# CRITICAL ANALYSIS AND EVALUATION OF HOSPITAL MAIN ENTRANCES ACCORDING TO DESIGN AND PERFORMANCE CRITERIA IN THE CASE OF TURKEY

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## ABSTRACT

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**IN THE CASE OF TURKEY**

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The entrance space of a hospital has formed an effective period of hospital life since it has reflected the scope and the image of the entire facility. Therefore it has directly influenced by the new formation of healthcare facilities on preserving and growing role of the community health instead of threatening the illnesses. Since entrance space is apart from the other spaces in the facility that has shaped by the restrictive nature of the medical technology, the space most efficiently implement these new objectives more than any space of the entire facility. However, entrance spaces of hospitals in Turkey are still bothered with many insufficiencies and displayed a problematic panorama. Therefore, this thesis has obtained the problems of main entrance space, and

has analyzed it with a consistent form of criteria to gather new solution proposals. In order to serve for this purpose, the present Turkish health care environment has explored and entrance space has been analyzed around new emerging concepts that reflect the changing ideals of the community. To present the problems and solution proposals about this specific place sufficiently, they are also evaluated through design and performance criteria. The essence of coping with the stress created by the environment with healing potential is emphasized. As a result, this thesis is expected to influence further researches, new hospital main entrance space designs as well as the renovation of older ones.

Keywords: Hospital entrance, Hospital design, Hospital performance, Turkish hospitals.

# ÖZ

## TÜRKİYE'DEKİ HASTANE ANA GİRİŞ MEKANLARININ TASARIM VE PERFORMANS KRİTERLERİ ESAS ALINARAK ELEŞTİREL ANALİZİ VE DEĞERLENDİRİLMESİ

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Hastane binalarının içerisinde yer alan giriş mekanları, tüm merkezin içerik ve imajını sergilemeleri sebebi ile hastane yaşantısının etkin bir halkasını oluşturmaktadırlar. Bu sebepten dolayı da sağlık merkezlerinin sadece hastalık iyileştiren değil, aynı zamanda toplum sağlığının korunmasını ve geliştirilmesini amaç edinen yeni oluşumundan etkilenmektedirler. Giriş mekanı, hastane tasarımının kısıtlayıcı doğası ile şekillenen bir mekan özelliği taşımadığı için, ortaya çıkan yeni hedefleri en güçlü şekilde sergileyen mekan olarak ön plana çıkabilmektedir. Tüm bu özelliklere rağmen, hastanelerdeki giriş mekanları pek çok yetersizlikler içerisinde problematik bir görünüme sahiptirler.

Bu sebepten dolayı, bu tez giriş mekanlarının problemlerini tanımlamaya çalışmış, ve bu problemleri, çözümlerini oluşturabilmek için tutarlı bir takım ölçütler çerçevesinde analiz etmiştir. Bu çerçevede, Türk

sağlık sistemi incelenmiş, ve gelişmiş ülkelerde yeni ortaya çıkan ana fikirler doğrultusunda giriş mekanının analizi yapılmıştır. Problemleri ve uygun çözümleri sağlıklı biçimde sunabilmek açısından, bu problemler tasarım ve performans ölçütleri çerçevesinde değerlendirilmiştir. Ayrıca, iyileştirici potansiyeli içerisinde barındıran bir ortamın, stresle baş etme konusundaki önemi vurgulanmıştır. Sonuç olarak, bu çalışmanın konu üzerindeki ileriki çalışmalara, yeni hastane giriş mekanlarının oluşturulmasına veya eski mekanların yenilenmesine yardımcı olacağı düşünülmektedir.

Anahtar Kelimeler: Hastane girişleri, Hastane tasarımı, Hastane performansı, Türkiye’deki hastaneler.

To My Family

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## TABLE OF CONTENTS

## LIST OF TABLES

## LIST OF FIGURES

# CHAPTER I

# INTRODUCTION

## I.1. Definition of the Problem

Health-care facility planning is a complex process that must satisfy a multitude of competing criteria. Besides, it involves the co-ordination of many professional groups and agencies on many levels, that is local, national, government, or non-governmental entities that enforce healthcare requirements. Thinking how essential is the health of the community that is served by these facilities and their whole effect on the nations, it becomes inevitable to appreciate the complexity of the end product. That's why a lot of research has been going on in developed countries which eventually find their places in many building codes, regulations, development plans and design guideline books. Eventually by the help of technological advancements in construction techniques, materials and technical details; facilities have been performed which have been accepted as qualified, leading examples on the subject matter by these countries. In spite of the availability of reaching the information required and possibility to use convenient technology to operate, Turkey has many problems starting from deteriorating economical conditions in obtaining the desired performance through these buildings from architectural point of view.

Occasionally, in most of the hospital departments, the proposed performances of the spaces have been evaluated with the efficiency of related medical technology and the space requirements of the introduced equipment by this technology. It is mostly an engineering study; architectural contribution is

minimized because of the accurate, pre-defined relationship of the technology. It is mostly an engineering study; architectural contribution is minimized because of the accurate, pre-defined relationship of the technology with the space. However, apart from treatment areas, there are special place that have to perform adequately both functional and physiological needs of the ill people since hospital is designed to influence healing process of human as a complete example of health with its whole body. Main entrance is one of them and the design of this component can be controlled mostly by architectural decisions. The process of decision working involves some problematic issues like the space quality of the entrance as being an initial space of the hospital, the satisfaction of functions contributing to the place, and the performance of the space when this work come into realization. Therefore, the subject of this thesis is the design and performance of this principal space. Since in Turkey, many problems can be mentioned in health-care environment from architectural point of view, the main topic of this research is the problems of the main entrance space which influence patients' and visitors' evaluations of hospital.

### I.1. The Aim of the Research

In order to define the problems and related expectations, the healthcare environment in the world, and in Turkey that shape the architecture of these facilities, should be covered. The shifts within the technology and the community, affected the process and further indicated new ideals through entrance space designing has been analyzed in order to satisfy arising needs. Considering the use pattern of entrance spaces, future expectations, functional and physiological needs of the community, this research have been evaluated the quality of the created environment as well as its success in performing as a space component. Performance criteria is defined for all of the components obviously, this thesis has involved only the ones related with architectural components. Additionally, some criteria specifically referring to the health-care facility design has been explored. Eventually, a proper research about the topic

that is also aimed indicating the related code restrictions, financial and capacity planning, functional programming and arranging the spaces, considering the needs of being a human when designing as the aesthetical factors, the acoustical, optical, climatical, performance of the space as well as the fire performance and the success of the finishing work is identified as the main concerns of the designer.

### I.2. The Scope of the Research

The present Turkish Health-Care System involves a variety of facilities which could be classified depending on their capacity, size, subject, scope and management types. Among these facilities that has indicated all through the research; analyze of entrance component has done for hospitals types. Institutional public hospitals, private investments, educational facilities, chronic hospitals all have been included. However, rehabilitation hospitals are out of the research; since the process and needs of these special patient populations differ in a wide range.

All of these facilities mentioned above can be accepted as complexes serving for a wide variety of users -so resisting against heavy traffic use pattern- an important issue in evaluating the entrance spaces. Respectively, these facilities involve many different entries serving for pre-clinical, clinical, administrative, emergency or service purposes and many more. This thesis is covered the patient and visitor entries serving for pre-clinical, clinical, or for both purposes in one entry.

Obviously the criteria which the evaluation is done are related with the architectural quality of the space. Arrangement, financial considerations, proper research through design, code-related design, acoustical issues and many other criteria is analyzed with defining the related problem and proper

solution; all affect the space and which are valid for the health-care environment in Turkey. Other contributions are excluded from the thesis.

### I.3. The Method and the Structure of the Thesis

The proposed method of the research involves the critical overview of the past, the situation of the present, and predictions about the direction of the health-care environment affecting the health-care facility design as well as the evaluation of the entrance space in hospital environment according to design and performance criteria both throughout the world and specifically in the case of Turkey. Within this evaluation, the declaration of problems in the specific case of Turkey is supported by photographs and examples if needed. In addition the literature review those covering the solutions is explained and again echoed by visual illustrations named as photographs. Lastly, the utilization of these universal solutions to the case of the thesis has finalized each title.

Including the introduction and the conclusion chapters this thesis consists of three chapters. Besides the introduction to the subject, in Chapter I, the thesis is made an overview of the Turkish health-care system in order to be referred to the existing problems -explored in the Chapter II- of hospital main entrance. The thesis has made an overview of the changing healthcare environment over the world with new emerging priorities and design concepts in Chapter II; besides it examined the critical design analysis on the problems of the entrance space organized according to the design and performance criteria. In this case, the evaluation of the entrance space is explored depending on the universal criterion that has applied to the whole components as well as the architectural ones. The solutions are given in the form of literature reviews done by the researchers throughout the world; also the utilization in the case of Turkey considering within the appropriate social, financial, technological framework was held. The titles within this chapter has presented in an order

that is used by architects while they are designing. The new emerging ideals are explored firstly that is followed by design process starting from proper researching to arrangement of components and satisfaction of humanistic requirements. Then components that have been expected to perform when they are designed have been presented. Finally, in conclusion chapter, the results of such survey has been covered briefly in order to be enabled by healthcare designers benefit while they are designing or exploring such spaces.

### I. 5. Terms and Definitions

Some terminology contributing to the text do need exploration in order to make a clear comprehension to the framework of the study as the terms of hospital, main entrance, design and finally performance criteria. This thesis has involved entrance spaces only in the context of hospital type medical facilities. These facilities are differentiated with their capacity and scope from the other ones. Also they are accepted as primary care facilities which involve the most advanced and extensive medical systems in treatment and diagnosis point of view with the capacity of minimum 100 beds or more. Some may serve in one specific topic like women hospitals, rehabilitation hospitals etc, or can serve to whole community regardless to the sex, age or type of the illnesses as general hospitals. Because these types of facilities are broad in scope, their arrangement is complex and their size is usually wide. This differently functioning departmental organization makes it inevitable to involve many different entrance spaces. Administrative, emergency, service, morgue, visitor, cafeteria, pre-clinic or/and clinic entrance can be counted as some of these mentioned. However, this thesis has investigated the problems of main patient entrance which has defined as serving for all of the users of the hospital and involves the pre-clinic section as well as cafeteria units in usual within the main functions of serving for registration, waiting and initial distribution for circulation purposes.

The criteria that has used to evaluate the entrance from the architectural point of view has distributed into two titles. Design criteria analyzed the space as a whole, the way for appropriate programming, the factors affecting the arrangement, the inter-relation of components, financial factors, influence of proper research on design, the regulations, related building codes and standards that has to be refereed in planning process and humanistic design issues.

Performance specification is a description of the required performance of functions of a component. That's why the thesis has analyzed required performance of the components and the end product (the whole space) to ensure the success of the entrance as an architectural space. Acoustics, lighting, operating system designing, detailing, materials, finishes, furniture are the contributing items to the subject. These specifications are used in order with the internationally agreed list of headings about many processes of design; for the arrangement and presentation of information used in design, construction, operation, maintenance and repair of buildings and building services, and in associated documents on the supply of construction products and services, their manufacturers and suppliers.

### I.6. Health Care Environment in Turkey

Being a component of a whole organization that is serving for the community wellness; entrance space has its restrictions and enforcing circumstances brought by this specified environment that should be analyzed. Moreover, the role of the authorities creating the entire system, financial sources and the clear categorization of the facilities should be mentioned to comprehend each function and use pattern of the entrance space in order to obtain the problems and seek for appropriate solutions through each case. Within the scope of this title, the present Turkish health care system with the providers in the system, and the structure of these facilities in Turkey with the situation introduced through has been investigated.

Although Turkish health care provision seems to concentrate on preventive care, most available resources are being spent on high-cost hospital services. The Turkish health care system is heavily-dependent on public administration and funding. The main provider of health care is the Ministry of Health (MoH), with its central administration. Beside the task of proving health care services as dutied by the government, it also holds the authority to permit or control facilities of entire providers. The second largest provider is the Social Security Organization (SSO) which covers private and public sector blue-collar employees and wage-earners. Other than the MoH, there are hospitals operated by the SSO, universities which provide mainly tertiary care including super- specialties, the Ministry of Defense, municipal governments, foundation and the private sector. These hospitals that has ruled under varying authorities can be observed or analyzed under different titles such as general hospitals where patient of all ages and sexes, and having all sorts of diseases are admitted to its out-patient departments. They, also, may be differentiated within their scope. Specialist hospitals dealing with one category of patient only form a different class as well as teaching hospitals where doctors and specialists are educated. Moreover there are rehabilitation hospitals where the diseases of organs, nerves, muscular and bone systems are treated during a certain period while resting in hospital and finally there are chronic and long-stay hospitals which are chronic and long-stay establishments where the patient stays because of treatment has taken a long-time to get better.

Therefore it should be noted that, these differentiated facilities may require different design understanding, aesthetic or even functioning. Design themes, color combinations used in an entrance space of a children hospital or in a women hospital should be very different since their requirements and related physiological comfort captured from the environment may vary greatly. Besides, the paperwork and registration procedure of a public hospital run by SSO and a private hospital should differ, the arrangement, scope and the

capacity of registration might display many differences. Therefore whether differences are functional or aesthetical; designer should analyze the procedure going on and the atmosphere of these specialized patient groups.

There are two major sources of hospital financing: allocations from the General Budget (GB) allocations and revenues from Revolving Fund (RF). GB allocations are basically tax revenues accessed through the MoH. RF revenues are basically fees paid by individuals and third-party insurers. Hospital budgets are prepared by simple adjustments to those of preceding years on the basis of inflation rates. Fees are determined by a joint commission of the MoH and the Ministry of Finance with little concern for actual costs of services. Since the referral chain is not pursued properly, hospitals are for the most part heavily-used as outpatient clinics. In fact, 90-95 % of hospital cases could be treated in primary health care facilities and only the remaining 5-10 % actually need be referred to hospitals. Unfortunately, hospitals accept direct applications, whatever the illnesses. This causes long queues and overcrowding in hospitals through most of the entrance spaces in hospitals which has accepted as a general problem. Besides, since the deteriorating economical conditions of Turkey, the entrance space of a hospital used by each person that enters, that is a huge crowd each day, has been regarded when subject comes to renovation.

Recently, the organizations of the health care facilities are heavily under the authority of the MoH, therefore the policies of this Ministry gain much importance. Through the architectural and constructional process of governmental hospitals as well as the private investments; beside the general codes of the Ministry of Public Work and the municipalities valid for all commercial facilities, the MoH did not introduced a group of applicable building codes to obtain a standardized end product. However the financial problems of Turkey, the underestimated importance of the facility design, the fakes of the institutional process lacks dissuasive obstructions, the unavailability of sufficient designer(s), and this two headed authority system

through mentioned process gave way to some improper entrance space designs. Therefore designers should be aware of the environment, the priorities of each facility and the requirements of the community suffer form these insufficiencies in order to realize a proper entrance space for the entire facility.

# CHAPTER II

# CRITICAL ANALYSIS
# AND EVALUATION OF THE MAIN ENTRANCE SPACES
# ACCORDING TO
# DESIGN & PERFORMANCE CRITERIA

## II.1. Critical Design issues of Main Entrance Spaces through Emerging Ideas from the New Formation of Healthcare Facilities.

The health care world is evolving rapidly with the technology that is introducing a new way of looking to the world with its discoveries. In this section the thesis is discussed the new understanding of medicine in the world, the paradigm shifts realized with this understanding, changing community requirements and finally the new model and new concepts that will be explained in detail in design of the entrance which is shaped through this photograph.

Within the span of the century that has ended, medicine has evolved from the relatively ineffectual study and curing of illness and injury to a system of positive, effective, life-prolonging intervention. All segments of the primary care portion of the health care system - health care providers, insurers, and users of health care services are expanding their services and changing their focus from illness toward wellness. As a result of these changes healthcare providers, including those responsible for planning and administrating hospitals and healthcare facilities, have became anxious

about increasing prime costs. As a result paradigm started to shift from those who provide the care provider dominated payment systems- to those individual and public who pay for the care- consumer centered marketplace-. Beside the care giver dominated, non-profit places that we go when we're ill, private facilities that serve patients as their clients begun to emerge. Furthermore in the recent past the culture-dominant missions was emphasized the idea of healthcare for everyone. Today the trend is toward a focus on the cost of caring for a defined population and healthcare providers emphasize the trend of managing, promoting and maintaining the health of the community instead of promoting the hospital as a place where you went when you are sick.

Within the light of the information above, it would be useful to look at the circumstance from the patient point of view in following paragraph in order to outline other issues that affect the shaping of contemporary healthcare entrance environments. To express the needs clearly, researcher has referred to the studies conducted by Charpman Grant Associates, Environmental Design Consultants, and Ann Arbor, Michigan, who suggest that all hospital patients (and visitors) share four basic design-related needs, physical comfort, social contact, symbolic meaning, and way-finding. Initially, physical comfort shall be defined as such things as appropriate space temperature, pleasant lighting, comfortable furniture, freedom from unpleasant odors and harsh or annoying noise, and so on as explained. Secondly, social contact encompasses personal privacy- limiting what others see and hear of you- as well as controlling what you see and hear of others. Additionally, symbolic meaning encompasses the array of non-verbal messages embodied in design. It might be an uncomfortable waiting area with inadequate seating which is not only physically offensive, but also suggests the patients that "the powers that be" hold them in low regard. Finally, way-finding is probably the most problematic aspect of large hospitals. Patients, already under-stress, can easily feel buried or lost in a forbidding technological maze when entered immediately, so are the visitors. These needs can be summarized as patients wants the best that

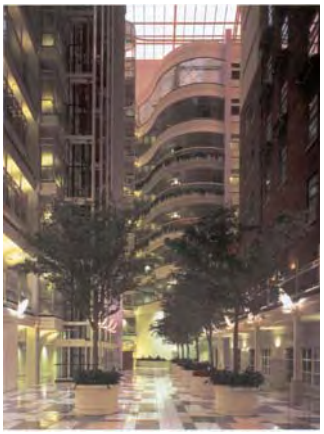
technology can offered administered by the best people, but with this high technology, they also desire a humanized environment, comfortable and aesthetically pleasing. That' why many hospitals entrance designs in the world are now moving away from the office image toward hotel or home imagery, with the use of domestic-scale plants, lamps, artwork, furnishings and window treatments, thus, communicating messages about psychological support, comfort, personalization, and close interaction. This seemed that, the reflections of these shifts have strongly felt in the entrance space of hospitals since the place is designed mostly by architectural decisions rather then the space requirements of technology and machinery and it has special importance in giving the essential image of quality to the hospital facility. Furthermore it is the initial place of the hospital, so healing environment has to be felt especially here, patient should immediately recognize the health giving intent of the environment by entering the space.

Therefore, the entrance of healthcare facilities that are sufficient to be carried out to the twenty-first century are the ones combining technology, economics with the information to produce an effective design inspired by the people who are going to use of it and that gives a healing motivation by establishing a healing environment as the entire facility. It seems essential to develop designs that are not only responsive to the new paradigms that define today's requirements as we presently perceive them, but that are inherently flexible enough to anticipate and respond to market trends as yet uncertain or unforeseen. Furthermore in contrast with the limited participatory design with those who have the opportunity to be adjoined formally as administrators and care providers like nurses, doctors in the past, new paradigm medical facility planners are more concentrating on assessing what their patients want. Besides the participation with users of the facility is helped to clarify design objectives and ensured that the objectives of the primary project planners, the architects, and the users corporate.

