving and forming them on the behavioral side. Knowledge about the good, bad, right, wrong, religion and moral conveyed to family members in this place. As a traditional family system, they continue to live at the same home after the marriage of man. Also, family members who are together in the daily tasks, made a system that they can address their whole needs around the hall.

Aesthetic: The pool that you encountered as soon as you enter the stone courtyard has different forms and dimensions, rich hand carved decorations underside the eaves, multi partite and hand carved wooden details on the hayat of the room doors, ornament arch components that reminds the cusped arch which ends the top side of the openings and the wood engravings on the ceilings of the rooms; all of them are the items of aesthetic order.

Social: The most important person in the house is the father as the Head of the household due to having a paternalistic family structure and at the same time men of the house are the breadwinners of the house. Women do the housework. This is the root cause of why the structural and design features of the houses are created considering the woman who spend a good part of her life at home. They have over populated family structure (like father, mother, sons, brides, grandsons, uncle and aunt). In addition to these, neighborhood and relative relations has a great importance; this is understood from here that neighbor and relative visits are quite often.

4. The Effects of User Needs on Architectural Design in "Traditional Kula Houses"

To observe the effects of user needs on architectural design associated with environmental factors, firstly the quality of the addressed housings must be determined. Historical Kula Houses which various civilization live in, settle in Anatolia bears the traces of, has a dense urban fabric due to be a castle settlement.

Historical Kula Housings are usually created with wood system design and built with adobe filling and usually they are two-storey (Url-1). Each hosing has a courtyard and the doors of all rooms opens to courtyard.

Housings, in terms of structural and design futures, are created considering the family structure and the women who spend a good part of her life at home. Daily life continues in the courtyard and garden and hayat in summers, mezzanine or top floor in winters (Zabun, 2009). In Kula Housings, like in other regions "Traditional Hosing" types, there is a space called 'hayat'; the doors of the rooms at the entrance or the second floor opens to, its front faces the courtyard, it is subtle and a porch like space (Bekleyen vd, 2014). Hayat is directly connected to the street.

When entering the doors of the houses firstly we encounter a stone courtyard surrounded with a stone wall at least 3m. high. Fruit and vegetables can also be grown in the courtyard (Url-1). For storage, there are cabinets with different names according to their function (like yüklük, çubukluk, testilik, peşkirlik, lambalık, tembel deliği) (Soysal vd, 2016).

Picture 2. : Stone courtyard general view (Url-1).

Parallelly to the courtyard, ground floors are usually built as stone. On the ground floor there are parts of home such as barn, cellar and kitchen (Karaarslan, 2015). Bakery and toilet are usually placed in one corner of the courtyard (Atalay, 2010). But in housings with interior sofa, toilet is in the house (Url-1). In some housing types there is a basement built under ground floor. This basement thought as a space where big cubes are, a place where food is stored and cooled. But in some housing types that have an open anteroom, there is a mezzanine between the ground floor and top floor. This floor kept low ceilinged, simple and unadorned since it is used in winter (Karaarslan, 2015).

Picture 3. : Open anteroom general view (Url-6).

There are few windows on the lower floors or there are no windows. However, every house has a window that facing the street. Moreover, in some of the houses, there is a separate window on the anteroom door to see who is coming. There are wooden shutters on the windows. Inside of these shutters are also in an integrity with the courtyard or garden and at the same time coherent with the daily life style (Url-1).

Picture 4. : Lower floor window and wooden shutter example (Kadaifçioğlu, 2017).

In traditional housings there are usually multiple floors which attracts attention to staircases between these floors. Type of the staircase shows difference according to type of anteroom. It is seen that in the housings with external anterooms staircase is in the room order or leaned on the facade, in the housings with interior or middle anterooms, correspondingly the plan schema, it is placed in a point to reach easily (Ünver, 1976, Küçükerman, 1988; Akt: Arat 2011: 26). Besides, direct connection from courtyard to hayat in the upper floors is provided via a staircase.

Picture 5. : Staircase example (Url-7).

Picture 6. : Staircase example (Url-6).

The upper floors of the housings consist of living spaces where daily life is spent. Room, in the internal spatial design of upper floors, shows itself as the key element, also it has the centralist effect that designates the plan types of homes. Encountering rooms created with specific purposes

in mind in “Traditional Housings” is a rare thing. Every room almost serve every purpose (eating, living-sleeping, bathing etc.) For this reason, rooms in the housings served in many ways. However, exceptionally there is a Turkish bath in some of them (Perker & Akıncıtürk, 2011).

There are two types of rooms in the housings; ‘baş oda and köşk oda’. One or two of the rooms on the upper floor is baş oda. In comparison to other rooms, these rooms are carefully garnished and faces the street facade. Usually the baş oda is separated for guests (Yavuz, 2013).

Picture 7. : Baş oda and köşk oda examples (Yücel, 2016).

Also, there are wood inlaid hood fumes in the rooms and again they have wood inlaid on the ceiling.

Picture 8. : Wood inlaid hood fume (Url-6).

Picture 9. : Wood inlaid ceiling examples (Url-6).

Room doors are single-leaf door, their width is varying between 80-90 cm., height is varying between 200-240 cm. Also, top side of the openings ends with ornament arch that reminds the cusped arch. Hayat of the room doors consist of multi partite and hand carved wooden details.

Picture 10. : Examples of doors consist of multi partite and hand carved details (Url-6).

On the upper floor, there are usually three windows facing hayat and the street. Also, there are top windows on the top row of these upper floor windows. Lower level windows have wood railings or have trellis and

rectangle shaped vertical windows with wood shutter, upper level top windows are windows with plaster system (Ay, 2009). The houses are light as they take plenty of light via these windows.

Picture 11. : Examples of rectangle shaped vertical windows and upper row top windows (Sungur, 2008).

On the upper floors of housings with open sofa space, one facade faces the street and another facade face the courtyard. Street facing facade of hayat is closed with wood trellis or with gratings (Url-8).

Picture 12. : Examples of windows with wood trellis or gratings (Url-9).

It is known that some of facades that facing the courtyard (early period) are open, some of them (late period) are closed with display window (Karaarslan, 2015).

Upper floors are protruding as if overflowing towards the street. Interwoven roofs of housings almost make you feel the existence of castle structure that didn’t extant. Roofing is tile and roof endings are made with eaves (İpek, 2016). There are rich garnishes underside the eaves.

Picture 13. : Examples from the narrow streets of Kula Housings (Url-6).

Picture 14. : Examples of the eave details of Kula Housings (Url-9).

On the other hand, streets are only wide enough to let a draught animal pass and there is no question of a city center in the middle of the city. Thus, structure of the city is closely spaced.

Picture 15. : Examples of Kula Housings narrow streets (Url-6).