As a result of these shifts happening politically, socially and economically through the community that facility serves, the new model for designing the entrance space of the hospital which influences the whole body has emerged. Miller and Swensson (1995: 75) define it as ‘mall model’ since shopping malls in the culture of the American society, which are accepted as not just a place of the retail exchange, but a place of amusement and social exchange. Therefore if the word familiarity is accepted as a key to humanizing and de-stressing the health care environment, they would establish a good example. Furthermore the mall like setting also offers tremendous flexibility for laying out inpatient and outpatient facilities. The medical mall usually centers on a major public circulation atrium or spine that connects all public entrances to health service areas in a configuration quite similar to a shopping mall (Figure II.1.). However, Miller and Swensson claims that the retail analogy and its positive gaining break downs a degree when it is thought that the idea behind to going to a shopping mall is being impulsed by many shopping opportunities instead of shopping from a particular purchase. But it is far less likely that a patient visiting the facility for a particular operation, to impulse by seeing another in his way. Yet, the storefront of other services does suggest to the medical consumer the range of help that is available for future needs. Also the analogy to shopping can help to prevent anxiety associated with medical mall procedures, which are often performed in settings that “promote” passivity.

In spite of these comments, this understanding has spread very quickly and effectively which gave way to emphasizing on the design of the entrance, and by this way of thinking, entrance space has gained many features, richen with additional functions that reasoned the existence of many visually aesthetic elements in order to reflect the image of the organization properly as being an essential component of it. Depending on Bednar (1986: 63, 66, 69, 70), the atrium can organize the facility in several ways. It should be established as a place of orientation; in fact by its very nature it is a focal space provides

II.1.A. Kaiser Permenante Kensington Medical Homer Gudesky Building, Centre, Kensington (Malkin, 1992: 313).



II.1.B. The University of Maryland Medical System, Baltimore (AIA, 1996: 100).

Figure II.1. Atrium entrance typology in hospital entrances.

orientation for building occupants and the public. To the extent that circulation is related to the atrium, this sense of orientation is reinforced. Besides, the atrium can organize a building functionally by accommodating a purpose shared by whole occupants, serving as a lounge, reception, or a common space for snacks and relaxation which can also defined for the atrium entrances in hospital facilities. An atrium also imparts an image identity to the building, a memorable gestalt of its spatial organization. It gives a building a center of gravity, a *locus nexus*, a place of repose, and finally with its sunlight, greenery, sculpture, fountains, and other features, an atrium sets as an asset which attracts people of all kinds.

This information about directions of the health care environment in the world influencing the design of entrance spaces in Turkish health care facilities

aimed to clarify the comprehension of the circumstances. The projection of these new born concepts through entrance space designs obviously has been suffered from many aspects which has been covered in the next chapter.

### II.1.1. Creation of Healing Environments

The built environment fills every part of our everyday lives and although we design our built environment, it strongly influences our lifestyles. The central role of the built environment is determining human social behavioral patterns and values according to Lang (1992: 57). In fact, when one designs a building he searches the most efficient way to meet psychological and physiological needs of the users. The building design is not only to solve the relationships of the departments. By considering many variables, a architect creates an environment. The environment becomes a part of its users and affects them both physiologically and psychologically. Thinking the main purpose of hospital environment is caring for the community wellness, the importance of creating these environments became obvious. Since entrance space is the initial space that has the role of setting expectations for treatment and setting the image of the hospital and it is not concurred by the heavy machinery which is necessary obstacles in process, entrance space should create this healing space understanding inevitably. Within this title; the problems when realizing the changing concepts in entrance space designs of hospital buildings, the stress forming factors, some issues to be considered when developing healing environments and ways to gather a motivating environment is discussed.

There are some reasons behind the failure in creating a healing environment within the entrance space that can be stated as the interdisciplinary collaboration lacking, empirical versus non-empirical studies, lack of user participation, regarding the role of research in decision making.

Conventional hospital architecture regarding these factors indicated above often conveys negative messages. In fact the problem derives from the fact that architects spend most of the their time in meeting concrete and well-defined requirements such as the client's program, building codes, minimum-size spaces recommended for each function, size spaces and zoning restrictions. They become so put off with the multiple layers of these specific requirements that they rarely have time or energy available to explore the each element defining a therapeutic environment. Furthermore, usually, because of the conditions of Turkey as a developing country, the priority is given to satisfy the basic requirements expected when spending the valuable sources as time and money. For the sake of making the entrance space, as a highly used space, durable, it is covered with stone materials that display too cool ambiance far from a little warmth (Figure II.2.). Afterwards to be happy with what is already created, bright color combinations are chosen and existing space is embellished with some decorative figures, elements and plants without thinking to gather unified concept within entrance space.

II.2.A. Traffic and Travmatology Hospital, Ankara.

II.2.B. İbn-i Sina Hospital, Ankara.

Figure II.2. Entrance halls that sets as an obstruction for the healing process.

There are various factors that cause stress in the entrance space of a medical setting due to different sources. For the healthcare settings, it is much harder to satisfy the needs when compared to the other spaces because as Volicer and Isenberg claimed the hospitalization itself is a source of psychological stress above all, for all patients, and families, regardless of the nature of the illness (Malkin, 1992: 15). Therefore, hospital stress factors can be summarized as the experience of being in a hospital, lack of privacy in a crowded entrance space, the medical language and the fear of procedures and probable unforeseen results that are coming over and finally inaccessibility to the information about possible procedures to be done in the setting. In order to cope with the stress of being in this environment Malkin suggested that architects should recognize that not all patient populations are the same. The term "healing environment" is too general and must become more specific in reference to the different needs of different patients. In other words, architects need to address the needs of specific patient populations if they are going to create environments that are truly healing. For example, the needs of cancer patients are different from the needs of patients with spinal cord injuries, and children's needs are different from those of elderly people. So it is not possible to design a generic environment and have it be healing to all patients, we should research the characteristics of a patient population and then create an environment to specifically accommodate their needs (1992: 30).

Although it is impossible to have a fixed formula for creating a healing environment because of state of research today, difference in each hospitals operational protocols, staffing, types of patients, and a host of other variables, including the physical design of the building itself that demands a highly specific application of a particular theory or group of theories, there are some factors that have to be considered in the creation of the healing environment for the entrance space of a hospital facility according to the researcher. First of all, since there is a high number of people using this special space possible noise sources should be indicated and controlled sensitively. Need for fresh air and

II.3.A. Güven Hospital, Ankara.

II.3.B. Bayındır Hastanesi, Ankara.

Figure II.3. Entrance space designs that contribute healing environment components in Turkey.

therefore avoidance of unpleasant smell is another issue to be held carefully. Thermal and lighting comfort with adequate privacy and communication possibilities, the logical amount of using natural elements, colorful but not disturbing, textural combinations among used materials are some necessary issues that architect should be keep in mind. Finally, a proper wayfinding organization, started to be shaped even the very basic step of entrance space design would be very helpful. Therefore an inviting, non clinical environment can be created which is in contact with nature and day light that is containing cheerful elements to remind the place is designed for humans for this introductory space of the setting. In Figure II.3. and Figure II.4. some examples of these kind of environments may be observed.

Finally, if the direction should be creation of environments that support and enhance healing, the components and their sufficient use for the desired target should be searched by architects in order to realize these ideas when trying to bring up a fresh look to the situation in the case Turkey. Even with a limited budget, an environment might be turned into a supporting space; if the elements mentioned above used in a sensitive manner to create a humanized entrance as being a sample for entire facility.

II.4.A. Memorial Hospital Addition, Seymour, Indiana (AIA, 1996: 110).

II.4.B. Interior courtyard atrıum of Lakewood hospital, Lakewood, Ohoio (Malkin, 1992: 66).

II.4.C. Atrium lobby of West Orange Hospital, Health Central, Ocoee, Florida (AIA, 1996: 69).

II.4.D. Atrium of Health Park, Lee County, Florida, USA. (Images Publishing Group, 2000: 163).

Figure II.4. Entrance Space Design that contributes healing space components.

### II.1.2. Patient Centered Design

Participatory design had its limitations since those who have the opportunity to participate formally to the process are administrators and care providers like nurses, doctors usually. In contrast, new paradigm medical facility planners begin by assessing what their patients want. The title, therefore, has explored the problems of spaces that regards the user participation, the benefits of the related process and the way to utilize this healthy collaboration in designing the hospital entrance spaces.

Although they accepted the idea of patients having a lot of needs through the period of their use of the hospital, architects working for Turkish health care environment often believed that the needs of varying patient groups can only been understood by the health care providers since they are aware of the circumstances which patients were in and the requirements of their treatment. Patients are seemed to be objected to use the facility regarded to be satisfied by the design or not since they had no other choice. All systems, furniture or other material used in the entrance space has often chosen in a most possible basic way, since it is believed that the desire of people varied so greatly that, it seemed impossible to make them pleased. Private institutions introduced this way of looking to the problem because their continuity is based on the client satisfaction -basically patients- who are seeking for the comfort, function and aesthetic environment to be threaten in.

Within this new way of looking to the problem, Kantrowitz (1993: 66) is exploring another approach that includes having an appropriate, enlarged menu of services in one convenient location through the entrance space. This approach recognizes the normal change and continuity of health status throughout the life cycle. For example, many examples of today hospital facilities involve pharmacies and optical shop etc. in the entrance area whether directly or indirectly linked to the space. Even a dental office and a chiropractic department may be added in some cases according to Kantrowitz. Furthermore Malkin stated (1992: 47), considering the inputs from the medical and nursing staff who gives reliable, valuable and important insights about the requirements of the space-designs is necessary obviously. Despite the fact that the data from the staff is essential, some of them may not be able to look at from patients or visitors point of view. As they are seen as the clients of the building, architect must consider the important information of patients and guests that are in need of the positive support of the facility.

Furthermore in Turkey, designs that are based on patient satisfaction has to begun to be considered as the initial right for the humans that have stress in their mind and looking for a space that sensitively holds their problems instead of establishing an additional stress factor affecting both their physical and psychological comfort. Entrances that have surrounded with furniture that indicates required quality, aesthetic and durability, seating units seemed to have enough comfort, toilets with a fresh and clean look, snack places with hygiene image and staff with all having smile in their face, physically nice and uniformed with a consistent way to show their respect to their users might change patient psychology in the first glance beside carefully arranged functions of the space. In addition, as it has explained before that, entrance design might be explored as a separate space from the hospital, and the essential need is physical and physiological comfort of the hospital to create a proper welcoming space.

### II.1.3. Flexible Design

In each stage of the health care design field including entrance space design, where capital improvements and building costs are significant, planning for long term is essential. Meeting the needs of rapidly changing technology and community requires dynamic planning attitude besides it should be accepted that the planning process itself must be a learning experience, because opportunities are available to learn from the process as well as from its results. In this sense building is always a project, flexible and responsive to evolving physical, emotional and intellectual needs this understanding therefore the long term strategic plan must have enough elasticity to be altered as the need arises. As a result we can define flexible design as creating facilities that can be quickly, economically, and repeatedly reconfigured which can be counted as a design task challenging enough. However, the need for a flexible space planning to tolerate the future

expectations should became an important criterion for the architect of the facility. Having this idea in mind, this chapter has examined the problems of entrance spaces in Turkey designed without a notion of flexibility, the definition and importance of this criterion through the world and possible solutions that can be valid in Turkish hospital entrance spaces.

Above all reasons, the designs are not base on solid information derived from research about the process, the possible solutions of the design problems are taken with short-term considerations by architects in the case of Turkey. Architects have to be aware of what is the challenging concepts seem to be effective in the future, and what is the position of architecture through the latest examples of health care facility designing. Since these expectations don't find their place in functional programs, arrangement decisions, capacity plans and material selection criteria, the entrance spaces of hospitals begun to be renovated even in their construction phase and eventually building become a labyrinth, a maze of major and minor spaces and their circulation spaces between. This is the main reason of the unsatisfactory, depressing, chaotic appearance of main entrance spaces in the Turkish hospitals.

Günsur (1994: 81-83), Kızılcan (1996: 29), Kantrowitz (1993: 74) and Miller and Swensson (1995: 33) all indicated the essential property of entrance space as flexibility as valid through all departments of the health care facilities. Therefore, concept should be defined as developing designs that are not only responsive to the new paradigms that define today's emerging markets as we presently perceive them, but that are inherently flexible enough to anticipate and respond to market trends as yet uncertain or unforeseen. However this approach that centered satisfying market requirements should be thought for twice. The essential purpose of serving the community shouldn't be overestimated, so privilege should be given to fulfill the needs of the users group who are already in need of this approach because of their vulnerability than an ordinary person of hospital entrance space. The need for flexibility can

further be explained by the technological nature of the healthcare industry. Not only must facilities adapt to changing patients needs, but they must also anticipate the physical demands emerging technologies may make. Miller and Swensson (1995: 35) stated that the idea of flexibility extends from planning and design to the range of finishes chosen for buildings, with the most permanent infrastructures- pathways and vertical circulations, for example- finished in high-quality, long lasting materials, and other areas, subject to shorter lifespan, finished with less expensive, less durable, even throwaway materials.

First of all information base decisions taken by architects must be the initial way of looking to the problem in the case of Turkey. For many occasions the capacity begun to be insufficient for the main lobby, reception and information desks to summarize for every meter square in the space. Hence, the overall planning and the arrangement should be clear and simple when designing an entrance for a hospital; the obstacles have to be minimized through design. This kind of a plan give chance to add or remove spaces easier when need arises. A different kind of shaping the space with many corners to turn, and many walls to be passed nearby should create unimaginative difficulties for a possible renovation. Desks have to be convenient to lengthen, since many additions took place within the life span of the building. Waiting spaces should tolerate some changes in their capacity, and eventually doors have to be designed to cope with the possible heavy traffic in the future. Secondly, the selection of the materials should be done with a consideration of possible revisions. The continuity of the chosen material should be thought carefully, rare kind of material selection should be avoided in the case of a possible repair since entrance places resist for a heavy traffic. Seems to be unnecessary, but an important feature that indicates the quality of the space, the upholstery of the seats in the lobby, should be easily changed. Lastly it is very important to remember that, the architects role on the initial design of the facility is obviously essential, however it would be preferred to seek for

architects that have the ability of controlling the space ability to adapt the possible future changes when designing by his initial decisions in the case of Turkey.

### II.2. Evaluation According to Design Criteria

Designing a component of a health care environment is to arrange the requirements that are forcing the process as the codes of the country and its municipalities, the economical positioning, the list of required functions, spaces needed relatively and the arrangement of these components within the space that at the end have physical and physiological effects on the users. The list of these criterions would lead to evaluate the entrance space properly, and this thesis is base on the evaluation of this process by the criteria obtained from the CIB Master List text to arrange this research in a consistent form. It is an internationally agreed list of headings for the arrangement and presentation of information used in design, construction, operation, maintenance and repair of buildings and building services, and in associated documents on the supply of construction products and services, their manufacturers and suppliers. The consistent headings related with the design process is utilized in the following paragraphs, beside the headings of criterion related with design from the mentioned list above, researcher has added some other issues since they are directly related and therefore needed in this process of evaluating the design of entrance space as a stage of health care facility planning. Therefore, the assessment of research, the financial and capacity planning, designing with the codes, functional programming, arrangement of space and the essence of addressing the humanistic design issues to the space would be held with defining the problems about such headings, the intended circumstances and the appropriate solution as well as the way to achieve it.

### II.2.1. Research-based design

One of the most important premises when designing each stage of health care facilities as entrance space design; since the complexity of the end product requires many junctions of many agencies in different levels, it should be confirmed through appropriate research due to preventing the unwanted influence for the whole system of the facility. In order to underline the problems related with the lack of the research, the importance and benefits, the characteristics of a reliable research and the expectations after the utilization of the solutions for the case of Turkey is explored.

The lack of research in health care facility design process may result with mistakes that can be very specific, such as failure to meet the licensing code requirement, or a design that is incompatible with the hospital's mission statement. Without obtaining the approximate number of the people enters to the facility, and the characteristics of the management, the common use patterns of the community and the relation of the component with the whole design understanding of the facility, the design and performance of the information desk cannot be satisfactory. Furthermore the probability to meet with technical problems like glare of light disturbing staff working in reception desk, the disturbance of the noise and insufficient ventilation because of the unexpected crowd in entrance place is relatively high. Therefore any problem driven through design whether technical or psychological might be reasoned to lack or improper research. Beside these consequences valid for Turkey, since there is insufficient research, every institution or investment seek for its own solution without being aware of the proceeding, developing technology, changing profession in medical education and their reflections to our country, the requirements when architecture meets with medicine, and finally own needs and expectations of architecture. Traditional minded or short term valid decisions regarding the futurist directions and the developments in the

technology of materials and systems would became a failure in building design within a few years and even building may require renovations which cause economical problems for the budget.

It is obvious that an appropriate research provides proper planning of functions, desired arrangement, and convenient technological knowledge to design each component as well as the entire space that means the initial goals of an architectural design. However, it gives chance to some essential points that a architect has to consider because of the specialty of the hospital environment. According to Charpman, Myron and Grant (1993: 18-20) design research can be examined in relation to five especially relevant trends in healthcare today: marketing orientation, recognition of the value and importance of health care facility design, sensitivity to the patient's perspective, recognition of the role of families and visitors, and emphasis on environmental accessibility. Furthermore, it seems to be essential to learn about what are the requirements of 'proper' design research that guides the each step of design through gaining the desired outcomes according to Charpman, Myron and Grant (1993: 23) .

In fact, in Turkey, architects have the ability of reaching to the information updated continuously with using the sources available from the internet or other media devices. However, people are still facing with failures in many aspects of facility designing process. One cannot be expected to be aware of all related subjects in the design with this kind of complexity and many numbers of givens at hand, architects should learn how to be guided by proper research in order to achieve the initial goals. Architects in Turkey should learn the essence of solid information in the designing process and integration of this study with the space created. It is obvious that this research has to be held seriously and the results should be examined as a whole argument affecting the whole components of design. Only through a properly done, serious research can indicate the chancing concepts of the market, the

requirements of the community, the possible appropriate technology to use through reaching what is aimed.

### II.2.2 Financial Planning

It is the way of things going on throughout the world, money establishes the initial concern for someone or some institution making an investment whatever its scope is. This title has covered the problems depending on financial considerations of hospital entrance environments in Turkey, and the possible way of analyzing the conditions that architects in. Also, the new emerging trend of atrium types of entrance spaces are explored within the cost effective means of designing, as well as the proper way of looking to financial situation in Turkey.

In the case of Turkey, for the public institutional facilities, those are serving under the authority of governments and related organizations; designing, constructing and renovating budgets are arranged with the program of related authority that brings up with the most economical and durable solutions possible. Furthermore, since there is much general expenditure, budget is arranged with many limitations for most of the times. Projects are either applied as a typical project or tried to be held within the minimum cost possible without giving any chance to be analyzed properly. This inevitably and definitely requires making a concession from components of the intended project. The fact that every line has a cost when designing such facility and since entrance spaces are accepted as the secondary spaces helping to serve the main aim, constraints usually bother some limitations on this subject.

As Marberry (1993: 47) stated, the words ‘low budget’ should be banned from the architects vocabulary. The key word in outstanding design has always been creativity. Designing to keep the bottom lines as low as it can go is simply a matter of expanding one’s creative thinking, while disciplining the mind. She believes that there are really economical ways to create beautifully

constructed health care facilities and so entrance spaces. Since architects create an atmosphere that affects the senses of patients and their families, the opportunity to be creative and to excel should be used remembering the idea that the basic needs of human beings don't change over time only details do. Marberry (1997: 50) expresses the challenge of keeping costs down has several benefits as pleasing the client resulting with new business, expanding design abilities in new directions and raising the one's confidence about ability to tackle innovative designs for each new project.

Another important subject to be considered about financial considerations is the construction cost of the atrium type entrances since it is on the agenda of the healthcare architects with many design opportunities. According to Bednar (1986: 74-77) the capital cost of an atrium building need not to be higher than that of an equal-area conventional solution. However, atrium buildings are generally more expensive due to a higher quality in construction, finishes and furnishings. Besides, over the life of a building, operational costs total far more than the initial construction cost. Thus, reductions in operating cost through conscientious design are often economically prudent whereas atrium buildings also have some possible increased operating costs and what are more significant maintenance costs. Hence, Saxon (1986: 159) claimed that atrium buildings can cost less to build than conventional buildings of the same size: they usually have simpler frames, less external wall, fewer elevators and stairs-and these savings more than offset any higher servicing costs.

Consequently, financial planning neither meant to choose the cheapest solution available nor the most expensive, however it is a planning process which the initial, maintenance and renovation costs of each element should be balanced in order to achieve aimed result within aimed period of time. In this specified place of health care facility, entrance space requires careful financial

planning with its heavy use pattern, being a place within a hospital but separated from it by its design, materials, lighting and many more.

### II.2.3. Designing with Codes and Standards

Turkish health care design environment lacks the related building codes directory that is expected to guide the planning and constructional process of health care facility projects. Therefore the problems faced because of this insufficiency by the users of the entrance space of the facility - that is to say community- and the issues that might help through dealing with this situation has been the subject of this title.

In fact, two authorities named as Ministry of Public Works (MoPW) and Ministry of Health (MoH) were responsible from the intended quality and functioning of these buildings. MoPW did not planned any specific codes, besides, the related department of MoH prepared a guide for renovated private hospitals to assure some necessary points which are essential, however it contain very generalized statements being away from evaluating many critical conditions. In spite of the rapidly developing technology used and complex set of criteria that emerges for the future satisfaction, the only codes published by the local municipalities for general use that is required to indicate what should be done seemed to be in a basic level, even did not mentioning about many complex stages of this problem solving process. Quantitative data is given; guidance for the quality does not exist. This is one of the fundamental reasons behind the lack of intended quality for these buildings. The process is left to the initiative of the architect and contractor, so this process of creating spaces that are built with a universally accepted criterion left aside, however people invent their solutions valid for that special case. In addition, ruling the procedures of the project is tended to be exploited by the people involved in the process because of the financial deterioration that Turkey is into. Furthermore since it is difficult to control this process in the rural areas of Turkey, MoH had

some typologies in case this requirement for the building and local authorities did choose what mostly suits with the conditions. This typology system regards the local circumstances, and it created a regular overview of the facilities through nation wide, echoes this hospital image with all of the properties, regarding the concept of exploiting this image to create healing environments.

When the subject comes to the entrance space, it could be indicated that, this problem of insufficient coding is also valid for this special space. Entrance space which is housing many functions requires clearly coding about arrangement of definite functions, capacity planning, entrance door location, its properties and some precautions for disabled use of the space. In order to standardize a minimum quality and quantity at critical junctions, this coding would guarantee the desired outcomes for the entrance space of hospital facilities that suffers from many insufficiencies. There seemed to be another problem with standards that have arranged some of the technical furniture in general use of the hospitals. However for the entrance space that have a very heavy use pattern, it was not possible to observe any interference about furniture, covering material of surfaces or any specification about the doors that are used by thousands of people each day.

Therefore building codes which regulates the critical problematic decisions and also facility standards that assure the minimum required comfort, quality and safety deserved by the whole community about designing and constructing the entrance facilities as well as the entire facility should be developed immediately for Turkey by these two ministries; it might be a collaborative work to clearly comprehend the complex criterion to be fulfilled.

### II.2.4. Capacity Planning

The initial question of architects to propose the covered area in a health care facility design does mostly involve the bed number of the facility it is

planned to house basically its capacity. This fundamental data outlines the sizing of this mass. The same approach might be valid for the component of this facility that is for the entrance space. This title here, explored the problems with improper capacity planning in entrance areas, the essence behind this arrangement to be done sufficiently.

Beside the property of being base information for minimum dimensioning of entrance space, the capacity of entrance space sets the number and variety of its functions contained. Since it had very heavy use pattern because of setting many different functioning such as registration, waiting, being a transitory space to all other departments of the facility, to arrange the minimum capacity is a very critical situation. Especially the ones that lead to the pre-clinical examination rooms are setting examples of most chaotic, depressing, inefficient spaces within the whole facility (Figure II.5.). An important another problem lies behind; it is the renovations taken in the facility in order to enlarging. Since there are new departments added to the hospital, the number of people using the entrance space is increased inevitably. However in Turkey, to increase the capacity of entrance space almost impossible in most of the circumstances because of many reasons like lack of flexibility through initial design and since it is not considered as an important space for the entire facility, on the contrary it is often pressed out by the neighboring departments.

Furthermore, Kızılcan (1996: 87) states that careful consideration of the capacity of the waiting rooms is an important concern. The main waiting room should have a capacity of one-third of all the people who would come for the maximum session of the week. This is based on the assumption that roughly one-third of the people would be waiting, one-third would be in the history rooms and the last third would be in the treatment rooms. In addition to the general waiting room, adequate number of waiting parlors for large family groups should be provided to distribute the people using the main lobby.

Therefore, any design cannot be evaluated as successful through lack of a carefully analyzed capacity it is expecting to serve for, so architects has to

II.5.A. Ankara Educational Hospital, Ankara.

II.5.B. Numune Hospital, Ankara.

II.5.C. Ankara Educational Hospital, Ankara.

II.5.D. Numune Hospital, Ankara.

Figure II.5. Entrance space designing with insufficient capacity planning.

comprehend the relation of the capacity of this space with its size, dimensioning, arrangement an so on. People entering to the facility would be staff if they use the same entrance space, visitors for a definite period of time and finally patients that are visiting the facility for examination, diagnosis,

temporary treatment or for a regular treatment or finally for staying in the hospital for a period of time. It still seemed impossible to give a formula about the number of people entering but a research about a similar situation may help to assume it. However, it is clear that entrance hall must be large of a size to match the capacity of the clinics which is easy to calculate the number of people in, since it is a distributive zone where patients learn the locations of the clinics. Precautions can be taken within this guess, like planning the out-patient department as a separate building so as its entrance in relation with the main hospital building, or designing many entrance to serve for same purposes that directs different route of approach. Finally, it could be indicated that, properly arranged capacity obviously allows architect to predict the physical, financial and psychological requirements of the space and it should take the deserved place in the list through design process.

### II.2.5 Functional Programming

Functional program means the defining of each different functioning space with naming them; process also involves the minimum space requirements in terms of numerical information. It provides an outline emerging with the requirements of the users, appropriate organizational policies and technology, and also present needs and future expectations of the space and the market. Within this content, the functional program provides a information base for the following step through designing the space with arranging the components, defining the relationships and proper sizing. As a result, in the developing paragraphs, the problems in arranging and realization of functional program for entrance space of health-care facilities in Turkey, the issues to be cared when designing such program and the list of the required spaces in entrance shall be discussed.

Entrance space in a healthcare facility obviously serves for many different functions beside this space leads the way to all entire functions going on through the facility. It tended to turn out to a chaotic space if related serving functioning and space separated to each had not planned appropriately. Since architects left aside a gap for the entrance space with a registration desk near to the entrance door, when facility came into use , all of these functions like place for insurance firms or paperwork, telephones, related amenities found their spaces within the sides of this gap, and finally lobby has located itself to what is left from these spaces. Another solution might be primitive structures basically stuck out onto the external wall of the building, near entrance space (Figure II.6.). However both of these improper and after planned positioning because of insufficient functional programming created additional crowd and such chaos through entrance area.

Figure II.6. An additional unit was constructed because of improper functional programming to Ankara Educational Hospital, Ankara.

In order to comprehend position and the essence of functional programming through the facility planning process, Alp (1979: 4-10) can be referred that explained the stages of this process as below:

1. Processing of information;
2. Assessment of needs;
3. Determination of the operating policies and level of technology;
4. Determination of the required capacity of the facility;
5. Functional decomposition of the operating system;
6. Determination of the specific area and space requirements – preparation of the architectural design brief;
7. Design of the facility.

While starting to a design of this complexity, entrance space is required to be carefully and sensitively decomposed with the detailed information at hand in order to arrange a long term functional plan and healthy relationing with proper sizing among entire services. Therefore according to the researcher, if there is no other special purposes that will locate themselves in the entrance area the functional program of entrance in a health-care facility shall be separated into these components in terms of proper functioning :

1. Access to the building through the campus, car park, or the path from the main road;
2. Entrance canopy and drop-off area;
3. Information or/and reception desk and notice board wall;
4. Main lobby;
    4.1 Children play area;
5. Toilets;
6. Telephones;
7. Related amentities;
    7.1 Cafeteria or kiosk;
    7.2 Newspaper kiosk;
    7.3 Food and vending machines;
    7.4 Pharmacy;
    7.5 Gift shop;
    7.6 Administrative offices, clerk offices;

7.7. Insurance company offices;

8. Circulation areas;

9. Access to main corridor, elevators, and stairs.

Finally, it should be remembered that each function covers series of other side functions, so to place something arbitrarily to the entrance may cause a lot of flaws in terms of other initial thing carried out within. A good working functional program based on detailed information about the process would lead to a appropriately functioning entrance space that is much desirable for a well-functioning health care facility.

### II.2.6. Arrangement of Components in Main Entrance Space

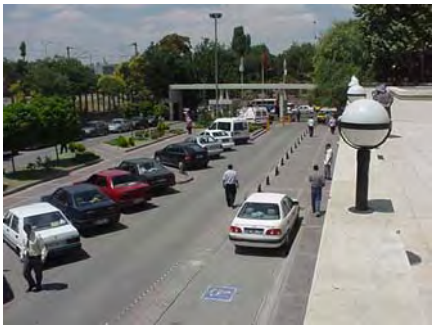
The arrangement of the components in entrance space presents the essence of designing since space come into reality through making use of all this knowledge base that is discussed in the thesis. Within the scope of this title, starting from approaching to the facility; step by step each stage of experiencing entrance space by means of arranging components is explored. Each case is covered with problems faced into, also the requirements of that case is searched and each have finalized with adapting the issues as most convenient way to the entrance environments. These steps might be counted as arrival to the facility, experiencing parking facilities and drop off spaces, placing reception and information desks, exploring the main lobby, places for snacks, and patisserie kind of treatments, placement of telephone boots and location of toilet spaces.

Traveling to the facility from home to the entrance door of the hospitals sets the first stage of this experience. Within this experience, health care facilities suffer from many kind of incompetence. The land is a quite valuable source for a health care settlement in Turkey, therefore facilities have been located in a quite restricted space within the cities, and occasionally settling parking facilities is a subject that is neglected through design process because

of insufficiencies. Therefore, as approached to the facility; problems of healthcare settlements begun to emerge. In Başkent Hospital case whose construction has ended in 2000, since there is not any appropriate space around the hospital location, parking lot is designed 300 mt away and completely apart from the facility within Bahçelievler district. In Güven Hospital case, there is not any specific area of parking, therefore the sidewalks of the main street is used as parking lot, if it is possible to find any place to do so. Within Numune Hospital case, parking lot is located in a very limited area; also parking is only possible with a fee paid to it. In all entire cases that have a planned apart parking lot from the facility, features as a planned parking area, a safe secure and well illuminated road leading to the facility mostly did not exist. As approached to the facility, whether from parking area or on foot through main gateway, many healthcare facilities do not facilitate a pathway through entrance door, that might convey negative messages and quite possibly contains many difficulties through the access to the entrance doors (Figure II.7.).

In fact, it should be understood well by the architects that, travel to the facility area includes many different kinds of experiences and many different travel distances. Environments including both outdoor and indoor spaces should be easily navigated and legible to a wide variety of visitors, including local residents who have some familiarity with the hospital, first time visitors, out of town travelers, disabled people, children and those who can not read Turkish. It might be by the help of an ambulance if the patient's situation is critical or by a car, taxi or by means of public transportation. The important point is trying to consider all of these possibilities. Charpman and Grant (1993: 36) points out the importance of considering, each of these modes of transportation, as well as the provision of parking areas, taxi stands and bus stops when the facility is designed. Furthermore the facility architect has to consider that this journey to the hospital has done by a person who has got

stress or physical duress because of their relative's illness and/or because of the unknown processes that has proceed. Difficulties can be disastrous since the anxiety of the client is already up norm; so the exterior physical environment



II.7.A. Hacettepe Education and Research Hospital, Ankara.

II.7.B. Numune Hospital, Ankara.


II.7.C. Numune Hastanesi, Ankara.

II.7.D. Güven Hospital, Ankara.

Figure II. 7. Inappropriate parking space arrangements.

has to be designed to give positive supporting physiological messages more than anywhere else. This travel might be involved following modes of transportation indicated below:

1. Arrival on foot;
2. Arrival by means of public transportation;
3. Arrival by an ambulance;
4. Arrival by a taxicab;
5. Arrival by car.

To ease the arrival on foot to the facility, the exterior signage and the location of the campus gateway should be placed properly; access from the roadway should ease the arrival. Furthermore when arranging the location of this main gate the location of the closest bus stop should be held carefully. From the campus through the building travel on foot has to be experienced through a well maintained landscaped entrance with a well lit safe route such as a footpath beside a road clearly leading to the main reception or information point as explained by Hosking and Haggard (1999: 53). Traveling by means of ambulance or taxicab often don't need any additional help since the route is accepted to be known by drivers and this journey finalized in the drop-off area of the hospital.

A large amount of patients or visitors prefer car as their arrival to the hospital, architect must examine the possible experiences and survey about the operational and environmental support they need. Proper exterior signing that is explored in detail, the location of the hospital and the location of the main entrance, the parking possibilities like the amount and the cost of parking, the parking facilities of the disabled people, and the environmental factors that affects the route of the arrival has to be investigated. In addition to the factors that are stated above, arrival by a taxicab also involves to consider the possibilities to find the numbers of the taxi near the telephones or to the main information desk. Finally the essential information of the public transportation has to be available in the facility and the way to the closest bus stop to the hospital must be easy to find out in order to ease the job for the people arriving by means of public transportation. Furthermore, when patients and visitors

leave the health-care facility, they have also needed comfortable, accessible, weather protected, safe place to wait for their bus to pick for the trip to home.

Parking facilities is another necessary issue when making one's way to the entrance for the people used their car through this journey. Designing the parking lots and the relation of this structure with the exterior and the complex is a difficult task to be succeed which the safety, physical comfort, convenience and accessibility features & policy issues should be considered. The topics like location, security, organization and lighting features of the parking lot, a safe, well illuminated and sensitively designed path leading to the entrance should be handled with special attention. Valet parking is a decision prevents difficulties of searching for parking, walk long distances from parking lot, and carrying heavy luggage in the way to hospital. Also they greet and assist the patient and visitors when they are in need. Moreover, parking structures are becoming an essential need for the large medical complexes, in order to use these structures, they should be safe, well lit, well designed and maintained, easily driven, and consequently easily accessible.

In order to make the main entrance easier to identify, and also provide weather protection for people getting in and out of cars, hospital facilities should have a covered area at the main entrance where patients and companions can be dropped-off and picked up. Some of facilities do not contain any protected area such as drop off area (Figure II.8.) which hardens to identify to notice the entrance door that also creates some severities for user group as vulnerable from weather. According to design an adequate 'drop-off' area some points have to be taken into account. First of all, providing easy-access to the drop-off area from major roads leading to the facility is essential, a circular drive can form one reasonable alternative. Location of the drop-off area should be immediately adjacent to the front door and a sheltered access to the building should be provided whenever possible. Providing ample parking near the main entrance and marking the route to the parking area with clear

II.8.A. Ibn-i Sina Hospital, Ankara.

II.8.B. Ankara University Cebeci Hospital, Ankara.

II.8.C. Numune Hospital, Ankara

II.8.D. Ankara Hospital, Ankara.

Figure II.8. Main entrances without shelter.

signage, also separation of a room for a taxi stand near the main entrance that has created congestion in the drop-off area, or a system by which taxis can be called when needed can be very helpful. When the volume and the mobility characteristics of patients and companions warrant it, stationing an attendant at the drop-off area throughout the day to assist people making their way between their cars and the building entrance might help much (Figure II.9).

The travel from home to the facility entrance area is finalized at this point and the interior experience of the hospital begun. However, within many of Turkish health care facilities, when entered to the hospital, a chaotic space

that is crowded and arbitrarily arranged has been met by the user. To follow correctly the route leading to the stairs or elevators even with a –you are here- map if there is one, became a problem of its own. The short term planned decision making, usually, creates spaces that is hard to comprehend since it is difficult to talk about an overall organization for this kind of spaces.

II.9.A. Memorial Hospital Addition,
Seymour, Indiana (AIA, 1996: 110).

II.9.B. Memorial Hospital Addition,
Seymour, Indiana (AIA, 1996: 84).

II.9.C. Hacettepe Education and Research Hospital, Ankara.

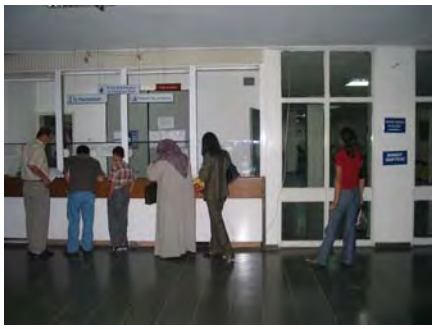
Figure II.9. Proper design of approach to entrance spaces.

In many ways the entrance sets the tone for the health-care facility. It makes an initial statement about the facility and welcomes the user. It provides a transition zone from the exterior to the interior environment and according to Anita Olds (1985: 105) the entrance to every healing space should have a torre or a Japanese arch, signaling the transition from profane to sacred territory from that which is spontaneous and ordinary to that which is spiritually and aesthetically integrated. As Malkin (1992: 68) states the lobby is the patients' or visitors' introduction to the hospital, and the design of that space sets expectations for the quality of clinical care. The entrance is also a place for people wait for transportation to communicate with the others, and to become oriented to the layout of the facility. Therefore, when a person enters to the facility, s/he wants to know where to go. The lobby and the hospital's main artery corridors must be architecturally legible and readily navigated by a wide variety of visitors, including local residents who have some familiarity with the hospital, first time visitors, out of town travelers, disabled people, children and those who can not read Turkish. As a result, the overall organization must be clear and simple, all services and their location should be legible from the entrance point for all previously mentioned user groups. Besides within a proper arrangement, user groups should have felt that the healing experience has already begun.

Another important criterion of sufficient entrance space arrangement is the proper positioning of information and registration desks. The function of an information desk -as it is in the name- to inform the people about a variety of functions going on the complex. The clear organization of information desk big enough in size and well enough in organization that means properly staffed and clearly located seemed to be underestimated by many architects in Turkey (Figure II.10.). Whether for operation, orientation or a service to serve appropriately an information desk has to be placed in according with some principles. Providing direct visual access to the information desk from the main

entrance is important for patients, visitors and also for the staff working in information desk in order to distinguish one that enters.

As patients and visitors stop, the area surrounding the desk may become crowded. Thus, the surrounding circulation area needs to be generously designed to prevent congestion. Also some management techniques can develop the efficiency of functioning of this desk. Providing special training to staff for giving uniform directions at the information desk can be very useful in preventing the confusion of the users. Providing customized maps that patients



II.10.A. Ibn-i Sina Hospital, Ankara.

II.10.B. Ankara University,Cardio Vascular Surgery Hospital.

II.10.C. Ibn-i Sina Hospital, Ankara.

II.10.D. Numune Hospital, Ankara.

Figure II.10. Insufficient reception and/or information desk designs.

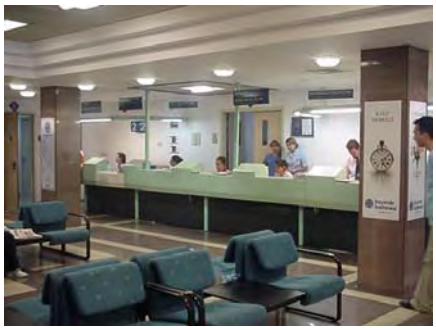
and visitors can take with them and marking the initial destination on with explaining the proper direction would give a great opportunity to prevent further congestion. There may be areas to store belongings of people who are traveling many clinics for hours.