In some of housing types there is a mansion in a part of hayat. Since it is open, roomy and with view; it is a part that is used in summer (Karaarslan, 2015).

It is said that, in housing types in the first half of 18th and 19th centuries, entrance to the house is usually from the courtyard and with wood double-leaf doors (Url-1). These housings consist of two parts as ‘seki üstü and seki alti’. Distinction between these two parts are expressed with both elevation difference and wooden rail and with arches (Atalay, 2010).

In the part called seki alti, next to cupboards, there are bathing cubicles and cabinets called “compartments” (gözenek) which are wooden

ornamental to put oil lamp, bottle etc. Some of the cabinets are as high as the ceiling, some of them mezzanine with railings on top of them (Atalay, 2010).

Picture 16. : Examples of wooden ornamental compartments, bathing cubicle and cabinets (Url-10).

There is a specific order starting at seki alti from cupboard wall, respectively; bathing cubicle-compartments-cupboard-compartments-shoe rack. There is one cabinet on the shoe rack side of the cupboard's side surface, one on the vertically placed wall to the bathing cubicle, there are certainly two cabinets under the seki alti. Also, shoe rack that is in seki alti is accessible from the single-leaf door that is on the chamfered corner (Url-1).

Picture 17. : Single-leaf door on the chamfered corner (Url-6)

In the place called 'seki üstü' there are; cedars, shelf, owen and cabinets. Owens are placed on the wall that is vertical to cupboard wall. Some of the hoods on the cooker are made of plaster and some of wood. Rooms that doesn't separated as seki alti and seki üstü have the characteristics of other rooms (Url-1).

There is no 'seki üstü and seki alti' distinction in the housing types after the second half of 19th century. Shoe rack, compartments and top windows

are removed. Also, cupboards converted to covered and kept up to the ceiling (Karaarslan, 2015).

At the beginning of the 20th century, alcove openings created on the walls. Doors converted too double-leaf doors and entrances removed from the chamfered corners (Url-1).

5. Conclusion

Physical and psycho-social needs must be met for people to be able to actively manage their live. For this the key element is, one to one overlapping user needs and environmental factors. If the link between these two concepts fictionalize correctly, it is impossible not to reach the comfort level. To ensure all, structural form and user needs must be defined before the design stage.

In this study, the role of environmental factors and user needs in architectural design was emphasized and it was aimed to provide information to provide a basis for future studies in this area by discussing the life, spatial organization, interior design and functionality in Historical Kula houses. In addition to this, it is possible to encounter sections belong to conditions of the period in the periodical spaces. Acquiring this data is crucial to convey our cultural legacy, traditional housings to the future generations in a unique way, to preserve the traditional urban fabric that is created by the social and cultural variety, in terms of maintaining the continuity of this urban fabric.

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ARCHITECT MUZAFFER BEY INTERPRETATION TO THE 1ST NATIONAL PERIOD: "ARCHITECTURAL ANALYSIS OF THE KONYA TEACHERS SCHOOL FOR BOYS- KONYA HIGH SCHOOL"

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1. Introduction

Looking at the History of Turkish Architecture, it is seen that **"Mimar Sinan",** a great genius in the 16th century, constituted the **"Classical Ottoman Architecture"**. In this formation, the economic, political and cultural factors of the Ottoman Empire was in at that time, are of great importance. After the death of **"Mimar Sinan"**, the period called **"Classical Period"** came to an end but the architectural style that was created by him, was continued to be applied for another century. The 18th century was an era where defeats at wars and land losses accelerated and Western influence started to be observed in every area. Especially in the Tulip Era (1703-1730), these influences also manifested themselves in the field of architecture, the decorative arts of buildings were removed from classical items and Western-origin items began to be widely used.

The concept of **"Westernization"**, which was established in the 18th century, was formally adopted as a concept and it has manifested itself as Reform Movements in the 19th century. All the Sultans who ruled the Empire from 1800 until the proclaimation of the Turkish Republic were influenced from the West and this influence have completely been observed from life styles to architectural understanding. In this period, the foreign architects living in the country were active, and the traditional architectural styles were completely removed. The eclectic architectural conceptions of these architects dominated in many structures built especially in Istanbul.

After the decleration of the 2nd Constitutional Monarchy, **"First National Architecture Movement"** which was developed as a reaction to this eclectic architectural concept, were influenced especially by the **"Turkism"** movement that was active at that time.

"First National Architecture Movement" is an important movement which has given many examples in Ankara, Istanbul and Anatolia and has its own unique architectural features. This movement which emerged as a reaction to the **"Westernization"** movement in the collapsing period of

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Ottoman Empire continued its influence for about 20 years. This trend, which aims to develop an architectural national style against the Western influence of architecture, could not create the desired effect. The examples given in this period could not go beyond using the classical Ottoman and Seljuk architectural archways, tiles and ceramic items on the facades of Western originated masses. Nevertheless, the architectural works that were built during this period are important because they are the products of the Ottoman Empire's recent works and as a result of the efforts of a newly generated movement to create a new architectural understanding.

It is also important that public buildings such as schools, post offices, government mansions and banks begin to be constructed in addition to religious buildings such as mosques, madrasahs and tombs (mausoleums). Within the scope of this article, the architectural characteristics of **"Konya Teachers School for Boys"** (Ottoman Turkish: Konya Muallim Mektebi), which was one of the architectural works of **Muzaffer Bey'**in Konya Province**, Muzaffer Bey** who was famous as an architect of **"Şişli Abide-i Hürriyet"** (Şişli Liberty Monument), was as an assistant to Vedat Tek, one of the two important architects of the "**First National Architecture Movement"**. In this article, the features of **"Konya Teachers School for Boys"** (Ottoman Turkish: Konya Muallim Mektebi), will be evaluated within the framework of the "**First National Architectural Movement"**.

2.National Architectural Period, Development and Characteristics

Until 19th Century, the architectural works carried out by the masters who educated in the **"Ottoman Guild of Architects"** (Ottoman Turkish: Hassa Mimarlar Ocağı) as a monopoly. With the development of relations with the West in the 19th Century, the classical style of architecture of the Ottoman Empire changed through the **"Westernization"** period, Ottoman architects from non-muslim minorities who were educated in Europe, and foreign architects became predominated (Çelik, 1998). Especially since the second half of the 19th Century, Istanbul has entered the process of intensive Westernization throughout the city, and at the end of this century, Galata and Pera regions, have become a European city with baroque and rococo forms, neo-classical and neo-renaissance styles.