After getting necessary information, the following point that admits the patient is the reception point. Therefore, reception desks might be designed in combination with the information desks to inform people about what they should do, where should they go and what happen next, however if the entrance is embraced a wide capacity, this multi purpose desk may create unnecessary crowd. Admitting functions may be united in reception, which require patients and their companions to wait, fill out forms, to have interviews with the staff, probably visit a few services before settling in a patient room an a way registration to the facility. Furthermore the reception point needs to adjoin the store of patients' records and is sometimes combined with it; rapid retrieval of records is essential, and so is their confidentiality. Moreover, especially within the facilities that has been run through formal authorities and organizations; because of the high number of procedures that should be completed for registration or any other purposes that is held through the entrance space there are many units serving as registration desks. These units either might have interpreted as independent kiosks or very long desks serving for many purposes generally placed through the main arteries of the entrance space and quite often their placement lacks organization since each unit have been placed without serious and long term thought behind when the need arises. Besides, since they are surrounded with a high number of people during day times of the hall leading to other services became too crowded with stressful people who might not knew what to do. Therefore the current insufficient scene of the entrance space might directly be related with these consequences (Figure II.10.) Furthermore some of these desks or kiosks had a small opening that is designed to exchange paperwork and make it able to hear

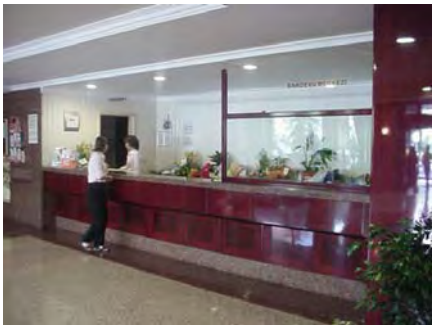
the dialog in between; however, this kind of a treatment seriously contradicts with the image of the facility that has to prior and protect human.

In relation to the statement that health care facilities are often thought of as somewhat inhumane places where patients are impersonally processed rather than treated with special care; the reception area can play an important role of a more caring image. The circulation pattern created by the reception desk, nearby seating and carpeting, the reception desk's proximity to other spaces, as well as the interior architectural design of the reception and the waiting area influence the image projected. Charpman and Grant (1993: 109) stated the points to take into consideration when designing a reception desk.

II.11.A. The John Hopkins Outpatient Centre, Baltimore, Maryland (Miller, Swensson, 1995: 5).



II.11.B. Bayındır Hospital, Ankara.



II.11.C. Güven Hospital, Ankara.

II.11.D. Memorial Hospital of R. Island, (Whitehead, 1995: 147).

Figure II.11. Proper reception and/or information desk designs.

Firstly as placing the desk so that a queuing line does not infringe on the waiting and circulation areas and screening patients visually and acoustically between registration stations by providing partitions or boots is some essential points to consider. Besides, the personal nature of much of the information discussed in the admitting department requires patients that should be able to feel that their conversations with the admitting staff haven't been overheard. To help ensure acoustic privacy, provide private offices, tall partitions, or spatial separations of task areas might be useful according to the authors. Thirdly, staff and patients need a comfortable conversational distance between one another; so avoiding obstructions might contribute greatly to organize this relationship well (Figure II.11.).

According to the researcher, if there is much procedure and paperwork to be completed for a healthcare facility, a rather space within the entrance hall, but separated functionally but connected visually should be designed in order to not to disturb the other functions of the hall, since there is a serious number of people waiting around these desks during daytime (Figure II.12.). Q-matic type quake planner machinery might contribute greatly to this kind of organizations. If architects in Turkey would took this kind of precautions, entrance halls gain more organized and calm vista within the rest of the facility.

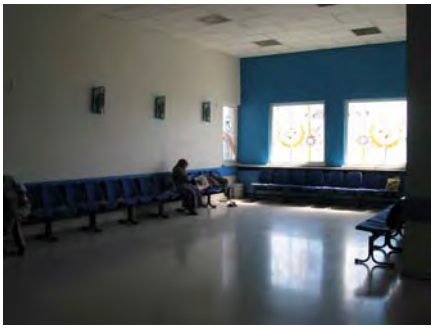
Figure II.12. More personalized registration arrangement within entrance hall, Memorial Hospital addition, Seymour, Indiana, (AIA, 1996: 110)

Another public space is the main lobby which located at the entrance space that serves especially for waiting purposes. Furthermore it is a public space as stated below a variety of the people use the main lobby, inpatients well enough to walk a bit for a change of scene, family members awaiting news of a loved one in surgery, a friend waiting for a patient undergoing an outpatient test or a procedure or those who wants to get away from the waiting areas on the inpatient floors, children accompanying visitors, staff and others who have business in the facility or people with their special needs like elderly or handicapped people. Besides those real serving functions, it serves for symbolic functions as mentioned before. It is an introducing space to the facility; therefore ideally, the lobby is projected an image of a competent, professional health-care facility sensitive to its users.

Through Turkish health care facilities, lobbies within entrance spaces, are generally planned where it has seemed as convenient after other functional units were been located. Their arrangements were usually coincident, and far from a notion of sensitivity. In fact, they generally seem too stuck in between the people going around in a hurry. Among the cases that is searched on, it is not encountered with a one designed with an adjacent children play area. These circumstances of lobby spaces might be physical as not being able to find somewhere to rest a bit, or psychological that might been captured an image of not being cared by the facility itself, since such a peaceful atmosphere is underestimated by the providers itself (Figure II.13.).

In order to serve for these real and symbolic functions, lobby arrangement should be planned carefully. It is the preference of many people in the main lobby; they like to watch people going by without putting themselves in the middle of the traffic. That’s why; lobby should be located where it has a visual connection with registration functions and where it had a clear view of

stair, elevators, and main circulation routes. It would be better to organize it as a multilevel lobby that provides a variety of spaces to explore as Malkin (1992: 59.) claimed.



II.13.A. Hacettepe Education and Research University Oncology Hospital, Ankara.

II.13.B. Ibn-i Sina Hospital, Ankara.

II.13.C. Ankara University Cardio-vascular surgery Hospital.

II.13.D. Main Lobby Ankara University Hospital, Ankara.

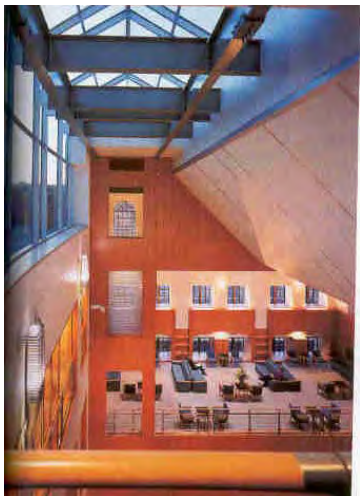
Figure II.13. Improperly arranged lobby spaces.

Furthermore Cox and Grooves (1990: 20) suggests that, since lobby space tends to be overcrowded at specific times because of all these procedures going on, it can be helpful to divide the space into separate wings or bays to reduce the scale. It is also more peaceful and can help reduce the risk of cross-infection.

Another essential feature of the main lobby is the proper arrangement of the main component of the lobby; naming shortly as seating groups. If the results of the researches shall be summarized these following points would be considered to help for appropriate arrangement:

1. Seating has to be enable people to arrange themselves in groups of different sizes.
2. Lobby seating must be arranged as the waiting people inside the lobby can see cars driving up outside in the drop off and picking up area.
3. Seating has to enable the people to position the bodies comfortably for conversation with regard to both the distance from one seat to another and the angle at which one person can face another.
4. Seating has to accommodate a wide range of users (elderly, weak, who cannot sit for long periods of time in backless chairs etc.).
5. Seating should be grouped to provide privacy.
6. A variety of seating options allow visitors to select ones that satisfies individual comfort requirements.
7. In addition to the general waiting room, adequate number of waiting parlors for large family groups should be provided. Large family groups that are under stress may become very emotional. They would be more comfortable if they are moved to a separate room, and the other visitors in the main waiting room would also feel comfortable.

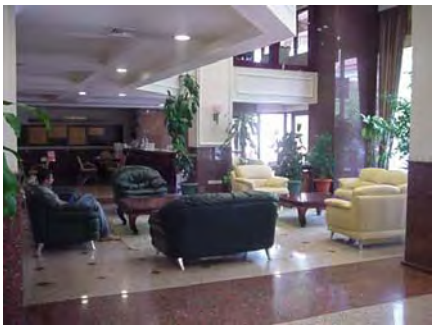
The lobby should offer some diversions such as television, newspaper, brochures and other reading material. Music might be provided in such areas. Access to nature and artworks can be very helpful for people waiting in stressful conditions. Finally, a well organized, peaceful and sensitive lobby arrangement that serves for all user groups including disabled, children and elderly whose needs have explored in the following titles, would contribute greatly to the overall understanding of hospital within all user groups (Figure II. 14.).



II.14.A. Carl j. Shapiro Clinical Centre Cancer Center, Massachusetts (The Images Publishing Group, 2000: 85)

II.14.B. John and Dorothy Morgan Pennsylvania (AIA, 1996: 52).

II.14.C. Mary Washington Hospital Virginia, (AIA, 1996: 78)



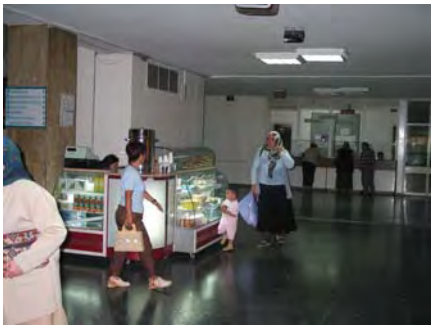
II.14.D. Güven Hospital, Ankara

Figure II.14. Successful arrangement of lobby within the entrance hall.

It should be accepted that, for visitors and outpatients who have to wait for several hours, snacks can be helpful until they have a chance to get a proper meal. Solutions might include drinking fountains, vending machines and other amenities adjacent to the lobby. Even the quality of the food in these machines is poor, the machines near waiting areas could be urgent in many situations. In some cases of current entrance halls, there might have an insufficiency about the place for food activities (Figure II.15.).

II.15.A. Mobile food stand, Traffic and Travmatology Hospital, Ankara.


II.15.B. Food Kiosk, Numune Hastanesi, Ankara.



I.15.C. Food stand, Ibn-i Sina Hospital, Ankara.


II.15.D. Food Kiosk, Ankara University Cardio-Vascular Surgery Hospital, Ankara.

Figure II.15. Improper arrangement of food stands and kiosks within entrance space organization.

Therefore a temporary buffet or ordinary cabin used as a buffet for some of these facilities. However this arbitrary and temporary arrangement usually disturbs the overall organization of the hall both physically and aesthetically. Besides their maintenance sets another problem for all types of these arrangements, this kind of an existence seriously contradicts with the image of a 'healthy' health care facility (Figure II. 16.).

II.16.A. Numune Hospital, Ankara

II.16.B. Ibn-i Sina Hospital, Ankara.

Figure II. 16. Insufficient cafeteria arrangements.

Since hospitals can be very wide in capacity, so enormous in size and complexity, or may be for some financial considerations, they may have patisseries, coffee shops, sandwich or newspaper and magazine kiosks which can be included trough entrance space apart from the main cafeterias or restaurants. However if they are place in the entrance area, the most important concern is preventing the entrance space to become a chaotic space with overcrowd of people and a mass of different functions. These facilities has to be secluded neatly from the main corridor, and proper ventilating of food spaces as well as the control of the excessive noise within these facilities should be properly designed. Sunken or mezzanine floors arranged for only serving these kind of purposes or a separate corridor linked to the entrance

spaces could be very challenge the modest type of facility designing (Figure II.17.).

II.17.A. Güven Hospital, Ankara.

II.17.B. MD Anderson Cancer Center, Texas, (The Images Publishing Group, 2000: 100).

Figure II.17. Properly arranged cafeterias & shops through main entrance spaces.

Designing the location of toilets might be another challenging design work for the architects. Through the entrance halls of the healthcare facilities, they have been placed usually adjacent to the walls of the main circulation route generally without a corridor that sets as a buffer zone of these toilets from the entire hall, a mobile partition has emerged as a usual to the privacy problem of these spaces. However, this solution became a problem for entire hall, since it disturbs the circulation route physically and aesthetically (Figure II. 18.). Therefore, some requirements has to be satisfied like making all public rest rooms accessible from hallways rather than through waiting areas, providing electrical outlets (for electric shavers and hair dryers), making them wheelchair accessible, providing several clothes hooks in each rest room, if space permits, providing a comfortable chair in order to arrange it properly would be very helpful. Besides; proper maintenance, hygienic and clean look of these toilets is a difficult but essential concern for these facilities that serves health to the community in order to establish a sufficient example.

II.18.A. Bayındır Hastanesi, Ankara.

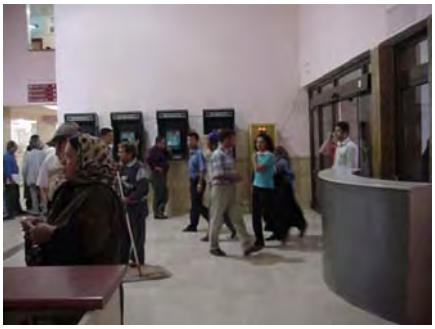

II.18.B. Traffic and Travmatology Hospital, Ankara.


II.18.C. Ibn-i Sina Hospital, Ankara.

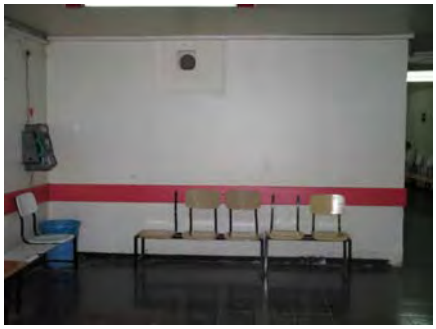
Figure II.18. Insufficient W.C. arrangements within main entrance.

Public telephones provide an important source of contact with the outside world. So facility must held public telephones to give the chance to the user of building. Main lobby should be facilitated by a telephone that can be used by the public. However, telephones without any closure or without any specific and partially apart location away from the crowd and noise of the hall established a usual problem for entrance hall designing. Their privacy has interrupted and crowd around them also interfere with the circulation since they are placed just inside the main hall without any precaution (Figure II.19.). Therefore, in accommodating these phones Charpman and Grant (1993: 120) suggest some points as locating public telephones outside of, but very close to

public waiting areas and using semi enclosed public telephones in or near waiting areas with visual and acoustical barriers between. Moreover, provide a writing shelf, lights, seats, and telephone books whenever possible would be very useful.



II.19.A. Public telephones located just within the entrance hall, Numune Hospital, Ankara.



II.19.B. Public telephones located just within the entrance hall, Traffic ve Travmatology Hospital, Ankara.

II.19.C. Public telephones located within main circulation route, Ankara Educational Hospital, Ankara.

II.19.D. Public telephones located just to the exterior of the entrance, space, Hacettepe University İhsan Dogramacı Children Hospital.

Figure II.19. Inappropriately located telephones.

For some of the entrance spaces in Turkey, the place of notice boards. and the way to inform people by these boards seemed to be overestimated through design process (Figure II.20.). Hosking and Haggard (1999: 96) suggested that, when placing these items the first step is to ask staff their requirement and also observe them working to see exactly where they need notice boards. The second is to supply larger boards than possibly needed, might be corner to corner on specified walls, dividing them with clearly printed headings into the main areas needed.

II. 20.A. Güven hospital, Ankara.

II. 20.B. Hacettepe Oncology Hospital, Ankara.

Figure II.20. Improper notice board arrangement within entrance space.

Finally, since entrance hall enclosing all these activities mentioned above, serve also as a transition space containing circulation routes leading to the all entire services of the facility, if consistent overall organization principles that contain long term decisions were not taken, within a very short time, it might turn into a chaotic space, a maze with many insufficiencies. Through initial arranging process of entrance, to handle the subject systematically and to arrange a simple plan with enough sensitivity and humanism that is quite absent through Turkish health care environments has been displayed as a necessity when serving to a community that is already stressful with the conditions of their own.

### II.2.7. Planning with Humanistic Design Criteria

#### i. Barrier-Free-Design:

Every individual has the right to have ease of access to any public building. Although barrier-free design is commonly associated with the environmental needs of disabled persons, it is much more universal concept, in its application. The three major components of barrier-free design might be defined as: functionality, safety and convenience.

First of all the entrance space environment must meet the functional activity needs and preferences of potential users and must be responsive to user capability. The component of functionality entails a concern for utility in arranging activities of similar or interdependent relationships in a functional manner. Secondly, the environment and its component parts must be safe for potential users which means the environment and the products comprising that environment should not do bodily harm and damage to its users. Last component is convenience which denotes the suitability and agreeability of the environment to needs and purposes. For example, accessible and usable transportation station facilities are not suitable and agreeable to the user if those facilities are not in close proximity to the respective transport vehicle. By incorporating these three elements of design, our man made environment would not only be barrier-free but would be functional and usable for all potential users. Within the scope of barrier free design, the problems are defined and explained that are met in Turkish health care environment about the topic, the special needs of these groups for their comfort in the entrance area of a hospital facility is covered and the properties of the indented design is stressed. These topics are differentiated within three titles in order to organize these three groups of requirements:

1. Designing for disabled
2. Designing for the aging population:
3. Designing places for children

- **Designing for Disabled**

The complexity of designing health care facilities today derives from the fact that these facilities through their design, management and organization principles should care and support the community well being both physically and psychologically. As a result, this sensitive attitude should cover the fulfillment of the requirements of disabled people who were in need of this level of sensitivity much more than ordinary people. Therefore this title covers the insufficiencies that were experienced by disabled people and the issues that has to be considered when designing such spaces. In Turkey, many entrance spaces are out of access for this group of people. The desks and other main functional elements like telephones, lobby seating and even toilets don't have the sensibility in their designing in order to be used by these people without an additional help which displays as lack of respect to their well being. Furthermore the only disabled people whose condition is considered rarely as the one who is traveling by wheelchair, however it should include people who are vision impaired, hearing impaired and so on. According to the researcher design criteria of disabled people might contribute these issues as stated through next paragraphs.

The major points to evaluate designs accordingly might have started from the arrival to the campus of the facility. First of all, in order to direct disabled persons to reserved parking areas, to specially designed routes and drop-off areas facilities independent travel should be signed clearly. To avoid unnecessary confusion, the international symbol of handicapped access should be used consistently. The parking space should be wide enough open the car

door in the fullest position (3.6 meters; vans need 4.8 meter). Within the parking space to the entrance of the facility, a route or a sidewalk with minimum width of 1.5 mt. in order to allow two wheel chair pass, should be reserved with the elimination of obstructions (such as grates) that may catch wheels or crutches; benches and other street furniture that may harden manoeuvring should be kept away. It might preferably snow free and the use of brick and other uneven paving materials that might create a bumpy ride for patients and wheelchairs should be avoided. If the complex involves a parking structure it is important that a wheelchair user be able to enter the elevator: lobby and an elevator should be wide enough to accommodate it. Control panel of the elevator must be in a height that a wheel chaired person can use. If there isn't any elevator, properly inclined (1/10 sloped) ramp should be involved.

Moreover, for vision-impaired person, changes in the floor texture of the route to the entrance may help great for the independence. Also the physical barriers or obstacles should be removed from the side-walks or the route to the hospital. Appropriate signage is very important for the hear-impaired people to came safely without confusing to the hospital entrance. Furthermore, a passable doorway by someone in a wheelchair or by someone who is vision-impaired should be designed. Turnstiles and revolving doors, for example, may prove hazardous to those who move with some difficulty and may be inaccessible for someone with a wheelchair or pushing a baby stroller. Another solution may be arranging the dimensioning in order to make the doorway passable by these people. Besides entrance doors that can be easily opened by people with little upper-body strength should be provided. The force needed to open a door does not exceed 3,5 kg. Automatic doors that open with a pressure-sensitive mat or an electronic-eye may be a good compromise between ease of accessibility and safety during windy conditions. Another point might be avoiding obstructions at the entrance way, as mud mats and pressure-sensitive mats that flush with the floor might help. This allowed a wheelchair to manoeuvre over them easily. In addition, providing space out of

the flow of traffic for storing wheelchairs may help much if possible, and convenient location might be a space within or near to the information desk.

The next step was designing information desks that should be made accessible and welcoming to all users. The desk should have a portion of the counter low enough 76 to 83 cm high- for wheelchair users to talk comfortably with staff or to fill out forms. Registration desk or reception area should be designed to accommodate wheelchair users and others who may need to sit, including counter space at appropriate height. Furthermore, flooring of the waiting area must suit physically disabled people, dampen the noise and be visually appealing. Another important point is to provide semi or full enclosed, handicapped accessible boots in the entrance hall. Additionally, some public telephones with amplifiers for the hearing impaired should be provided. Arranging disabled toilets have seen as an essential point in order to design appropriately for disabled use. Finally, arrangements should be sensitively done to access and accommodate in the main lobby as providing wheelchair space among the seats of the lobby.

Health care facilities in Turkey only might serve properly to the community if they could realize how importance to respect and treat all individuals and their requirements equally. Disabled people should access the treatment they are in need without an obstruction and they had to feel as they are a part of this community. Through a proper design, sensitively held in order to adapt their use pattern within daily life in the facility starting from entrance space, this aim could be fulfilled.

- **Designing for the Aging Population**

Since aging population is making increasingly extensive use of health and hospital facilities, architects should standardize the public facilities also for the aging population in Turkey for the entrance spaces. Since entrances are

very crowded and might be difficult to travel in; there are some guidelines to facilitate these people into the space which would be within this title according to the researcher.

First of all, for the people with failing eyesight, particularly the older ones, the usage of contrasting colours or intensities may help them to negotiate the environment, especially at edges. Therefore avoiding may be helpful to those blues, greens, and neutral colors, which are aging eye, may have trouble distinguishing among. Secondly, acoustically optimal environments that incorporate sound-absorbing materials should be designed; acuity of hearing tends to diminish with age, and some persons have difficulty distinguishing spec from background noise. Thirdly, higher illumination levels and diminishing glare should be provided where uneven lighting should be avoided. Large, clear letters should be used for signage with avoiding lighting in the background of signs. Lastly, ample seating should be provided, with arms for ease in sitting and rising that might cause additional comfort for those people.

This idea of the creating community integrated health care facilities and for designing entire communities around healthcare, means achieving a level of coordination and integration impossible in the traditional hospital setting and in the context of the traditional relations between hospital and community in the case of Turkey. Therefore to set this kind of integration to respect the requirements of elderly emerges as an essential point to be considered carefully by the designers of the entrance space.

- **Designing Places for children**

The predictable presence of children creates special design requirements for their usage especially for waiting area that is to say the main lobby, enable parents and children to wait comfortably without bothering both

themselves and other adults. When designing small play spaces for children within adult waiting areas, planners should consider the following suggestions according to researcher:

Firstly as mentioned through paragraph above it is necessary to create a play area in the most protected part of the room, out the circulation flow. If only a very small space is available, filling it with a sunken area, a partially enclosed area, or a raised platform might be a proper decision. This play area should be good visual and auditory range for the perception, so that receptionist can act as a tacit supervisor. Also, placing some adult seating clusters facing the play area and some directed away from the play area enables adults to care for their children. Besides considering some multi-person seating without arms, like couches, to enable a parent to comfort or hold a child would help greatly for the adults. In addition, using sound attenuating materials in the waiting area might became as a necessity in order to ease the acoustical comfort for the entire people using the main lobby at the entrance space.

This kind of an arrangement within the main lobby would be very helpful to loosen the stress of the patient or visitors who are stressful already, and even pleases the staff while they are trying to do their job in this crowded area within the noise of the community in (Figure II. 21.).

**ii. Communication**

Communication is the way of having relation between the facility and to the community it serves. People feel much comfort and relaxation when feels that s/he can find the answers to whatever the question is, and the healing process begun immediately. That’s way entrance seems to be the most appropriate space to start with. Through this title, the understanding of this concept and improving the ways of communication within Turkish hospital entrance environment will be discussed

II.21.A. Public space called ‘pedi dome’, MD Anderson Cancer Center, Houston, Texas (Komiske, 1999: 53).

II.21.B. Children play area, Childrens’ Hospital of the King’s Doughters, Norfolk, Virginia, (Komiske, 1999: 68).

Figure II.21. Properly designed children play areas within hospital main lobbies.

What the user see, hear, smell and fell within a built environment combines into one symbolic image for that individual which establish the way of communication within that place and this individual. That’s why the overall organization of the entrance space as well as its functionality, safety and its aesthetic helps this process. However there was another important factor. The spaces are functioning with the operators and users, and therefore this communication concept covers the elements of well designed space as well as well administrated space. The essences of staffing within the image of the space came into realization at this point. The aesthetic, cheerful, functioning and well maintained entrance space organization is the subject of the entire thesis since there are many problems faced in relation with these topics, However staff attitude of entrance environments sets other problems for its potential users. Designers and providers generally skipped over the fact that, in order to convey positive messages when communicating with the community, the attitudes of the security staff, receptionists and other responsible might be cared with great attention starting from their costumes to the smile in their faces.

The following ideas are suggested by Kızılcan (1996: 86) in order to solve the communication issue for the entrance space in the hospital facility:

1. Provide a reception and information center. There is no information device or system that is nearly as helpful or supportive as a knowledgeable individual to provide information and assistance. Even if cannot be staffed at all times, there should be an obvious center where the newcomer can turn for information. It should be adjacent to the entrance and clearly visible to anyone entering.

2. Provide a lounge seating area. Admission procedures are sometimes time consuming. Since many patients are accompanied by friends and family, there should be some places where they could muster and wait as a group;

3. Avoid an austere or institutional manner. The transition from home to hospital is unsettling. To enter directly into an environment that may be read as remote or disinterested only adds to the stress. There are some parts of a hospital that are unavoidably sterile, technical, and frightening, but the entrance lobby is not one of them. The lobby should be comfortable, the colors should be cheerful, the lights should be bright, and everything in the lobby should be immaculately clean;

4. It would be inappropriate to give the lobby a residential character. Patients come to the hospital because they have problems that cannot be taken care of at home. The hospital is a special place and should give patients the feeling that they have put themselves in the hands of an organization that has the knowledge, the experience, and the competence to take care of them. The hospital should create the impression of friendliness and concern but also competence and efficiency.

All these issues covered above should be considered with proper staff attitude to the users since the after image of the communication with the space

and the user has been set within a combination of space quality, functionality and comfort and the quality of service that is served by the personnel to the community of the entrance space, which determines expectations for the entire facility.

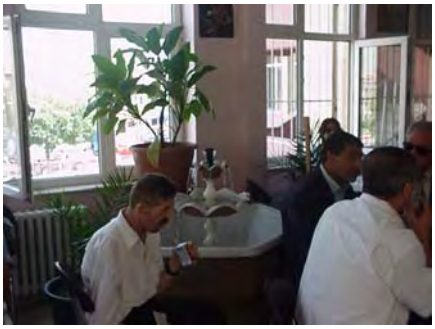
**iii. Aesthetic Factors**

Aesthetic factors relate to a variety of elements contributing to the overall appearance of the setting, its colors, design themes, and visual impact. . The overall results of aesthetic environments is physiological, it helps the recovery process of people and motivate the staff to get more sufficient work. This thesis will cover some specific problems in dealing with the task and also despite it is difficult to define all issues obtaining such an environment since it a subjective topic; some features are mentioned since they may help to orient designers in this difficult task.

In some of entrance space designs, many specific problems might be observed since space is not designed and maintained with enough sensitivity and care within healthcare facilities. First of all, overall organization of the space generally did not contain harmony among features used which displayed a disturbing panorama without a notion of aesthetics through these spaces. Besides, architecture sometimes had very little detailing or interest; as reception desk might have seen as stuck in the middle of the lobby and dwarfed by the space around it, having no soffits or ceiling treatment overhead to call attention to it and make it more prominent. Lobbies or lounges were often an extension of corridors, with no changes in ceiling height, no changes in lighting, and little change in ambiance. Furniture layouts often seemed totally inappropriate for the shape of the space, as if the furniture had been arbitrarily plunked down into the room with little regard for scale or circulation. In addition sometimes the shape of this major room was so odd and irregular that


II.22.A. Entrance Hall, Traffic and Travmatology Hospital, Ankara.

II.22.B. Entrance Hall, Traffic and Travmatology Hospital, Ankara.



II.22.C. Cafeteria adjacent to the entrance, Numune Hospital, Ankara.


II.22.D. Food Kiosk, Ankara University Cardio-vascular Surgery Hospital, Ankara.

Figure II.22 Views from different sections of some entrance halls that lacks the notion of aesthetics.

it seemed very inappropriate. Further, Malkin (1992: 50) explained that, she is very uncomfortable with this problem of the integration between the architects and interior designers within the same space because of the lack of collaboration (Figure II.22.).

The aesthetic appearance does require a talented, skillful designer whatever the space requirements, techniques to use or the restrictions of the

budget is. The forms, dimensioning, arrangement, color, surface treatment of components all affect the aesthetical considerations, Apart from these, for example, visually interesting, unobtrusive artwork might be used in the facilities' entrance mainly in the lobby spaces, interior landscaping can also contribute much while designing for such a purpose. The artwork, usually two dimensional abstracts and interior landscapes, should be selected carefully to blend with the color schemes of the entrances.

Therefore, with using such elements, designers should seek for the way of creating pleasing environments. This would contribute great to the main aim of the facility in Turkey; probably even much more than any aesthetic environment could contribute to its target within a different situation since it contributes to the healing process in hospital environments (Figure II.23.).

Figure II.23. Aesthetically pleasing environment carefully detailed and arranged within entrance hall, Güven Hospital, Ankara.

**iv. Privacy**

Although entrance space is a public space that serves a large portion of the users to the whole facility, the design of entrance should pay special attention to a range of acoustic and visual privacy needs. This title covers the problems of entrances that suffered from the need of privacy; some special locations that contributed functions require privacy and the way to achieve it.

Healthcare facilities are designed to maintain the wellness of the community and this statement covers mostly individuals waiting for to be threatened. Therefore most of the people entering from the facility might be worried and stressful. When they step ahead from the entrance door, they usually find themselves in a huge hall with people running around, basically a crowded space that might make them feel as being alone into a large community without being able to deserve any privilege because of their condition. This situation additional stress and worry that could not support the process they are into within Turkish hospital entrance spaces. However, a level of privacy is required for some activities taken, and this privacy would let people to feel as they are cared in each step and support their calm position which therefore motivated these individuals. As an example, people spending a quite long time in the lobby as they are waiting with stress most probably, requires to get calm down and rest for a while. Main lobby as a whole or partially can contribute the privacy need of the patients and visitors who are seeking for relaxing or restful space for a while. If possible, a minor transitory space can be designed between the main artery and a part of the lobby to accommodate a visual privacy. Furthermore sound proofing materials can help much through a desired acoustical privacy within main circulation and the working areas or main lobby. Telephone boots, rest rooms, if available, or small offices may be in need of this kind of privacy, therefore situation must be held sensitively to obtain the aimed privacy needed. Designers might reinforce

the concept of smaller, more intimate surroundings as a way of telling patients that they are seen as individuals, not just numbers in a large impersonal system.

**v. Spaciousness**

Spaciousness is the state or quality of being wide, within extensiveness of area. The term also connotes the "feeling of liberation" and the "sensation of being open", or it signifies width and openness. Spaciousness is an important construct on which people can base their descriptions and evaluations of interiors and that it is closely related to such variables as color, lighting, window size and shape, furniture arrangement, and room size and shape as the major components which affect the design and the general atmosphere of the whole visual environment. Therefore this title explored the flaws in Turkey in order to achieve spaces with spaciousness and the factors affecting it as to achieve the desired level.

In Turkey, as it is in the world, entrance spaces are accommodating a large number of people so obtaining that kind of satisfaction would require a careful evaluation. Since it sets the initial image of the space, people entering from the outside should face with a space that is spacious enough in order to grasp a positive ambiance. However, designers are so lost within the restrictions of designing such spaces, codes and the desires of the client, generally, they have ho time to deal with this kind of an statement. Hence, the usual attitude is to limit the hall within minimum space that is possible and skip over other essential features that might dramatically change spaciousness of space. Usually, even no matter how the space is embellished, well functioning, expensively designed, if it lacks the criterion of spaciousness, users felt the sense of depression which creates a great obstacle for a hospital design to motivate (Figure II. 24.).

II.24.A. Ibn-i Sina Hospital, Ankara Ankara.

II.24.B. Traffic and Travmatology Hospital, Ankara.

Figure II.24. Improperly designed entrance halls failing to fulfill spaciousness criteria.

Factors affecting spaciousness are, in the light of previous researches, room geometry, color, lighting, windows, and furniture. Researches in man-environment relationship mainly show the following general findings:

1. Various features of room geometry such as vertical elements, size and shape, room proportions (height/depth ratio) affect the openness-closeness of the room itself.
2. Variations in the color variables hue, chroma, and value have been found to affect the perceived volume of interiors.
3. Three lighting arrangements, such as peripheral, downlighting and combination lighting systems affect spaciousness.
4. The size and shape of windows on vertical surfaces affect 6the perceived spaciousness of interiors.
5. Orderliness of the furniture and other items in a room affect spaciousness.

In the light of the studies, it can be resulted that when an interior becomes more disorganized, it is perceived as being smaller, more cramped

and cluttered as well as poorly planned and failing to satisfy the functional requirement; in addition to these it looks unappealing. In order to reduce patient stress, health-facility interiors should be designed to be as spacious as possible. Turkish healthcare designers should notice the importance of this criteria for the entrance space since spaciousness influences the patients' evaluation and perception of the facility. Interiors should make the patients feel comfortable (Figure II.25.). Patients should be made to feel that they are in peaceful, any environment starting from entrance space.

II.25.A. Good Samatarian Medical Center, West Palm Beach, Florida ( The Images Publishing Group, 2000: 157).

II.25.B. West Orange Hospital, Health Central, Florida, (AIA, 1996: 69)

Figure II.25. Properly designed atrium entrance halls that fulfills spaciousness criteria

**vi. Cultural Factors**

Cultural properties of a community obviously has a strong implementation on the design work for any facility. However, when designing such entrance space for a healthcare facility used by a wide variety of patient groups coming from many kilometers away from the city, importance of these factors has to be emphasized. Therefore the general use patterns of these groups and the problems created as well as issues to be cared because of these habits on the design of entrance will be explored within this title.

First of all because the procedures and paperwork requires so much effort to deal with, and naturally because the type of our social-relationships, usually if there is one person patient, s/he has accompanied by two people. This situation already establishes much crowd within this environment. Besides since they usually spend their whole day within the entrance space, waiting, eating, watching or doing necessary paperwork, this space should be able to handle this kind of heavy use pattern by hundreds of people each day. Besides, these people are sometimes difficult to orient, since they might be completely strange to the atmosphere, procedures and so on.

Therefore durable and easily maintable furnishings and surface covering materials displayed their importance within entrance hall and especially main lobby usage. Furthermore, information point should placed intelligently to have at least visual control on these people not kowing where to go or what to do next. These desks has to be staffed carefully, chosen from people educated and made awared about who they are facing with. The clear scheme of entrance space leading to main circulation routes and elevators or stairs might ease their work dealing with that totally strange facility already difficult to comprehend while they were healty.

### II.2.8 Designing for the Ease of Wayfinding

Wayfinding could be defined as an act of problem solving. It is because of the fact that, when traveling a familiar route, people do things spontaneously without having to consciously think about them. When they are not familiar with the area, however they consciously search for visual cues, points of references called landmarks and signs to guide them. Therefore way-finding might be defined as a cognitive process comprised of three abilities, cognitive mapping that involves information gathering and imagining, decision making that allows people to plan a strategy and finally, decision executing that transforms decision into behavioral action (Malkin, 1992: 447). Therefore this chapter has covered the difficulties of an improperly organized entrance space without a consciousness of wayfinding design, the components of the wayfinding system in order to define and ease this problem solving process; some issues to be concerned when obtaining an easily navigated entrance space and finally the essence of entrance through the entire wayfinding system of the facility.

A clearly organized, an easily legible entrance spaces are not very common for the case of Turkish hospital facilities (Figure II.26). This situation leads people to the confusing routes of the hospital, and the process of wayfinding starts to be seemed as an obstacle for a people trying to cope with illness. Furthermore these spaces lacks further flexibility criteria to tolerate possible future requirements, so, even they have a clear outline that could be easily red by many people for a few years , entrance space eventually becomes to a maze, even a labyrinth which is impossible to cope without additional help. Besides, an important component, that is, signage has to be developed by designers, instead when the need arises, a sign produced by administrators and located to somewhere that seems most logical (Figure II.27.). These problems leads to the failure of proper wayfinding organizations for entrance spaces in

Turkey, so precautions should be taken in parallel with problems stated through initial design process.

II.26.A. Ibn-i Sina Hospital, Ankara.

II.26.B. Numune Hospital, Ankara

II.26.C. Numune Hospital, Ankara

II.26.D. SSO Dışkapı Hospital, Ankara

Figure II.26.Insufficient organization of approach to the entrance of the facility

Wayfinding design program consists of an integrated series of components that includes interior finishes, graphics and signage, color, artwork, lighting, and architectural detailing. Each of these components reinforces the others to form a language of visual cues that enables people to make navigational decisions at critical junctions and route to their destinations.

II.27.A. Ibn-i Sina Hospital, Ankara.

II.27.B. Hacettepe Oncology Hospital, Ankara.

Figure II.27. Signage panels that are not designed and organized properly.

These components form many strategies as a whole through solving the wayfinding problem. Visual cuing is one of these strategies that can be achieved within the main arteries of a hospital circulation system by creating landmarks and distinguishable architectural features so that where you are doesn't look like everywhere else. This cuing is the essence of making the building architecturally legible. This term landmark is defined as a highly memorable image that can be used as a point of reference when giving directions and one that would be recalled by the exiting first time user or the repeat visitor. Landmarks serve as organizers that are linked together through the establishment of a path; they play an important role in subdividing routes into separate segments of information. Furthermore within interior spaces, landmarks may be a set of elevators, a view of a courtyard or a garden, a view of exterior sculpture, an atrium, another unique architectural feature or a highly memorable work of art that anyone would recognize, having once passed it (Figure II.28.). However, the selection of art images should be used as wayfinding landmarks must be based on a through understanding of wayfinding principles. With regardless of stylistic preferences or ability to appreciate art it has to be noticed and recognized by most people. They can be

placed at critical intersections where people have to make decisions, can be directional in nature.