In the last period of the Ottoman Empire, the foreign architects who were in charge of the construction of Istanbul built structures with complicated eclectic style by using the building elements influenced by the Seljuk and Ottoman architects and sometimes even Arab and Indian architects on the masses designed in Western forms (Ödekan, 1989). This intricate architectural understanding of the Ottoman Empire in recent times has led to different searchs in this area, which have led to the

emergence of new architectural styles. The period that started with the announcement of the 2nd Constitutional Monarchy on July 23, 1908 and continued until the 1930's, is named as **"National Architecture Period"**. After the dethroned of Sultan Abdülhamit II., **"The Party of Union and Progress"** (Ottoman Turkish: İttihad ve Terakki Fırkası) became very effective in the state affairs, gave great importance to the public works and architecture especially in architectural style has changed.

In the formation of this architectural style, which is called **"National Architectural Renaissance"** (Aktemur&Arslan, 2010), **"National Ottoman Renaissance"**, **"Constitutional Monarchy National Architecture"** (Gültekin, 2011) and **"Neoclassical Turkish Style"** (Hasol, 1998), the influence of the **"Ottomanism"** understanding was left to the understanding of **"Turkism"** that **"The Party of Union and Progress"** pioneered. In this period, it was argued that the architect should reflect the national feelings of the Turkish nation and tried to spread the consciousness of Nationalism.

In parallel with the **"National Literature Movement"** initiated by Ziya Gokalp, who advocated **"Turkism"** and **"Turkish Nationalism"** by prominent architects, works and opinions, the period wanted to create a national movement in the field of architecture (Arseven, 1959). However, despite of all these efforts, the result was insufficient, a great majority of the architectural works were basically placement of classical Ottoman architectural elements on Western originated masses. Despite all these efforts, however, the workings have been inadequate and a great majority of the artifacts were created by the placement of classical Ottoman architectural elements on Western origins. The greatest reason for this is the fact that most of the architects and engineers of the era were educated by Western architectures in Europe (Yavuz, 1981).

The leading architects of the **"First National Architecture Period"** were Vedat Bey and Kemalettin Bey. When we observe their architectural works, it is possible to see the influences and form understandings of the Western architects they have studied with. During the period when the Ottoman Empire was collapsing, with the influence of the **"Turkism"** movement, usage of some elements from Ottoman and Seljuk period especially on the facades of architectural works were quite common (Aktemur&Arslan, 2010). Despite western influences in the mass design of the **"Great Post Office Building"** in Sirkeci, the work of architect Vedat Bey, flattened and pointed arches and elements of traditional Ottoman architecture such as tiles were used. It is seen that the design of the interior and the upper roof is influenced by Western public structures (Yavuz, 1981). It is possible to see the following common characteristics in the works of Vedat Bey and Kemalettin Bey;

1. In parallel with the examples in the West, there are axis-based plan schemes symmetrical to the entry axis (Yavuz, 1981).

2. The entrance facades of the structures have a splendid appearance and are usually separated by stone arches between the floors. Different window shapes were applied to each floor using sharp, pointed and flat arches (Yavuz, 1981).

3. Stone rosettes, column headings in terms of diamond shaped or muqarnased and tile ornaments are used between the arches used on the windows of the entrance gate. There were also horizontal embossed ornaments and tile panels, used between the floors (Sözen, 1984)

4. Based on the importance of the structures and the position of the facades, generally the fronts have more splendid forms where sides and rear facades have simple forms (Sözen, 1984).

5. At the entrance of the constructions, arches with traces of crown gates of Seljuk period were used (Aslanoglu, 1980).

6. On the upper cover of the structures, wide eaves carried by supports and traditional decorations were used under the eaves (Kıvırcık, 1992).

7. While new construction techniques and materials are being used in the West, the advantages of new constructions technics had not been used in Ottoman Empire. Arches have been used to pass through wide openings in the structures where masonary construction system, reinforced concrete skeleton system or both systems were used (Aslanoglu, 1980).

Besides Architect Kemalettin Bey and Vedat Bey, Arif Hikmet Koyunoğlu, Ali Talât Bey, **Muzaffer Bey**, Gulio Mongeri, Mehmet Nihat, Hüsnü Tümer, Necmeddin Emre, Tahsin Sermet, Vasfi Egeli, Mukbil Kemal, Y. Terziyan, Nafilyan, Ahmet Burhanettin Tamcı, A. Kemal, Alaettin Özaktaş, Aram Hanciyan, Cemil, Ekrem Hakkı Ayverdi, Galip, Hafi, İbrahim Beykozoğlu, İrfan, J. D'Armi, Kavafyan, Küçük Kemal, Kemal Altan, Leon Güreğyan, M. D. Çurvidas, Mehmet Fesçi, Mesut Özok, Nesim Sisa, Nuri Nafiz, Rafael Rus, Şefik, TanaşYamas, Taşçıyan, U. Ferrari, Yahya Ahmet, Yorgiadis, Ziya, Zühtü Başar are among the other architects whose names are well known at that period. (Sözen, 1984). Architect **Muzaffer Bey**, who was an assistant to Architect Vedat Tek, (among two important architects of the First National Architecture Movement), was famous as an architect of **"Şişli Liberty Monument"** (Ottoman Turkish: Şişli Abide-iHürriyet), has an important place among the known architects of this movement.

3. Architect MuzafferBey's Life and His Architectural Concept

Muzaffer Bey was born in Istanbul in 1881. After graduation from secondary school in Istanbul, he continued his education in Military Engineering University (Ottoman Turkish: Hendese-iMülkiyeMektebi) in Halıcıoğlu Istanbul. In this school he was a bright student especially in painting and drawing lessons and was noticed by Yusuf Razi Demirbel, the brother of Architect Vedat Bey. Due to the financial difficulties of his family, he had to leave the school. He was accepted to work at the Painting Atelier of Vedat Bey. Even if he could not graduate from the university but he was talented enough to join and experience in the planning and implementation stages of the buildings designed by Architect Vedat Bey (Erdem, 1971).

He continued to work with Vedat Bey during the construction of the **"Grand Post Office Building"** in Sirkeci and later he was assigned as an architect to the **"Post and Telegraph Administration"**. Architect **Muzaffer Bey** became famous with **"Şişli Liberty Monument"** (Ottoman Turkish: Şişli Abide-iHürriyet), which was built as a memorial for the martyrs at the **"31st March Riot"**. The project of Architect Muzaffer Bey won the contest for this monument where his masters Architect Kemallettin Bey and Vedat Bey also participated to the contest (Sözen&Dülgerler 1978).

The architects of "**First National Architecture Period"**, were either educated in Europe or trained by foreign architects in our country. Architect **Muzaffer Bey**, despite his lack of university degree diploma, had an important place among the architects of this period because of his innate talent and self improvement as an assistant to Architect Vedat Bey. He was built structures that reflects typical styles of that period in terms of both plan and facade conception. In 1914, **Muzaffer Bey**, was invited to Konya as the chief architect of the province upon the request of Konya Governor Hüsnü Bey. He concluded the projects of **"Teachers School for Boys"**, **"Teachers School for Girls"** and **"Agricultural Monument"**. However, among above structures, only **"Teachers School for Boys"** could be completed and after he passed away in 1920, his student Architect Falih Ulku, completed his remaining structures (Sözen&Dülgerler, 1978).