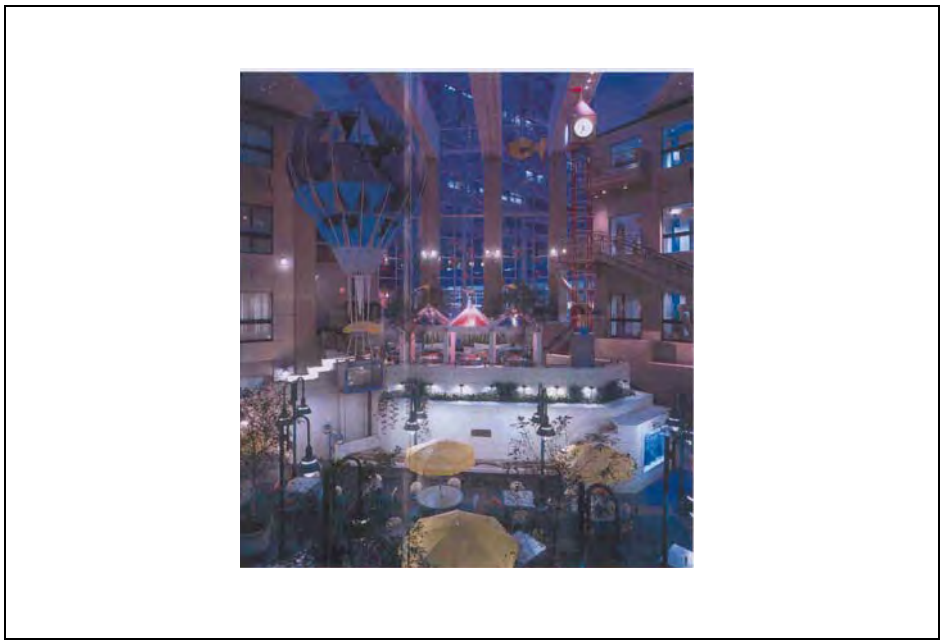


Figure II.28. Entrance design as a landmark, St. Louis Children Hospital, West County Satellite Health Center, St. Louis, Missuri (Miller, Swensson, 1995, 14)

Providing a series of "you are here" (*buradasınız*) (YAH) maps is required to ease the problem of wayfinding as another component. In a health care facility complex composing of different type many buildings, person needs a YAH maps located to the pedestrian gate for an overall understanding of the facility and to plan their most direct route. In a proper YAH map; the information presented clearly, it should be oriented that the “forward must be up” and map’s location should be visible or it has to be near an identifiable object or a structure that is shown on the map and lastly you are here symbol has to be considered with at least one other point of reference. The first map should be in the entrance lobby as an adjunct, to the information center. Others

should be located at the key points where major pathways cross or where there is some ambiguity that requires clarification

Finally, providing a comprehensive color, symbol, and sign system to guide people through the hospital would be an important step (Figure II.29.).

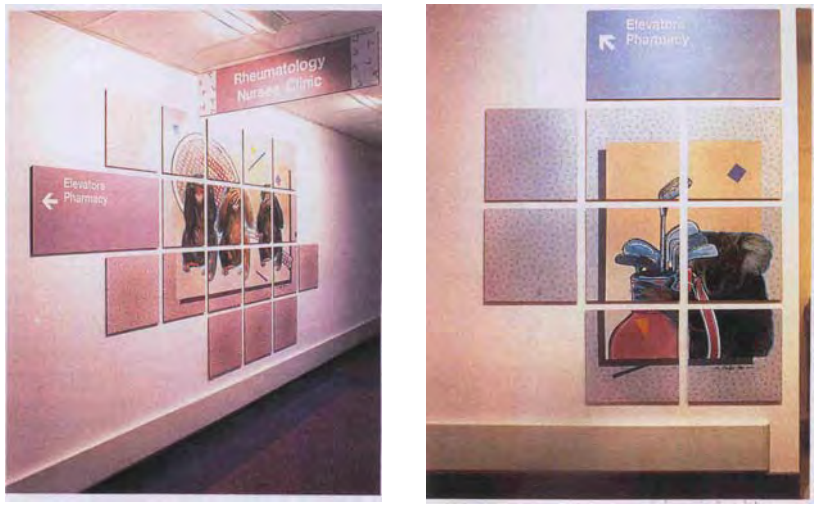



Figure II.29. Aesthetic and Modular signage panels, Kaiser Permenante Medical Center, San Diago, California (Malkin, 1992: 462).

Starting at the entrance lobby, there should be a continuous system of guidance to lead newcomers to then destinations. At this point Malkin (1992: 63) echoes that a common mistake about the signage system that has done for many hospitals is listing every possible room and destination beyond that signage panel. Studies have shown that people generally do not read a directional sign panel with more than seven destinations listed. In fact as in airport traffic management system destination listings should be large and overhead, and they carry people to the next drop- off point where information for further destinations are listed. These signage systems should consist of a series of

properties that is expressed by Charpman and Grant (1993: 41). First of all it is useful to develop a proper hierarchical system of major and miner directional signs in order to provide an appropriate amount of information as it is needed, without causing confusion. Major and minor signs should progress from general to specific information where it would be very useful to keep the message clear and short enough (preferably not more than seven words) to be interpreted similarly by all users. Besides, once the wording for sign copy has been chosen, it should be used consistently throughout. For example, using -outpatient buildings- on one sign and -clinics- on the other should be avoided. Because certain colour combinations are more visible than the others, the effect of a sign's scheme on its visibility should be investigated. Consequently, if the signage panels are located to the outside in order to lead easily to the entrance space, locating signs so they can be easily seen within the viewer's 60-degree "cone of vision" and providing their size appropriate for a person driving car have displayed some issues to be concerned.

Since entrance is the principal space, the physiological problems of getting lost might destroy the healing process from the beginning when giving harm to hospital image also. In order to cope with the situation, some precautions should be taken appropriately starting from approaching to the entrance. The problem of exterior wayfinding usually creates a significant problem for patients and visitors. It is a multistage process starting from the travelling to the facility by means of the transportation expressed before. As part of their travel, they must be able to locate the entrance drive, park their cars in a proper parking area, exploring the correct building within the complex and find the main entrance into the building. These clues have reported by both Charpman and Grant (1993: 41), and also by Kızılcan (1996: 113). First of all, a facility's street sign should identify the centre clearly and building-signs should be consistent with these street signs in order to display a clear identity. There should be hierarchical sign system as major signs located at the edge of the site and parking area provide to driver with information at crucial decision

points. Minor directional and informational signs point to secondary entrances, call out special uses such as handicapped access parking, and indicate traffic flow patterns around the facility. In addition, identifying the building with well-illuminated signs is needed. Outdoor signs that can be seen at night as well as during the day should be provided. Furthermore, many health care facilities, particularly those that have expanded over a period of time, have several entrances serving for different purposes. Making the entrance system understandable to patients is a matter of real concern. If the visitors' entrance is not easy to find and distinct from other entrances, frustrated users may be forced to waste time walking around the building looking for appropriate entrance. Marking the entrances with pylons and illuminated signs might help much in order to prevent this congestion. Especially, providing a highly visible entrance feature is needed. The purpose of this requirement is to utilize some form of architectural means to emphasize, so that it can be seen and identified from a distance. The sign(s) at the entrance should be limited to conveying a clear, simple message, such as identifying the facility and entrance and giving the hours of operation while conveying a sense of welcome. Other information confuses and discourages visitors.

Once patients and their families or friends enter the hospital, their wayfinding problems are by no means ended. Even more important, however, is the fact that they are now within the institution itself and the way in which they are received and treated would affect their attitude about the institution. The essential idea might be designing entrance hall with a clear and simple organization scheme that would greatly contribute to the work done in order to ease wayfinding. To make the proper transition from entrance area to reception and waiting area; it should be noted that, entrance should be threaten visually distinct from the corridor and other non-public destinations. Signage and other way finding aids should be used to direct patients and visitors to the waiting area; they might be placed in the corridor opposite the entrance to the waiting and reception area or in direct view from the entry area. Besides, it should be

remembered that, providing an identification sign in clear view of patients and visitors approaching the area to let them know that they arrived at their destination would be very helpful.

Through obtaining a proper wayfinding organization, importance of entrance space explored as the main artery corridor; it is the principle circulation spine connecting points of entry with various destinations and vertical circulation such as elevators to stairs. Anything placed in the main artery corridor should contribute to wayfinding. Art images that are purely aesthetic may be reserved for lobbies or lounges or perhaps used as landmarks (Figure II.28.). But they should not be mixed with wayfinding orientation devices. For example, a central atrium creates an excellent landmark reference as individual make their way through the building. Views of courtyard or special works of art also serve as wayfinding landmarks. A building might be laid out with a north-south axis corridor, with all clinic destinations located on these two axial spines. Where they intersect would naturally be the center of the lobby, admitting or registration services, cafeteria, or other public use areas. Furthermore being able to see one part of the building from another or being able to see the lobby, an atrium, a bridge or another architectural feature enables a person to maintain a point of references.

The importance of wayfinding lies behind the improper experiences of many users within the hospital when they got lost through the corridors of the facility and felt much stress where they have gone to be threatening in. since behind many number of functions entrance space have displayed features of a central space that leads to many directions of the facility, the use of wayfinding devices that is mentioned within the paragraphs above have obtained special importance for this particular situation. Therefore in order to set a proper image of the facility to give the idea of supporting the well-being of the user, immediately an individual enters to a campus of the facility, the organizational

scheme and other tools mentioned above should direct him/her sufficiently without causing additional stress to the intended location.

### II.2.9. Proper Use of Color

It is commonly admitted today by many psychiatrists and clinical psychologists that color has one simple but clear effect: its emotional impact tends to lead on outwardly directed attention; in other words, it is entertaining and pleasing. Healing is both physical and mental process; that's why, the proper use of color in healthcare environments can play an important role in this process since it positively motivates people if it has used intelligently. Within this facility, entrance space is accepted as where the image of the entire facility captured therefore where this healing process begun. Besides, it sets as transition point for all user groups in the facility from outside to inside, and in order to develop a proper transition, color combinations might play an essential role if they have chosen intelligently. With all this information in mind, this section covers the flaws in the use of color through entrance spaces of hospitals and some essential issues to be explored when choosing proper color schemes within entrance spaces including the laws of perception and the information about color psychology.

It might be observed from many of the Turkish health care facilities that, the designers of these facilities have a very restricted knowledge about color and its effects on human psychology within a built environment. Besides most of the decisions on color for entrance spaces seemed to be based on the personal preferences of designer or even of the provider itself , therefore they might be taken without considering the full potential of the applied color combinations (Figure II.30). The general preference is to choose a single color and using its different chroma for intended purposes all through the environment since it is a safe way to obtain a harmonized environment since there is lack of enough information related about the topic.

II.30.A. Entrance hall, Traffic and Travmatology Hospital, Ankara.

II.30.B. Entrance Hall, Ankara University Cardio-Vascular Surgery Hospital, Ankara.

II.30.C. Food Kiosk within the Entrance Hall, Ankara University Cardio-Vascular Surgery Hospital, Ankara.

II.30.D. Entrance Hall, Ibn-i Sina Hospital, Ankara.

Figure II.30.Inappropriate color use within main entrance space.

Despite the fact that use of color is a strong tool in order to challenge the creation of humanized environments, proper arrangement of it contributes many difficulties. Unfortunately, because human reactions to colors are emotional, clinical data are not easy to gather, and facts are difficult to quantitate. Color perception varies with the individual observer and depends on his vision, experience, and mental attitude, so his esthetic approach to color has been conditioned by his background, training and personal taste. This confuses

the issue of color and often clouds a logical and practical attitude towards it. There are many other aspects to color preferences. Malkin (1992: 56) further claimed that; the esthetic color problem for the architect is not only how to choose single color, but also how to develop color schemes for exteriors and interiors of entire buildings of different types. Color schemes are functional and the aesthetic aspects of architecture and it should be remembered that color is a priceless component in creating a healing environment. A rich color scheme does not necessarily cost any more than a poor one, but requires taste, experience and imagination. However, hospital color plan should be built upon intelligent elements and not left to chance or personal feeling. Among many of the possible ways of dealing with color in interior design, the researcher would explore some issues in order to ease coping with this complex subject.

First of all it is essential to consider the needs of specific population that might directly affect the selection of color. The primary concern therefore should be the creation of a proper transition space that is supportive to all its users. When defining other specific needs as the requirement of staff working on the reception desk, designer should explore the topics below:

1. The religious or symbolic associations with color, including cultural taboos, bias, and nationality, that may be relevant to that particular community. They may restrict to develop color schemes in mostly institutional facility entrance areas. The excessive use of bright colors, or using radically bright colors is not possible for these facilities, since it is accepted that these color schemes destroy the image of a being a serious facility that is serving under the authority of the government which displays a very formal character. Also colors like dark green or combination of red, yellow and green have reminds the relation of the facilities' negative political

understanding in Turkey so they are eliminated in most of the color schemes used.

2. Ages of people who were using the space as the spaces that are designed for children playing might be more cheerful to reflect the inner energy of children. However, for many of the sections through entrance, designers should be aware of the fact that it is used by patients, staff, visitors, old and young people including children, or used by both women and men. So personal preferences that may be loved by a number of people in the community and that motivate them may be accepted irritating by the entire population of hospital facility.

3. The typical length of exposure of people to these colors as for the main lobby, warmer colors that won't offend to the people through a long time of exposure might be offered, the excessive use of cooler colors that make space seem cold and bleak which need to be seem friendlier might result with a failure.

4. Types of task, amount of contrast desired, level of visual acuity required; as an example information desk should be easily perceptible when entering the hospital; so the figure ground relationship should be understood and realized properly, there might be a dark background color and a bright colored desk in front of this background that is able to attract everyone's attention. Or some contrasting colored objects might be placed within the entrance hall in order to display as a cuing device for wayfinding.

5. Effect of lighting on colors since interior color schemes should be assembled and evaluated under the type and level of artificial light under which they have used. Beck (1986: 67) discussed that good

lighting as elemental to the evaluation of the patient's appearance that different kinds of light can enhance or destroy the effect of space color scheme, and that light can affect the mood and appetite of the patient. The color rendering characteristics of a light source is described by a Color Rendering Index (CRI) and it might help the understanding the relation between color and artificial lighting.

6. The use of color as an aid to cleanliness and health which has to do with the selection of colored surfaces either to show dirt or camouflage. Most of the hospital interiors are white. Undoubtedly white surfaces "show dirt." However this is a doubtful advantage, unless the dirt can be quickly removed after detection. If the intent is to make dirt visible, the color of the surface in question should have the greatest possible contrast to the color of the din that may mat fall on it. On the other hand, if the dirt cannot be quickly removed, the color of the surface should be close to the color of the dirt in order to "hide" it. Moreover, materials in uniform colors showed track and spots, particularly in certain color ranges, while those with variegated patterns would look clean for a much longer period.

7. The effect of color on the perception of space which can be translated into the following guidelines for interior design and architecture by Malkin (1992: 57):

    7.1. To prepare people for the color of a room they are about to enter, the entry should be painted a complementary color.

    7.2. Bright objects are overestimated in size. Yellow appears the largest, followed by white, red, green, blue, and black, in descending order.

7.3. A light object appears larger against a dark background. A dark objects appears smaller against a light background.

7.4. A window wall and frame should be light so as not to contrast too much with daylight sky. High contrast can result in headaches and eyestrain.

7.5. The after image of colors should be considered. If a red wall is placed next to a yellow wall, the yellow wall would appear greener than it actually is due to the after image of red: cyan.

7.6. Light colors and small patterns visually enlarge a space. Dark colors and large patterns make it appear smaller.

7.7. The absence of variety in the visual environment causes sensory deprivation. A variety of colors is essential because the individual quickly adapts to the effects of anyone color, no matter how predominant, and it becomes monotonous.

7.8. Therefore, a "warm" light source is best with low levels of illumination, and a "cooler" light source is best with high levels of illumination.

8. The practical applications of color psychology that is explained by Malkin (1992: 58) through these points below:

8.1. Red and yellows, for example, should be used in settings where creative activity is desired and socializing encouraged; greens and blues in areas that require quieter and extended concentration and high visual acuity.

8.2. Cool colors may be appropriate in environments for agitated, hypertensive, or anxious individuals; red may be appropriate in a depressed person's environment.

8.3. Under warm colors, time is overestimated, weights seem heavier, objects seem larger and rooms appear smaller.

Under cool colors, time is underestimated, weights seem lighter, objects seem smaller, and rooms appear larger.

8.4. Warm colors with high illumination encourage increased alertness and outward orientation; cool colors and low illumination encourage less distraction and more opportunity to concentrate on difficult tasks; an inward orientation is fostered.

Consequently, it should be indicated that designers might not be able to know all these statements about color, perception of the space and the color psychology when they are trying to cope with so many faces of this problem solving process in Turkey. However, when it is needed, the full potential of color in order to obtain desired aims for this specific place should be surveyed and applied with enough care and sensitivity. At the very last, this is the task of designer, and designer has to constrain the extent of knowledge exists, and use his/her skills to create a sufficient color combination for entrance spaces in health care facilities in the case of Turkey.

### II.3. Evaluation According to the Performance Criteria

Buildings are designed to shelter the requirements of the process going on through the covered space and in order to facilitate the process appropriately; building has to perform some issues which would led users to obtain the physical and psychological comfort whereas gave a chance to obtain energy efficient and safe built environment. Therefore appropriate performance should set an inevitable criterion for the success of the design through its evaluation. Within the titles that are covered below, the performance criterion that should be fulfilled has discussed with the problems and related solutions. The criterion related with the subject is based on the list of CIB Master List

(1993: 4-5) headings, in order to optimize the issues in an appropriate range however some are added in order to evaluate the issues related with health care facility planning.

### II.3.1. Lighting Performance

Lighting is accepted as an essential factor to the biological and physiological health of human beings and it is known to affect hormonal and metabolic balance of humans. For the hospital settings Watson (1990: 314) determines four objectives that apply to hospital lighting: to meet physical needs (clear visibility), to meet psychological needs (atmosphere), to meet budget needs (most hospitals lose money) and to meet service needs. This vast topic is covered with looking for the problems of lighting in the main entrance spaces of Turkish hospitals, the points to be considered for a sufficiently illuminated space through daytime and nighttime that is to say with using the features of daylight and artificial light, and finally the daylight control for the atrium type of entrance spaces.

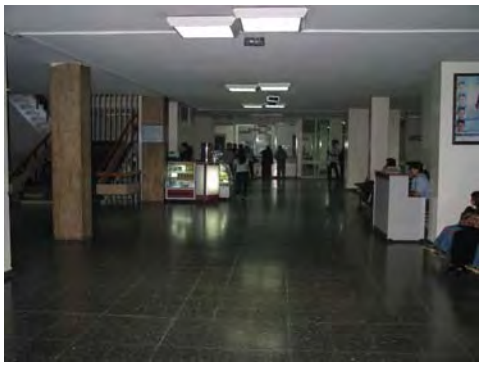
The lighting issue in a hospital entrance environment naturally has some obvious functioning. These functions may require different illumination levels to conceal or camouflage the functions intended accordingly or that may require a pleasant, delicate environment with low levels of illumination, however in Turkey, lighting is only used as a device for making people see their environment, and decide what to do with the help of other components than lighting. Using this significant tool with its whole range of possibilities may be served is usually skipped over process by the designer because of the lack of information or the constraints of the budget. What is more, lighting is accepted as a device of exploiting the energy and money sources for the public areas as entrance through the building in Turkey. Within clinical areas special requirements might be taken into consideration since it is accepted as a

necessity for the work going on, however for entrance space lighting considerations are not taken sensitively with assuming the natural need of light by humans both during daytime and nighttime. Either the windows are arranged without a serious reasoning, in order to have a nice elevation, therefore excessive light disturbs people when sitting at the main lobby or working behind the reception desk during summer time, while resulting for much energy consumption for heating during winter conditions. Another face of the problem is related with, insufficient daylight penetration to the entrance space, that gives way to a depressing, dark entrance that has a very negative effect on people emotions when introducing with an environment that is supposed to heal themselves (Figure II. 31.).

Hence, if daylight is provided in some of a proper way, the problem does not end for entrance spaces. The architects or interior designers should accept the lighting devices as a component that contributes another dimension to their environment created. In today's healthcare environments in Turkey, entrance spaces are illuminated with the same devices that used throughout the hospital which did not tend to fulfill the requirements of users, or devices are chosen in a wrong way that resulted with disturbance (Figure II. 32). However, the problem has to be held as aesthetically as a hotel entrance may serve, although illumination levels may vary according to the contents of the tasks going on within these two different spaces.

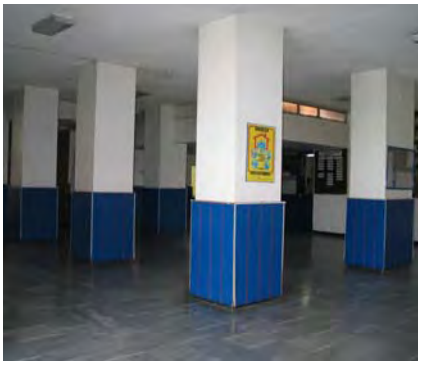
Therefore, what might be the proper way in order to obtain sufficient illumination within the entrance environment? There are two ways of illuminating the exterior and interior built environments: natural daylight and artificial illumination. Daylight is an important factor in hospital entrance life; both for staff and patients, and the proper design of electric light should take the daylight contribution fully into account. In some areas natural light (daylight) provides sufficient and suitable illumination for normal visual tasks throughout the middle part of the day. It is wise to make full use of this daylight to minimize the use of electric light. The extent of daylight penetration

II.31.A. Circulation corridors within entrance space, Traffic and Travmatology Hospital, Ankara.



II.31.B. Entrance hall, Ibn-i Sina Hospital Ankara.

II.31.C. Entrance Hall, Ibn-i Sina Hospital, Ankara.



II.31.D. Entrance Hall, Traffic and Travmatology Hospital, Ankara.

Figure II.31. Improper lighting design that creates an impression of depressing space within entrance hall.

and its distribution is necessarily restricted by the need to avoid glare from the windows in the less brightly lit parts. However, some extension of daylight areas may be achieved by the use of clerestory window designs. Utilizing sun shading devices that would be explored in the following paragraphs and making use of different glazing materials could establish an option. The obstructions of daylight by surrounding buildings should also be considered.

II.32. A. Numune Hospital, Ankara.

II.32. B. Hacettepe Hospital, Ankara.

II.32.C. Bayındır Hospital, Ankara.

Figure II.32. Glare problem within the artificial lighting design at entrance halls.

The fringe zones of the daylight areas can benefit from permanent supplementary electric lighting, i.e. lighting which is left in operation during daytime. Such lighting should be designed to integrate visually with the natural lighting whilst supplementing the horizontal illuminance to maintain the recommended value and preserve the daylight character within the space, so extending the use of available daylight to a greater area. The Chatered Institution of Building Service Engineers of UK, (CIBSE 1989: 53) expresses the fact that the interaction of natural and electric light is not a simple additive process. The flow of natural light across a room from a window is fundamentally different from that of the electric light from luminaries in that

the surfaces, facing towards the window are more brightly lit than those facing away from the window. Furthermore, the view of a distant scene or daytime sky seen through the window has a much higher illuminance than a luminaire. The brightness of the window makes the electric light appear less bright because of the adaptation of the human eye to the outdoor scene. It follows that the electric lighting installation in the entrance area that is close to good daylighting may be required to produce more light to give an acceptable overall balance of brightness than that for an area fully screened from daylight and totally artificially lit. The resulting problems may be taken into account by careful window design in the original construction or by using external structural elements such as canopies, blinds or shading devices to screen the window from the direct sunlight.

There is another choice when illuminating the entrance spaces that has involved many types of artificial light sources that are indicated below:

1. Tungsten filament;
2. Tungsten halogen filament;
3. High pressure mercury tungsten discharge (blended);
4. High pressure mercury discharge (fluorescent);
5. High pressure mercury discharge (metal halide);
6. Low pressure mercury discharge (tubular fluorescent);
7. High pressure sodium discharge;
8. Low pressure sodium discharge.

With each type there are a range of lamps available which differ in construction, wattage, luminous efficacy, color properties, cost, etc. The construction, operation, range of luminous efficacies, life and color properties of each lamp type are summarized along with typical entrance applications through Table II.1. This table gives an overview of the range of lamp types

available. The manufacturer's data should always be consulted for information regarding specific lamps before making an appropriate decision. Furthermore, the determining process of to utilizing any kind of light source has to be based to the criterion as follows (Kızılcan, 1996: 110):

1. Visual comfort;
2. Compatibility with architectural design;
3. Flexibility in arrangement;
4. Compatibility with air conditioning design;
5. Compatibility with acoustical requirements;
6. Ease of cleaning and decontamination;
7. Aesthetics;
8. Economics of selected systems with regard to maintained illuminance level:
    10.1. Initial installed cost;
    10.2. Maintenance and other annual costs;
    10.3. Cost of rearrangement;
    10.4. Depreciation and replacement costs.

Within designing the artificially lit environments for the entrance space in the hospital facility, designer should consider some additional factors. First of all, traditionally, lighting engineers and those in the design professions have been concerned with lighting in terms of either vision or aesthetics. What has been overlooked is the biological significance of light. Many studies prove the benefits of full-spectrum lighting, like controlling the level of serotonin, a hormone that controls the feeling of depression, and also some other benefits as shorter reaction times, better visual acuity, improved fine motor-skills, less physiological fatigue, overall improved task performance, and vitamin D

Table II.1. General characteristics of lamps used for entrance interior lighting ( CIBSE, 1989, 58);

| Lamp type | Construction and operation | Typical lumious efficiacy range (lumens/ lamp watt) | Life | Lamp name | Color properties | | Typical applications |
|---|---|---|---|---|---|---|---|
| | | | | | CCT Class | Colour rendering characteristics (based on visual assessment) | |
| Tungsten halogen filament | A tungten filament in a small envelope containing halogens; does not require control gear but may require low voltages. Immediate full light output; may have restricted operating position; light output and life sensitive to small voltage variations; lamp life sensitive to vibration; envelope surface liable to deteriorate if touched with bare hands; almost no decline in light output with time. | 18-24 | Limited by failure of the filament, avarage life 2000-4000 hours according to type | | Warm | Emphasises reds strongly, yellows and greens to a lesser extent; blues strongly subdued | Display; area foodlighting; shops; ambulance and car parking areas; operating luminaries |
| High pressure mercury discharge (flourescent) | an electri discharge in a high pressure mercury atmosphere contained in an arc tube within a glass envelope with a flourescent coating; needs control and gear. Run-up period to full light output about 4 minutes, re-ignition after about 10 minutes unless special circuits used; operates in all positions. | 36-54* | likely to be determined by economic factors; life to 30% reduction in light output typically 5 000-10 000 hours according to type, rating, switching cycle, etc. | | Inter-mediate | Emphasises yellow and blues which shift towards violet; subdues reds | Area floodlighting; hospital road and pedestrian way lighting. |
| Low pressure mercury discharge (tubular fluorescent) | An electric discharge in a low pressure mercury atmosphere contained in a glass tube internally coated with a fluorescent material; needs control gear. Many sizes of lamps and types of fluorescent coating which produce a high range of luminous efficacies and color properties; the most common types are shown in the table. they are divided into four groups: (a) for applications for accurate color judgements are required; (b) suitable for general use and having rare-earth, triphospor coatings; (c) suitable for general use but having halo-phosphate coatings; (d) compact, low power lamps designed as alternatives to tungsten filament lamps. Tubular fluorescent lamps are available in a wide range of physical and electrical sizes. Immediate light output and restrike; operate in all positions; light output sensitive to ambient temperatures, air temperatures above and below about 25C reduces the light output; diffucult to start at low temperatures. All tubular flourescent lamps described are of the hot cathode type, i.e. they need a heated cathode to operate. Cold cathode tubular flourescent lamps also exist and also are widely used for illuminated signs and occasionally for interior lighting. Cold cathode types have longer life , a lower luminious efficiacy and a higher operating voltage. their main advantage in use is that they can easily be formed into long, complex shapes. | 37-90* | likely to be determined by economic factors; life to 30% reduction in light output typically 5 000-10 000 hours according to type, switching cycle, etc. | (a) Special lamps: Northlight/color matching | Cold | Similar to north skylight; emphasises blues and, to a lesser extent, greens | used where colour rendering similar to north sky daylight is needed, e.g. viewing screens. |
| | | | | 3000 K, e.g. Color 83, Energy Saver 84 | Warm | Emphasises oranges, greens and blue violets; subdues yellow and deep reds | Social areas; restaurents |
| | | | | Warm white | Warm | Emphasises yellows and, to a lesser extent, greens; reds slightly subdued blues; subdued and shift towards violet | Commercial/Public buildings |
| | | | | (d) Lower power, compact lamps: 2D, SL, PI lamps etc. | Warm | Emphasises oranges, greens, blues and violets; subdues some yellows and deep reds | Patient reading; waiting areas; toilets; residental accomodation, shops, as replacement for tunsten filament lamps where conditions are suitable. |

synthesis. Full-spectrum lighting refers to a source that closely resembles the spectral distribution of sunlight; it includes radiation in the near ultraviolet band. Unfortunately full-spectrum fluorescent lamps are not always readily available room electrical wholesalers, and they are considerably more expensive than the cool white and warm white fluorescents that are commonly used in hospitals. Another factor of great psychological importance, especially to the sick, is color; a light source that works with the hospital decor to help create a pleasant, friendly atmosphere in terms of color inevitably contributed towards the recovery of many types of patient. As an example, tubular fluorescent lamps of warm white color range are suitable for use in health facilities in colder climates. They bring warmth to surroundings. Similarly, for health facility in the hottest parts of the country, the cooler color types of lamps should be used.

In order to clarify the special requirements about the illuminating the spaces related with the entrance space in a health care environment, the table below (Table II.2.) may help designers for a proper planning according to CIBSE. The first column indicates the particular locations for which light has to be provided and the area over which the service illuminance should be averaged, together with a reference to the particular time of day, where appropriate. The second column gives the recommended service illuminance to be provided on the horizontal plane, unless otherwise stated.

In order to make some specifications and clarify some clues through achieving proper entrance space illumination within health care facilities, topic should be explained step by step with exploring each case. Starting from exterior lighting, it should be noted that consideration should be given to the provision of exterior lighting to give a satisfactory night environment depending on the guide by CIBSE (1989: 50). In some cases, the use of

Table II.2. Illumination Requirements of Entrance Space Components (Modified from CIBSE, 1989: 11-13)

| No | Location (particular area and time of day) | Service illuminance (lux) |
|---|---|---|
| **1** | Road surface | 30 lux minimum |
| **2** | Entrance hall, waiting area and lift hall floors | 200 lux |
| **3** | Lift cars- whole floor area | 150 lux |
| **4** | Reception- floor | 300 lux |
| **5** | Enquary desk | 500 lux |

monochromatic sources gives rise to a feeling of insecurity. These factors should be taken into be account when selecting light sources. The choice of locations for direction signs is based primarily on their use in day time. However, if practicable, they should be located so that they are not clearly illuminated when the road lighting is in use. Preferably, the road lighting should be planned to light the signs as well as the roadways. Internally illuminated signs are not recommended because they are liable to damage and require frequent servicing. Local lighting by external luminaries must be sufficiently uniform for signs to be read easily and should be used only when the road lighting installation is inadequate for this purpose. Car parks vary considerably in size from small staff car parks at hospitals to main hospital car parks. For large car parks in hospitals floodlighting using high output low energy sources is more suitable. Maintenance of any floodlighting mounted at heights over 8 m should be taken into consideration. Footways that are not well lit from adjacent roads or from the lights in adjacent buildings require their own lighting, preferably by wall mounted lanterns or from columns about 1 m high. Low-level lanterns should be vandal resistant.

The lighting of an entrance canopy should draw attention to its location and the service illuminance should be adequate for the area immediately below. The luminaries should be located so as to avoid any damage to ambulance aerials (Figure II.33.). The contrast in brightness between the approaches to a building and the entrance area requires careful consideration to avoid a sudden

change of visual adaptation when entering or leaving the building. This occurs both under bright sunny conditions and during the hours of darkness.

II.33.A. Augusta Medical Center Fisherville, Virginia. Florida (AIA, 1996: 81).

II.33.B. Health Central, Orlando (AIA, 1996: 71).

II.33.C. Memorial Hospital Addition, Seymour Indiana (AIA, 1996: 111).

Figure II.33. Properly designed exterior lighting in order to emphasize the entrance of the facility.

Where brightness contrast is excessive under natural lighting conditions, the lighting of entrance thresholds and the shielding effect of entrance canopies can reduce the problem. Avoidance of highly reflective road and pathway surfaces also helped to minimize excessive brightness contrasts. Also it is indicated by the Illuminating Engineering Society of North America (IES)

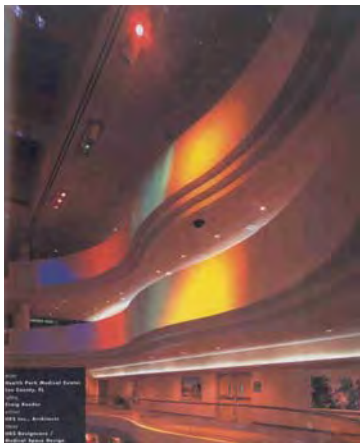
(1986: 7-23) that entrance foyer is a transition space between the outdoors and interior space, so foyer lighting should promote a sense of security and welcome while allowing adaptation between high and lower illuminances. In the entrance foyer the lighting should be designed in conjunction with interior materials and finishes to clarify transit routes and points of arrival. A change of type, height or orientation of the luminaries can highlight the focal point of activity such as reception, waiting areas and lifts. This approach to design also provided variations which contribute to the pleasantness of the interior. High illuminance should be used to emphasize the reception desk and staff against other features in the area; however, a lower overall level with a system of local task lighting should be considered. Local variations in illuminance may be used successfully to direct people towards particular locations within the hospital (CIBSE, 1989: 52) (Figure II. 34.).

In public areas like main lobby, the main requirement is for quality of light, rather than quantity, with deliberate variations in contrast and intensity. Furthermore casual and prolonged reading tasks must be anticipated, though these can usually be accommodated with relatively low illuminances. A more residential treatment may be appropriate to create an inviting ambiance (IES, 1986: 7-24). Also, the lighting for elevator lobby areas should be designed to orient people to the elevators and should enable them to read directional signage and instructions and select the proper signal controls for elevator call. Internally illuminated signage and controls should be considered. Furthermore Suitable lighting for shops, newsstands and other specialized services including cleaning and maintenance may require quite sophisticated equipment and controls. Such lighting should be considered as part of the overall interior lighting scheme and should not be so bright as to dominate adjacent public area unless that is the intent of the design team (IES, 1986: 7-24).

II.34.A. Le Bonheur Children's Medical Center, Memphis, (Whitehead, 1995: 138).

II.34.B. Health Park Medical Center, Lee county, Florida (Whitehead, 1995: 138).

II.34.A. Health Central, Orlando, Florida (Whitehead, 1995: 142).



II.34.D. Health Park medical center, Lee county, Florida (Whitehead, 1995: 139).

Figure II.34.Artificial lighting design within entrance atrium hall designed and has performed successfully.

The importance of proper emergency and escape route lighting shouldn't be regarded. An emergency lighting system is a complete, but separate, lighting installation supplied from a stand-by power source. Furthermore, stand-by lighting is required to enable normal activities to be

continued during an emergency. The lighting should be directly related to locations where specific essential tasks are carried out. Another safety and escape route lighting is required for the movement of patients and staff to a safe location in an emergency, as well as for the evacuation of the building within the entrance space. Through entrance space as valid for the entire facility, lighting is required at the following locations according to CIBSE (1989: 50):

1. Corridor intersections if there is any;
2. Changes of direction and of level;
3. In front of the staircases and lift halls;
4. Entrance door and emergency exit if there is one within the hall;
5. Fire alarm call point;
6. Fire fighting equipment.

Another essential topic is related with the new trend in designing the hospital facilities that is defined as the ‘mall’ type of entrances with departments organized around an atrium. These atriums are usually designed by replacing part of the core of the building with an open court that may be many stories tall (Figure II.35). Beside it has many advantages and naturally disadvantages involved within the intended design purposes. The positive attributes of increasing the daylighting perimeter include reduced electric lighting loads, reduced core cooling loads, and reduced peak demand from lights and light heat extraction. The negative attributes of increasing the thermal perimeter include increased heating loads, increased solar loads, and possibly increased energy use due to the extended envelope of the building. Since the atrium is inside the building, the roof over it can make use of top-lighting or clerestory and side lighting concepts to filter light into the building. Light entering the atrium must provide task lighting on the floor of the atrium space and secondary light to adjacent spaces. The difficulty in designing an atrium is to avoid excessive glare at the lower levels and still have enough

natural light to illuminate adjacent spaces. Rooms and spaces adjacent to the atrium can be open to it-in which case the atrium must be thermally conditioned or it can be thermally separated by glazing and its temperature allowed to float up or down above the maximum summer thermostat setting or below the minimum winter thermostat setting for that space. In such cases, the setback temperatures might be uncomfortable to people.

Figure II.35. Sufficient daylight design for atrium type main entrance, Good Samatarian Medical center, West Palm Beach, Florida (The Images Publishing Group, 2000: 156)

According to Robbins (1986: 114). In order to prevent this excessive heat to the building while allowing for the daylight to come in with indented dose, exterior and interior sun control and shading devices should be introduced to the entrance atrium of these facilities:

1. Overhangs and extended overhangs that are used in conjunction with side-lighting concepts and are often an extension of the roof plane past the plane of the aperture. In multistory buildings, an overhang may be a horizontal plane extended from the wall above the window. Overhangs

used in daylighting schemes serve a dual purpose according to Robbins (1986: 119), they control direct sunlight, and they reduce or control the daylight entering the space.

2. Light shelves that have been used to control sunlight in buildings and to reduce glare from the sky while admitting sky light and reflected sunlight. Light shelf configurations can, generally be classified as interior, exterior, or combined. According to Robbins (1986: 120), much of the interest in light shelves springs from their assumed ability to project daylight deep into the building core, beyond the normal day-lighting perimeter of the building and beyond the normal penetration from shelfless apertures. In addition, light shelves can reduce cooling loads caused by solar gains and can improve visual comfort in a space.
3. Horizontal or vertical louvers and blinds reflect daylight and sunlight into a room, act as shading devices, and reduce a view of the sky that might otherwise cause glare. It should be noted that vertical louvers, blinds, and fins are often used as east- or west-facing apertures to control sunlight penetration in morning or afternoon (Robbins, 1989: 128).
4. The final choice might be using various glazing materials that has intended light and thermal transmittance characteristics.

Robbins (1989: 128) further stated that; in these special cases where radiation damage is a critical design issue, the final decision as to whether daylight or electric light can or should be used to illuminate objects sensitive to ultraviolet light damage must be made by the client. Knowing the relative damage caused by daylight and electric light allows the design team to choose lighting schemes that fit the character of the design project and provide some protection to the objects being illuminated. In most cases, daylighting is a feasible lighting system.

Therefore, if there is a desire of designing the entrance space as an atrium, possible outcomes should be considered in detail. Design researches appear as an important factor also for lighting considerations when making initial decisions. In fact, apart from the other issues covered in the thesis, lighting design is a very vast topic. Thus the collaborative effort between architect, interior designer, and electrical engineer and, perhaps, a lighting-design consultant should be provided for Turkish health care environments. Planning for natural lighting can more easily be controlled by the architect who can design into the project, wherever possible, courtyards, greenhouses, solaria, clerestories, skylights, window wells and balconies. The term of natural light is that it changes continually, giving variety and form to the perception of objects and architecture. The luminosity of natural light, of course can never be matched by an artificial source. However, the fact that it is inevitable to make use of artificial lighting, designers should seek for ways to utilize it in its full potential. Through using many alternative techniques besides serving for a proper functioning space, a delicately illuminated, comfortable and attractive space might be obtained.

### II.3.2 Noise Control Performance

Noise is one of the most significantly disturbing environmental factor that causes physiological changes in the body and affect healing. In fact it is a factor that is harmful to a completely healthy person, so that a hospital patient can greatly affect, and it may seriously retard his recovery. Clearly noise is one of the most disturbing environmental stressors; it produces a generalized stress action. Entrance space, especially during day time, because setting a center for the facility, is used by a wide variety of people who can be accepted as a disturbing noise source and therefore if the space is not handled with noise reduction techniques this situation may shelter the entire positive features of the design. Seeking solutions towards an acoustically sufficient environment, this topic is covered acoustical problems of entrance spaces in Turkish health

care environment, noise sources, the noise limits and noise reduction techniques that should be applied within entrance space.