The most successful examples of the **"First National Architecture Period"** were given in Istanbul and especially in the new capital Ankara. There has been some examples more plainly than those of Istanbul, in Anatolia. Konya province is one of those Anatolian cities. Even though **Muzaffer Bey** has a very short life, he has an important role in Konya's architectural heritage. In this article, Konya **"Konya Teachers School for Boys"**, which is the only work that Muzaffer Bey saw completed in

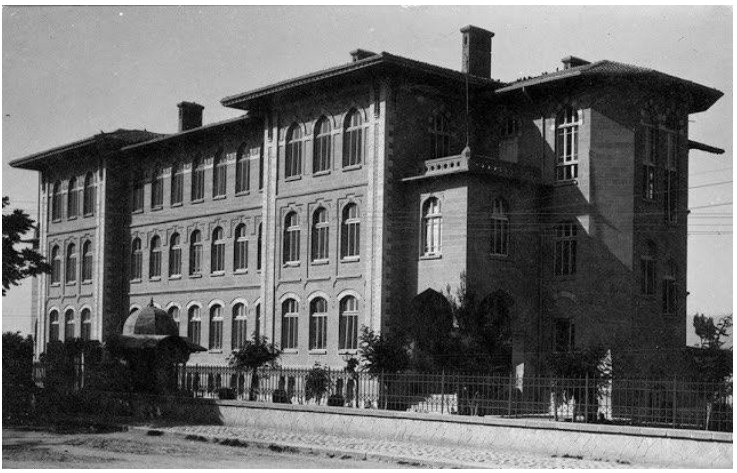
Konya, will be examined in terms of the characteristics of the **"First National Architecture Movement"**.

4. Konya Teachers School for Boys - Konya High School

4.1. History

The construction of the **"Konya Teachers School for Boys"**, which was requested by the governor of Konya at the time of Ottoman Sultan Resat (V. Mehmet-1909-1918), was begun in 1910 and base structure could only finished in 1914. The governor of Konya, Husnu Bey, invited Architect **Muzaffer Bey** and the construction was finished in year 1917. The building was changed its names at different periods in history. The building, which started to be used as **"Teachers Training School for Boys"** (Ottoman Turkish: Dar-ül Muallim) in 1917. The building was used as Headquarter of Occupation Forces in 1918 immediately after the Mondros Armistice Treaty following World War I. Later used as **"Military Junior High School"** (Ottoman Turkish: Rushdiye) for a short period of time. After the proclamation of the new Turkish Republic in 1923, until 1934, the building was used as **"Teachers School for Boys"**. In 1934, **"Teachers School for Boys"** moved to Adana. Then the building began to serve as **"Konya Boy's High School"**. Between 1972 to 1997, it was named as **"Konya Gazi High School"**. Since 1997, its name has been **"Konya High School"**(Boduroğlu&Kariptaş&Sariman, 2010).

Picture 1. The period when the building was used by the name of **"Konya Boys High School"**(1934-1972) (Ektem Photo Archive, 1937)

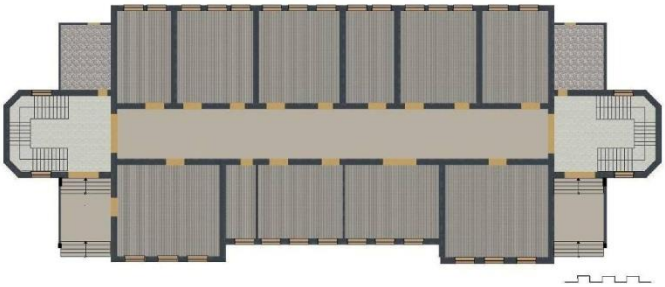


Picture 2. The period when the building was used by the name of **"Konya High School for Boys"** (1972-1997) (http://lcivelekoglu.blogspot.com/2017/03/26-mart-96-yil-once-bugun-mimar.html)

4.2. Architectural Features

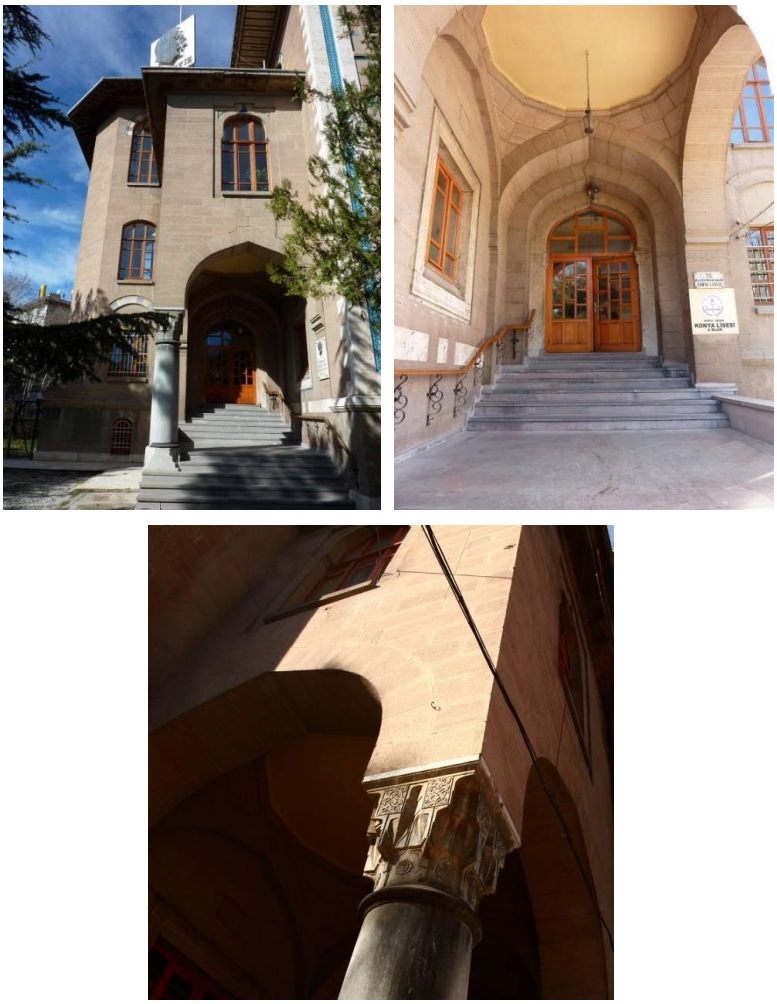
The building, which is located in a large garden, has a rectangular and symmetrical plan scheme and is built on three floors on the basement floor. The triple plan schematics are the same. It consists of two symmetrical staircase towers connected by a rectangular plan with a central partition containing the rooms and other places belonging to the school.

Pulling the middle section backwards at the entrance, attributed a movement effect at the front side of the building. The central section of the rear side was designed flat. The upper cover of the building has a folding roof with wide ornamental eaves (Picture 3 and 5).



Picture 3. Konya High School Entrance Floor Plan (Şenay Çabuk Archive)

When you get into the building from the front entrance, you pass through pointed arched doors opening into the entrance hall which includes stair towers with polygonal plan schemes placed symmetrically on both sides of the building. On both sides of the entrance there are marble columns with a muqarnased head and these columns are connected to the building again with pointed arches. The upper covering of these sections, which are arches, is shaped like a dome, and these areas are used as a small room on both floors in both the first floor and the symmetry in the rear side. On the second floor of the front facade, these areas have turned into balconies with railings decorated with star motifs. At the entrance, you use 4-step staircase which leads to an intermediate area and you reach the entrance door with a 6-step staircase (Picture 4).



Picture 4. Konya High School Entrance Images (Şenay Çabuk Archive)

The building has a symmetrical plan scheme and front entrance is also designed as completely symmetrical. Entrance has more splendid forms incomparison to the rear and sides in terms of decoration technique. In both the front and rear facades, the floor alignments are made more pronounced with horizontal embossed ornaments. The use of different window styles on each floor, is one of the most important features of the First National Architecture Movement, has also been applied to this structure. The window styles at entrance floor is flat, the first floor has basket arched and the second floor has windows with sharp arches. The corners of the protrusions formed at the two corners of the structure are also projected outwardly, and a tile border is made clear in the middle of these protrusions (Picture 5).

Picture 5. Konya High School Entrance Images (Şenay Çabuk Archive)

The first floor windows were made in such a way as to form a frame around them, and rectangular shaped tile ornaments were used in the upper parts of the windows. These protrusions between the windows passed through the gap between the floors and extended towards the entrance floor and ended with an adornment of tile on the end. On the arches of the first floor windows, tile ornaments were used again in the area between the windows of the second floor windows along with all the surfaces of the embossed ornaments at pointed arches (Picture 5).

Picture 6. Konya High School Images at Sides which are identical (Şenay Çabuk Archive)

The two side of the structure were arranged completely identical to each other. Both the sides and the rear facade have a plain and simpler structure than the front. The tower-shaped side facades have a polygonal plan on the sub-basement level. There are four windows along the facade, two on the first floor with flat arches and two on the second floor with pointed arches, side by side in the stair towers. The heights of the windows were shaped according to the inclination of the stairs at the lower part, the first floor continued to be leveled on the upper part and the second floor was finished in the same line (Picture 6).

Picture 7. Konya High School Rear Side Image (Şenay Çabuk Archive)

The eaves of the stair towers are located below the eaves of the front facade, and above the eaves of the rear facade. Rear facade has more plain look than the front facade. The arches used for the windows on the front facade continued on the rear facade. However, on rear facade, different colored embossed ornaments are used between floors and on window arches connecting to each other, makes a more distinctive effect on decoration, instead of tile ornaments used on the front facade (Picture 6 and 7).

Picture 8. Konya High School Image of Corridor at the Entrance Floor (Şenay Çabuk Archive)

Picture 9. Konya High School Images of Entrance Floor Stair Hall and Corridor of Upper Floor Classrooms (Şenay Çabuk Archive)

The building has spacious, comfortable and well-lit interiors on floor plans with high ceilings and numerous window openings. The rooms on the entrance floor are pointed arches over the doors of the corridor opening, and the upper doors have classical doors that are opened to the long rectangular corridors with flat arches. As floor covering, geometrical patterned tiles and borders are used in the hall where the stair tower is

located. In connection with this, in the corridor where the lower floor spaces are opened, the border made up of the combination of the geometric patterned tiles and tiles at different designs are used. The upper floors have a marble staircase and an iron casted stair rails. In the corridors on these floors there are single colored tiles and borders consisting of geometric patterned tiles on the edges. The entrance to the stairhall is entered through the flat arched openings in the corridors (Picture 8 and 9).

5. Conclusion

The architectural understanding, referred to as the **"First National Architecture Movement"**, has widely produced its most important architectural works between years 1908 and 1930. This architectural movement, which emerged as a reaction to Western architectural understanding in the direction of Nationalist ideas in general, has developed in connection with the **"Turkism"** Movement that developed during this century under the leadership of Ziya Gökalp. As a result of the **"Westernization"** movements, the Western members who dominated the Late Ottoman Architecture left their place to an architectural understanding where the elements belonging to the Classical Ottoman and Seljuk Architecture were applied especially on the facades. This period was criticized for the application of classical elements on the architectural Western mass formations. However, architectural examples of this period are of great importance because they are the last examples of the Ottoman period architecture and constitute the first steps taken into contemporary architecture. This period has also a unique era to start building public buildings besides religious buildings. The most magnificent public buildings have been built in Istanbul, the capital of the Ottoman Empire and Ankara, the capital of the new Turkish Republic. In Anatolia, it is possible to see more modest examples of this movement.

Konya is one of these Anatolian cities. Architect **Muzaffer Bey** who was attained as a chief architect of the Konya Province in 1914, constructed the buildings bearing the characteristics of the **"First National Architectural Movement"**. **"Konya Teachers School for Boys"**, with todays name **"Konya High School"**, was completed in 1917, is one of the most important examples of this movement. When we examined the structure, in terms of the common features of the **"First National Architectural Movement"**, we reach below points;

1. Having a symmetrical plan understanding,
2. To clarify the entrance of the structure with marble columns and arched passages,

3. To place an arched passage at the entrance gate reminiscent of the crown doors,

4. The entrance facades of the structures have more splendid and active then other facades.

5. Sides and rear facades are designed simple and plain in comparison to front façade.

6. The use of horizontal embossed ornaments that determine the floor alignment between the floors on the facades.

7. The formation of different window forms using different types of arches on each floor throughout the structure.

8. The use of tile ornaments above and between the windows,

9. The use of wide ornamented eaves carried by supports,

Consequently, it can be said that Architect **Muzaffer Bey**'s **"Konya Teachers School-for Boys"-"Konya High School"** structure carries all the important features of the **"First National Architecture Movement"**. In this context, this well protected structure should be preserved as National Architectural Heritage for future generations.

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A WING KEEL DESIGNED THAT IS FROM NACA-EPPLER (e818-il) HYDROFOIL SECTION ANALYSIS WITH CFD METHOD

Uğursal DEMİR*

1. Introduction

Computational Fluid Dynamics (CFD) is a method that is constantly evolving with computer programs in recent years. Apart from the flow used in marine engineering discipline as a fluid, packaged computer programs used for critical calculations of aerodynamic sailing yachts in particular can give near results. As known; Vortex formation is inevitable in the nature where turbulence occurs in nature where almost no laminate flow appears in real life. While work is becoming more complex at this point, the uniqueness of engineers comes into play. How do you capture an optimal form? How to obtain the form that will provide the maximum lift force at a low resistance force? A series of analyzes are run around the questions, and optimization is done.

Fin keels are a very broad category of keel which is characterized by a high aspect ratio appendage. Within this category are a vast world of variations and subtle differences that give rise to very different performance characteristics.

The theory behind a fin keel is the leading edge will produce lift which will carry the boat to windward. The whole keel is shaped like an air foil to aid in generating lift and make the entire system much more efficient (Benavent, 2016).

These optimization tasks, especially on sailing yachts that are fun, race-oriented, are in a very critical situation. Even 1-1.5 knots to be fed to the boat in the form of modifications made on the yacht release part of the boat are obtained as a result of very precise calculations and workmanship. Yacht owners are becoming more vigilant in racing boats, which are a speed anticipation that pay great attention to these optimization tasks. In this case, a new emergence of poultry release models, especially in the field of academic work; both in terms of CFD and experimental discussion.

2. The Purpose of This Study

To create more wing keels're very improtant. For yacht builders, a deeper draft means that buyers in shallow waterways will not buy their product. Yacht builders want to be able to sell their yachts to everyone, which means that they need to produce a yacht with a shallow enough draft

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that it will appeal everyone while still retaining the desired performance attributes that will make them competitive when compared to deeper draft competitors.

Yachts compete on windward performance and on their ability to sail into shallow waters. Naturally, these two camps are on opposite sides of the spectrum. You can either sail to windward OR get into shallow waters, not both with a regular keel (Benavent, 2016).

As a result, the design of new models of wing keel which is considered to provide high performance will bring about technological advancement. It will also enable yacht builders to produce faster, stable craft. It can also be predicted that it will trigger future investments in supply-demand balance.

3. Method of The Study

A turbulent flow may be defined as a flow which contains self-sustaining fluctuations of flow properties imposed on the main flow. There are several factors which may cause an orginally laminar flow to transition to turbulence. The fundamental quantity in describing transition to tubulent flow can be achieved at around a Reynolds number of 2300 and for a boundary layer flow over aflat plate at the Reynolds number of around 300,000 – 500,000.

Modifications of the equations of fluid motion for the effect of turbulence in flow area, the equations of fluid motion are modified and amended by turbulence models. There are two approaches to reformulate the Navier-Stokes equations are known as the Reynolds Averaged Navier-Stokes equations (RANS) and the Favre Averaged Navier- Stokes equations (FANS).

Standart k-ε two-equation turbulence model: A commonly used two-equation turbulence model is the k-ε model. The partial differential equations are derived for kinetic energy of turbulence (k), and the dissipation of turbulence (ε);

$$\frac{D}{Dt}(\rho k)=\frac{\partial}{\partial x_j}\left[\left(\mu+\frac{\mu_t}{\sigma_k}\right)\frac{\partial k}{\partial x_j}\right]+G_k-\rho\varepsilon$$

$$\frac{D}{Dt}(\rho \varepsilon)=\frac{\partial}{\partial x_j}\left[\left(\mu+\frac{\mu_t}{\sigma_\varepsilon}\right)\frac{\partial \varepsilon}{\partial x_j}\right]+C_{\varepsilon 1}\frac{\varepsilon}{k}G_k-\rho C_{\varepsilon 2}\frac{\varepsilon^2}{k}$$

where $C_\mu=0.09,\quad C_{\varepsilon 1}=1.44,\quad C_{\varepsilon 2}=1.92,\quad \sigma_k=1.0,\quad \sigma_\varepsilon=1.3$

The most widely-used engineering turbulence model for industrial applications. robust and reasonably accurate; Widely used despite the

known limitations of the model. Performs poorly for complex flows involving severe pressure gradient, separation, strong streamline curvature. Suitable for initial iterations, initial screening of alternative designs, and parametric studies (Hoffmann, Steve T. Chiang, 1998).

4. Design of Wing Keel and Definition of Boundary Conditions

Eppler 818 Hydrofoil Airfoil - Eppler E818 hydrofoil was used in the wing profile of the wing keel. Max thickness 9.4% at 33.1% chord. Max camber 2.8% at 67% chord (UIUC, Airfoil Coordinates Database).

Fig.1. Eppler 818 Hydrofoil Airfoil Section

Three dimensional(3d) model was made in the rhinocesros program and the necessary initial conditions were shown at fig.2.

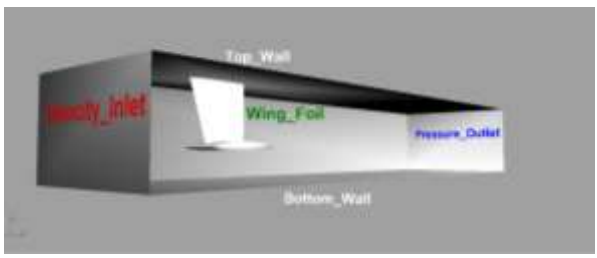


Fig.2. 3d Wing keel Model and domain area

The hydrofoil length is 100cm. Three-dimensional modeling was performed by taking A = 100 cm. Boundaries are shown at fig.3.

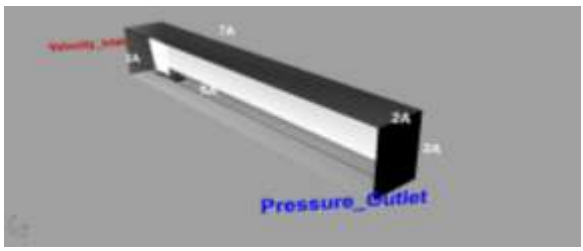
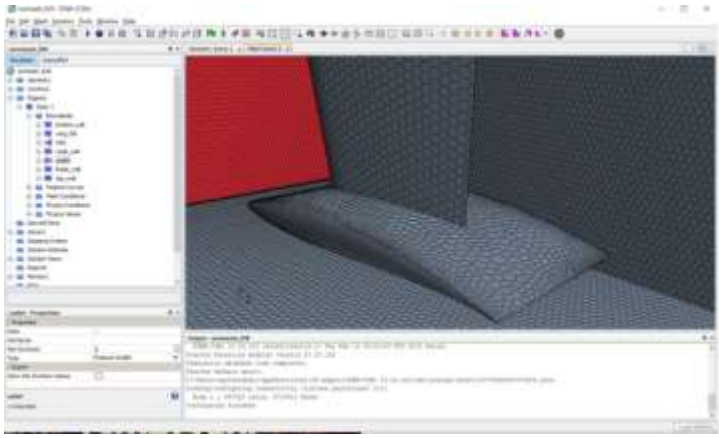


Fig.3. Domain and Boundaries

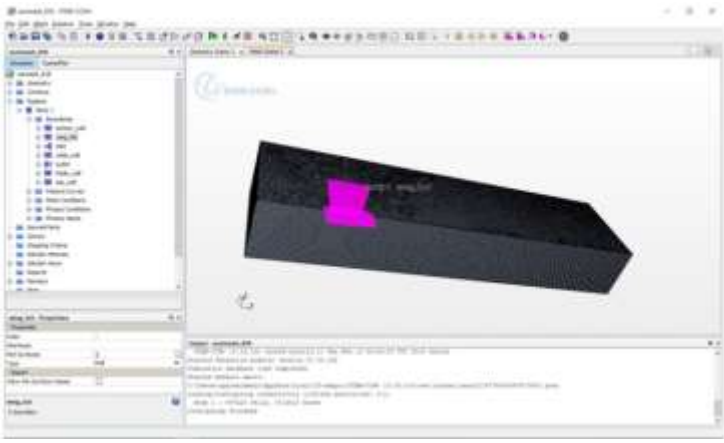
4.1. Mesh Operations in STAR-CCM+

Fluid velocity 15 m/s, Re ~ 200,000 Max Cl / Cd at = 4.25

In the Star-CCM + program, 897.423 cells were obtained as a result of mesh removal using prism layer mesher, polyhedral mesh, surface remesher methods after necessary arrangements. In addition, the boundary layer around hydrofoil has been determined to have a base size as 0.05m.



(A)



(B)

Fig.5. (A) and (B) Meshing Model

Model selection for physics values in STAR-CCM, turbulance modelling is K-Epsilon and implict unsteady. This conditions were shown at fig.6.

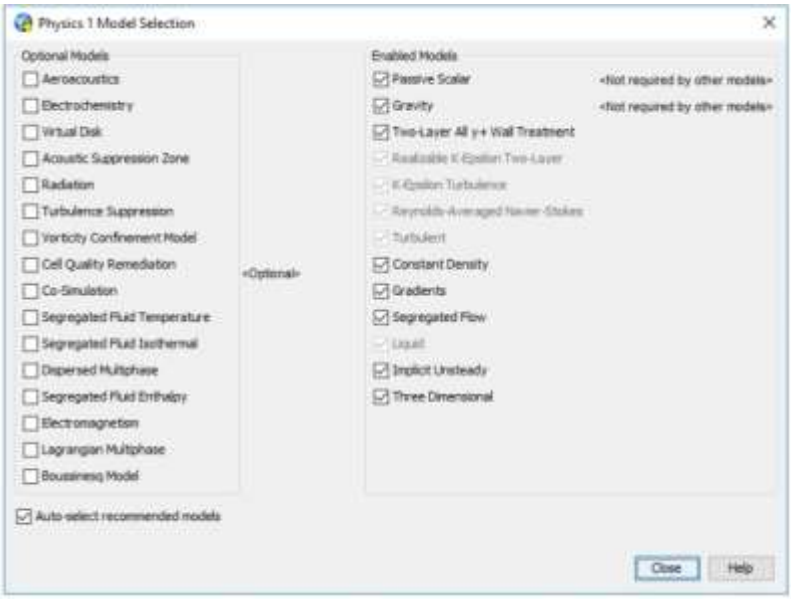


Fig.6. Physics Values

4.2. Running the analysis

Flow velocity, vectorial and scalar data are presented in the X = +1m cross section plane. In addition, the scale of the turbulence energy conversion is printed on the screen. Possible results are given in the figures.

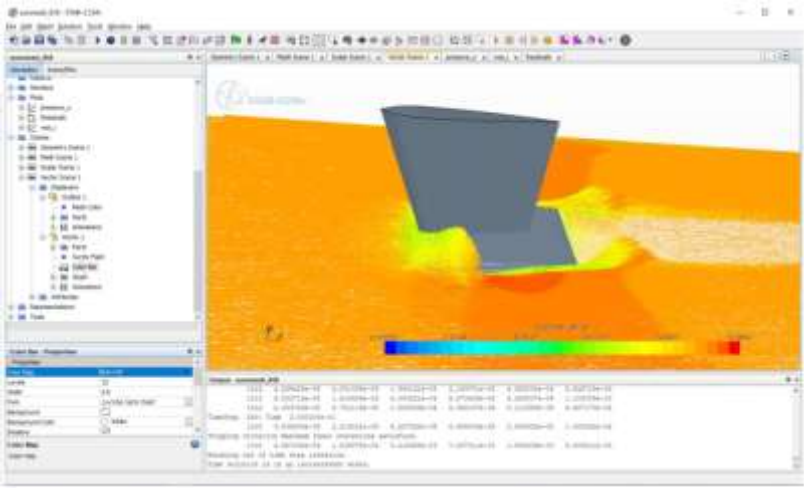


Fig.7. x=+1m velocity change in 1316 iteration

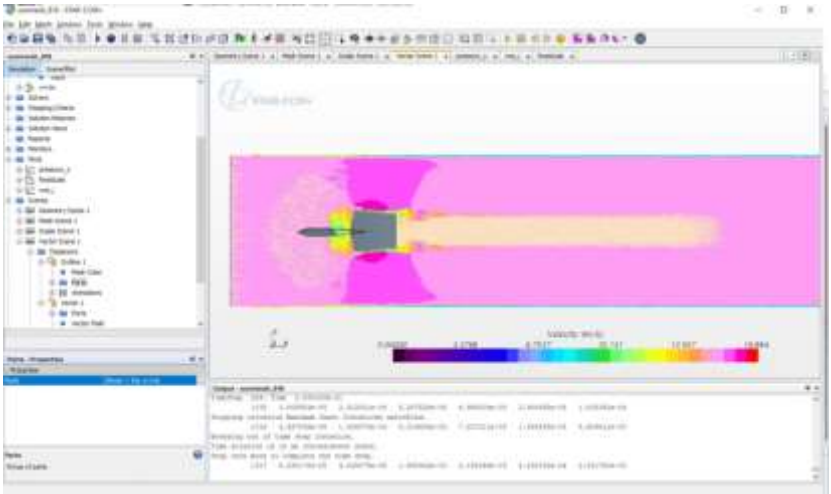


Fig.8. x=+1m velocity change in 1316 iteration on top view

The velocity of the fluid on this plane was investigated by throwing a section plane X = +1.2m.

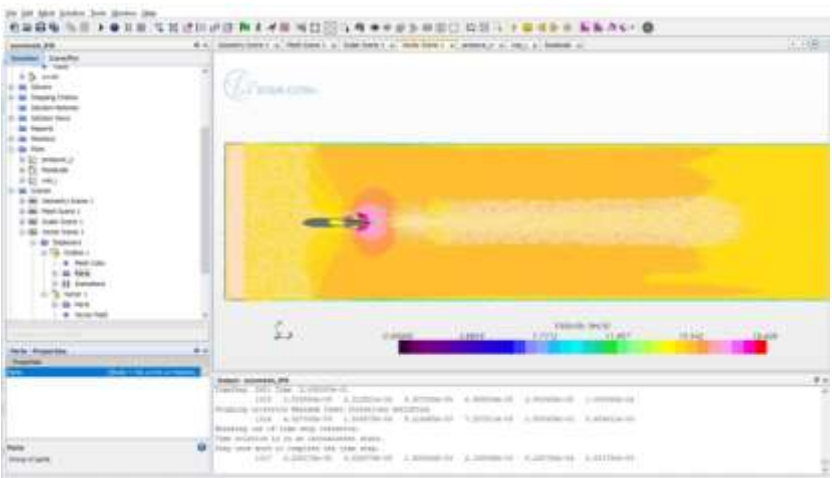


Fig.9. x=+1.2m velocity change in 1316 iteration

The change in turbulent charge in + z direction measured from the X = 1 m section plane is are shown at fig.10.

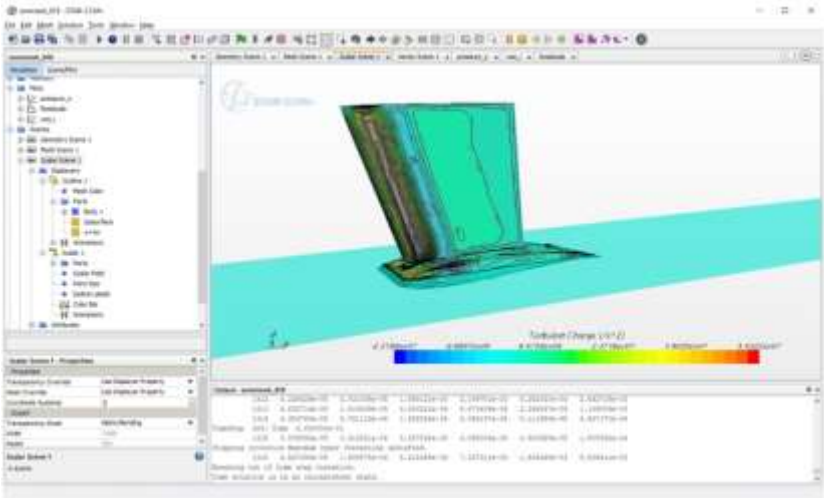


Fig.10. z=+2A Turbulent Charge in 1316 iteration

5. Concluding Remarks

By running the analysis, the change of the turbulence kinetic energy with the total pressure was printed as a WY_plot screen.

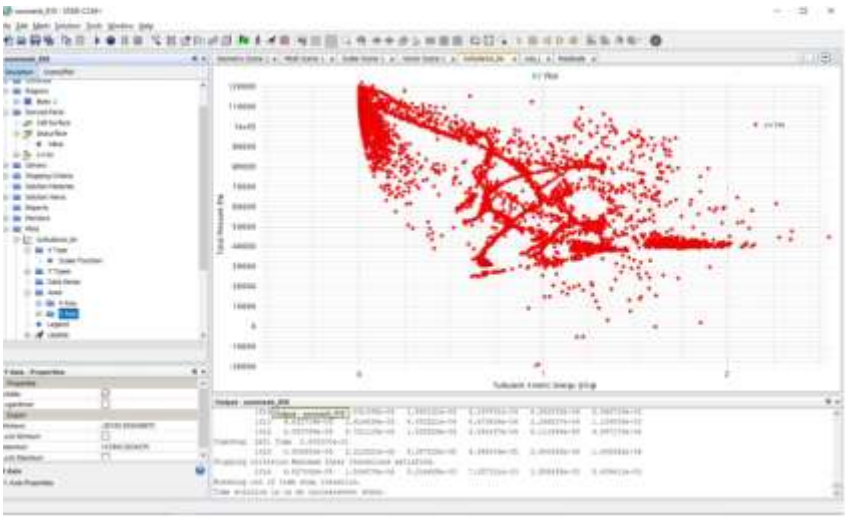


Fig.11. The change of turbulence kinetic energy

Finally, the residual values at 1317 iteration time are table below.

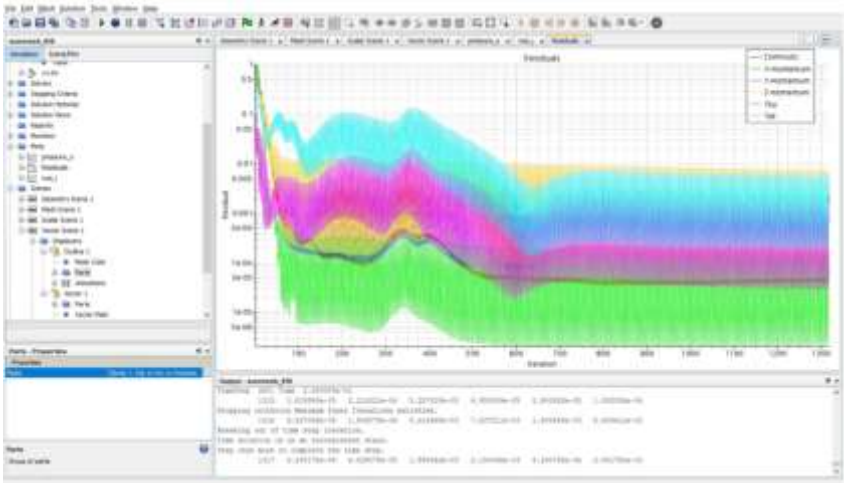


Fig.12. The residuals values in 1317 iterion

The concept of winged suspension in a seawater fluid with a density of 1025 kg / m³ can be used in sailing yachts that can be predicted to develop further in the sector in the coming years in this study, where the velocity of the section plane at x = +1 m and then at +1.2 m is studied for total pressure and turbulence kinetic energy change. A wing keel model was made. Possible results in this model are given in the study. In such studies, iterations were solved with the aid of the k-ε two-equation turbulence model, which is widely used in CFD analyzes. Turbulence values and boundary layer conditions used in this type of volume of fraction method are taken as standard. This type of hydrofoils has been further examined by comparative experiments and the importance of the accretion of analysis results has been emphasized once again in terms of academic studies. Findings from possible outcomes indicate that effective use can be achieved by altering the angle of attack. As a result, it is thought that the formation of more optimal forms than hydrofoil longitudinal section can be found by adding lines to control flow and comparing with existing results.

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