The term, acoustics, is a technical subject that requires careful consideration based on information about subject and its related terminology. Some of Turkish designers and architects might not be aware of broad scope of the problem and since there seemed to be insufficient research through a well-performing building, the noise problem is discovered after the construction is completed with the noticed existence of disturbing noise level. Afterwards, sound absorption materials introduced such as carpets or wall covering and these decisions brought many problems; also they don't supply the desired efficiency. Besides the decision of surface covering materials should be based on their acoustical performance, the lack of proper information here results with another problem of selecting inappropriate material as a covering for an acoustically sufficient environment. For the entrance space, which is very noisy because of the many reasons stated above, the selection is usually based on the durability and aesthetic properties of the component, e.g. granite floor covering is selected which results with excessive noise created with this hard, noise reflecting finishing. Another reason for the creation of this commonly noisy space is the improper application of standards and codes within the entrance hall, since architectural design and the arrangement of surface coverings generally revised in order to serve for aesthetical considerations with a little notion of well performed building.

The noise criterion through the entrance space might be investigated under the headings of two titles as interior and exterior noise criterion because each title has some specific considerations about indication of the accepted noise levels and some different techniques to control the unwanted sound.

The interior sources in the entrance space can be accepted as the mainly community itself, the traffic noise coming from the adjacent roadway, and the

machinery used in the space like the noise of security devices, the HVAC noise and so on if there is no other source existing. After identifying these sources, regulating pertaining to undesirable noise problem usually has two basic purposes left. The first is to specify noise limits that a hospital entrance space may not exceed at adjacent properties. Such limits are often specified by country or municipal noise ordinances or regulations in the abroad. The second purpose is to establish acceptable land uses, often including minimum construction requirements, for noise-sensitive projects that are planned for areas subjected to high noise levels, such as near airports and highways. Therefore, before proceeding to discuss noise control measures a question that must, be addressed at the outset is: what are the maximum acceptable interior and exterior noise levels? Obviously, the maximum acceptable interior noise level is a function of the type of occupancy. According to Cavanough (1999: 162), the acceptable interior noise level is generally based on the degree of interference produced by noise on task performance. In a noisy manufacturing facility, the acceptable noise level may be based on hearing damage risk. Once the acceptable noise levels are known, the required noise reduction can be determined. For example, if the acceptable noise level for an office space is 50 dB, and the noise level in the adjoining space is 8O dB, then the required reduction is 30 dB. An, acceptable interior noise for given activity cannot be specified in dB levels because interference or, annoyance produced by a noise is frequency dependent. Our ears are not equally sensitive to all frequencies. Consequently; acceptable noise levels cannot be specified by a single number, but in terms of a detailed noise spectrum.

Speech communication is the most critical activity in entrance spaces. Therefore, an obvious approach on which to base the acceptable interior noise level is the degree of interference a given noise level caused on speech communication. Specifying background noise levels based on speech interference levels had serious limitations, since it did not consider other effects of noise such as annoyance and interference with activity. Cavanough

(1999: 162) stated that, based on extensive interviews with people in offices, public spaces, and manufacturing facilities, a family of octave band sound pressure level curves has been developed to specify acceptable background noise levels. The curves are called noise criterion curves, abbreviated as NC curves. Furthermore, the NC rating procedure does not distinguish between two different environments with vastly different spectra; and regards them identical. In order to address this problem, Cavanough (1999: 165) defined a family of curves known as room criterion curves, abbreviated as RC curves. RC curves as explained above provide a more comprehensive evaluation of noise environments than NC curves. RC curves extend from 16 Hz to 4 kHz in place of 63 Hz to 8 kHz for NC curves. The related interior noise levels specified as NC and RC values are explained by a table by Cavanaugh which is displayed at Table II.3. only for the intended spaces. The hotel lobbies added to the table since the atrium entrance designing is very common; so the design criteria of atrium emerge as an important feature. The acceptable interior noise

Table II.3 Recommended RC and NC Values for Unoccupied Spaces (Modified from Cavanough, 1990: 168)

| No | Space | Recommended RC(N) Value | Recommended NC Value | Approximate dBA value |
|---|---|---|---|---|
| **1** | **Hotels or Motels** | | | |
| | *Halls, corridor, lobbies* | 35-45 | 35-45 | 43-53 |
| **2** | **Hospitals and Clinics** | | | |
| | *Wards, corridors and public spaces* | 30-40 | 30-40 | 38-48 |

level is higher obviously, it is logical for an atrium being noisier. However, there has to be more restrictions about hospital lobbies because people would be very sensitive than hotel lobbies than the required level shall be evaluated as in between.

Another important point to consider acceptable noise levels for HVAC and non-HVAC noise those have explained in the previous paragraphs. Cavanough continued with explaining that, HVAC noise should be low enough so as not to mark desirable occupancy-related sounds. Generally HVAC noise should be at least 10 dB lower than occupancy- related sounds in all octaves. Table II.3 has listed acceptable HVAC background noise levels in terms of RC and NC values for various occupancies including hospital public spaces. Conformance to RC values generally requires costlier HVAC system than conformance to NC values. That is why NC values are extensively used even through RC values provide a more reliable specification. Furthermore, the corresponding approximate dBA levels of acceptable HVAC noise are also listed in Table II.2.; they may be used only in those rare situations where instrumentation for octave band measurements is not available to verify existing noise with that specified; they should not be used for specification purposes. Table II.3 values may also be used as the upper limit of non-HVAC noises, such as traffic and equipment noise. For instance, the required transmission loss of external wall of a building situated in a high traffic noise area may be determined on the basis that the wall should reduce traffic noise to a value below that given in Table II.3 for that occupancy.

These interior noise levels related with the undesirable sound by occupying noise of community using the entrance hall, machinery, HVAC system or traffic noise coming from adjacent roadway can be controlled by these ways as stated below according to the Cavanough (1990: 170-186)

1. Interior noise control through architectural design;
2. Interior noise control through sound absorptive treatment;
3. Interior noise control through barriers;
4. Interior noise control through construction techniques;
5. HVAC noise control within interior space.

The simplest and the most efficient mean of controlling interior noise is through architectural design. Spaces in which noise level is expected to be high should be separated from noise-sensitive ones. Within the entrance space the main entrance hall might be separated with the main lobby where a private, more silent and calm environment is desired. There would be a visual connection obviously, however, for acoustical comfort and privacy needs explained in previous chapter, some separation should be provided. Beside, Cavanaugh (1999: 170) claimed that the separation between noisy and noise sensitive spaces should be examined both in plan as well as sections.

Another means of controlling interior noise is through the use of sound absorptive materials. Since sound absorbing materials act by reducing the intensity of reflected sound, they are effective in reducing reverberant sound only. The addition of sound absorption has no effect on the level of direct sound. Furthermore, Cavanaugh (1999: 174) expressed that, 10 dBA is usually the upper limit of reduction possible through sound absorptive treatment. In a room with reflective walls, it is important to keep noise sources away from the walls. Theoretically, a noise source near a reflective wall increases the noise level by 3 dB, as compared to a source in the center of a room. A noise source placed near the edge of a room increases the level by 6 dB, and a source placed in the corner of a room increases the level by 9 dBA. In the entrance space ceiling heights might vary depending on the facility going on under these different heighten ceilings. Then these techniques shall be both used, in the entrance hall the absorbers could be used as decorative elements hanging from the ceiling (Figure II.36), and in the main lobby that is a more close space, therefore ceiling height is low, ceiling absorbers (Figure II.37) can be used. These new mall type hospitals with grand atrium type entrances requires these absorbers close to the noise source(s) since atrium sets a space with many noisy activities an places where noise spreads easily.

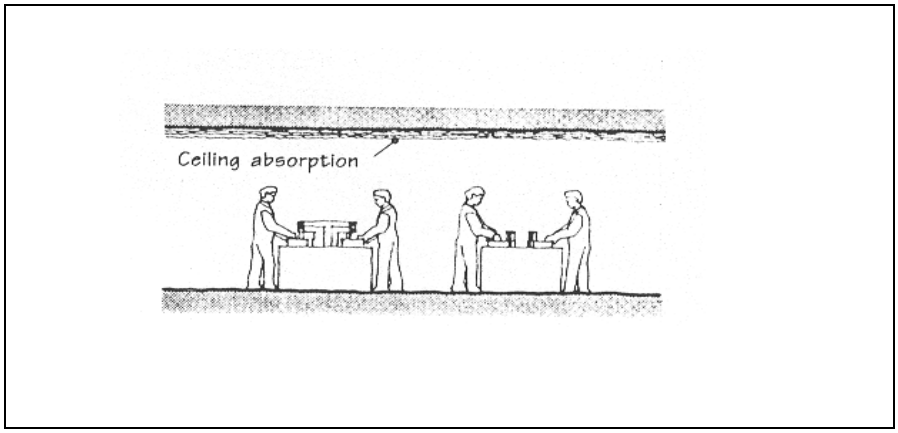



Figure II.38. In a Room with a low ceiling space absorbers bring absorption close to the noise sources (Cavanaugh ,1999: 172).

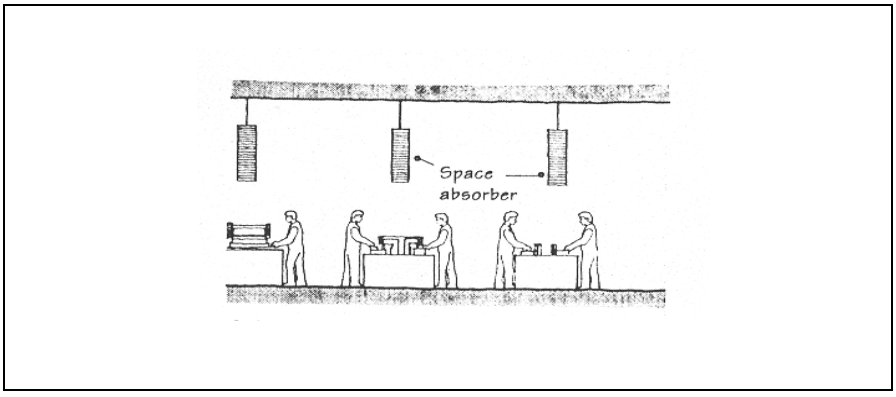



Figure II.39. In a Room with high ceiling, ceiling absorption is effective since it is close to the noise sources (Cavanaugh ,1999: 172).

Third way of controlling interior noise level is a sound insulating (full-height) barrier between a noisy environment and the receiving room which is the most effective means of interior noise control (Figure II.38). For normal occupancies, the required sound insulation of the barrier may be obtained from the empirical data. The magnitude of noise reduction required between the source room and receiving room is a function of the background noise level in the receiving room. The transmitted noise level should be lower than the

background noise level- generally by at least 5 dB. This ensures that sum of transmitted and background noises would not be significantly higher than the original background noise level. However this type of noise reduction is not commonly applicable for entrance hall, since the places are usually arranged not as room by room but visually and physically connected many spaces among each other. It might be used for some separate admitting departments, rest rooms, a part of the main lobby. However the entrance space seeks for a solution that brings up a controlling feature to the space where noise is born.

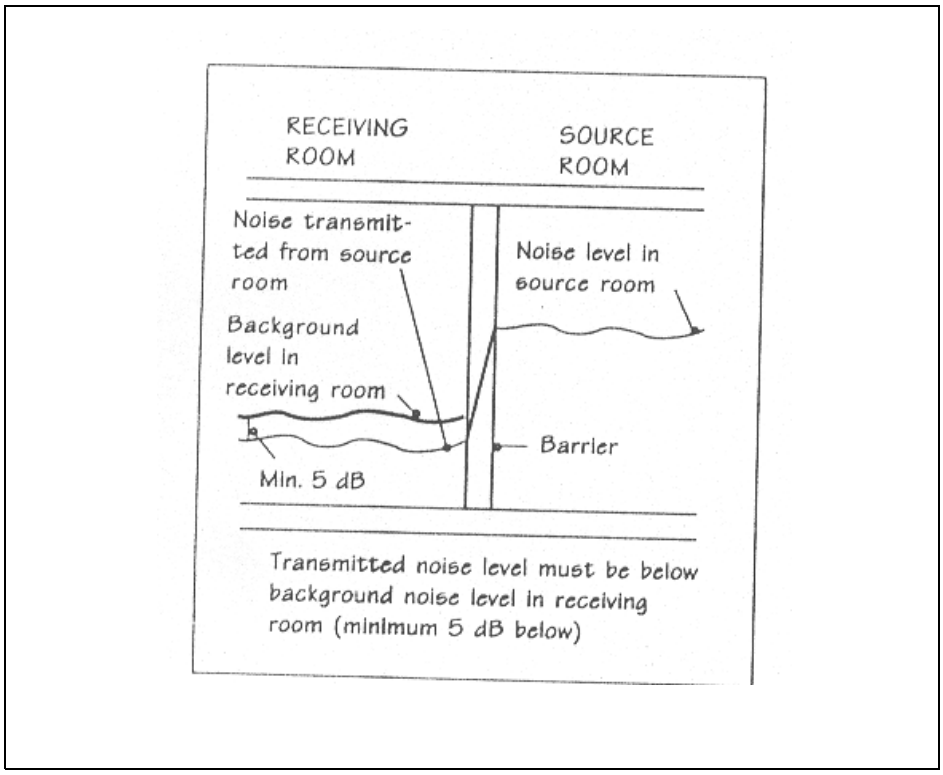



Figure II.40. Background Noise Level in Receiving Room and Noise Transmitted from Source Room. (Cavanaugh ,1999: 177).

Another essential way of noise control contains the techniques based on construction itself. The acoustical performance of any building material or construction can be compromised if the installation or construction is improperly or carelessly done. Starting from the initial construction decisions,

each arrangement should be done with maximum care in order to obtain an acoustically pleasing environment. The detailing of slabs, partitions, ceilings and penetrations should be done with careful considerations. For example, suspended ceilings with a common air space above, often used as return air plenums, can transmit more sound between adjacent rooms than the dividing partition which does not extend to structure. Usually a barrier consisting of a single layer of gypsum board (or material of equal weight) is sufficient to correct the problem. Return air must be entirely ducted or through lined transfer ducts. In some cases, blanket insulation placed on top of the ceiling would be sufficient. Besides the sound leakage through light fixtures and air grilles should be watched out. Some light fixtures are rated for sound transmission. Fluorescent lights and some other special lights have ballasts which can radiate objectionable noise. Ballasts for fluorescent lights are rated A, B, C, etc., with "A" being the least noisy. However, over a period of time, quiet ballasts may become noisy. It is hard to guess the noise created, since a modest entrance hall contained hundreds of these fixtures. For this reason, incandescent lights should be used in recording studios and other situations where this noise would be unacceptable. Electronic ballasts are quiet but they are more expensive. The lighting engineer should carefully evaluate the requirements of any noise-sensitive project. These precautions were for ceiling treatments; however, they displayed the importance of detailing through construction process in order to control noise levels for the critical entrance space of health care facilities.

Noise emitted by a heating, ventilating and air conditioning (HVAC) system is present in almost all modern buildings. The acceptable HVAC noise levels (NC and RC curves) were described before, the means of achieving the goals established by the above criteria has to be the studied in order not the disturb noise-sensitive users of the entrance space. Although acousticians play only a minor role in the design of an HVAC system, they are routinely required to review HVAC design drawings to ensure that the established noise criteria

met in the completed building. The HVAC systems commonly used in buildings may be classified as: window air conditioners, fan coil units, roof-top units, packaged air handling units, and built-up air handling units. The primary source of noise in HVAC system is fan unit and the other components is counted as ducts movement as well as the air flowing through the duct. Cavanaugh expresses the process as calculating the expected noise levels particularly in critical spaces like entrance halls are required at the design stage, and if the calculations reveal excess noise levels, there changes in duct layout, duct lining, addition of duct silencers, using sound absorbing plenums, branching of ducts and active noise controlling precautions are taken.

There are also exterior noise sources apart from the interior ones which affect the users of the building. The most common sources of exterior noise, also named as environmental noise, are traffic noise, aircraft noise, industrial noise…etc. How do we rate the annoyance potential of environmental noise would be the question. The NC curves and RC curves used for rating interior HVAC noise cannot be used to rate environmental noise, because one of fundamental difference between two types of noise: the HVAC noise level is constant, while the environmental noise varies with time. Because of its temporal variation, environmental noise can not explained by a simple rating criterion. Consequently, an extremely large number of criteria have been suggested over the years. However only two of commonly used criteria might be discussed as Leq which is defined as sound pressure level which, if constant over a given period, contained the same sound energy as the actual sound that is fluctuating with time over that period and Ldn which is an abbreviation of day-night equivalent sound level. It is Leq(24) in which the sound levels recorded during 10 PM and 7AM are raised by 10 dB over their actual values to account for the greater annoyance caused by the same sound at night. Both of these values are measured by integrating sound level meters.

When site planning measures do not provide the desired; noise reduction embankments or barrier walls or both should be built in order to cope with exterior sound criterion (Cavanough, 1999: 182). The terms commonly used for the noise reduction given by a barrier are barrier attenuation, and barrier insertion loss. Barrier attenuation is defined as the sound pressure level reduction provided by the barrier under free-field conditions. Hence, barrier attenuation does not include ground characteristics. Barrier insertion loss takes into account the modification introduced by ground absorption on both sides of the barrier, Barrier insertion loss is, therefore, defined as the difference in sound pressure levels with and without the harrier, but in the presence of the ground in both cases.

Finally, sound can be negative if it is perceived as noise and cannot be controlled; whereas sound perceived as music can be positive and therapeutic That's why designers should be informed about the acceptable noise levels both interior and exterior of the building and the techniques to reduce the undesired noise if it exceed the boundaries. Noise deterioration is expressed as a very important problem of this age, that's why designers should approach so carefully and sensitively to this subject when dealing with an environment caring for expected to care for community health within a space that cares for it. Entrance space, because of its usage pattern and procedures, requires much attention and within many contemporary noise reduction techniques, designers could find a proper solution that pleased both provider and the users who are seeking aesthetical and calm, basically -a healing- environment. Acoustics are largely under the control of the design team, and every effort should be made during the design process to predict possible sources of noise and find ways to decrease them.

### II.3.3. Performance of the HVAC Systems

In a health facility, heating and ventilation are very complex issues that require careful consideration. Needs vary, depending upon an individual department and the population served. Since entrance space contributes a wide range of people, a large number of lighting fixtures and large glazing systems; the control of climate and indoor air quality is difficult. This issue found its place in the following text with exploring the problems of Turkish healthcare environment about obtaining the desired atmosphere, the essence of natural ventilation, the circumstances to be cared when employing proper HVAC system and finally cooling and heating systems of atrium type entrances since this typology covers many points to investigate.

Energy consumption of a building has been trying to be decreased with this century since the sources of energy are limited, and too expensive to waste. In addition, an expensive initial and maintenance costs of these systems restricts their use within Turkey, where the facilities have very limited budgets. Because of the space restrictions, if enough natural ventilation could not realized, these crowded spaces became as sources of heat and odor. However, some private or contemporary examples of these facilities designers made use of such systems as the mechanical ventilation, cooling and heating, however there is another problem emerging, they usually do not give enough importance to natural way of ventilation. Therefore an optimization should be made between two of these systems, architect should design a space that is totally symbol of health for these specific location. Besides these problems stated above, Turkish designers usually regard to make a collaborative work with mechanical engineer, than many detailing problems and space insufficiencies emerge within construction process of a sufficient HVAC system through the entrance space as obtaining such a low ceiling that leads to creation of an depressing environment. Another essential problem have emerged through the use of split conditioners that might disturb the users by velocity of the air that it

circulates. The users in the entrance of a healthcare facility might be ill or sensitive to these kinds of conditions more than the people in any other spaces, it would be very inappropriate to use this kind of a device in order to cool the entire hall.

Heating, cooling and overall ventilation subject has two faces to be considered: natural ventilation with making use of energy efficient building design and the use of air conditioning devices in order to ease the work of cooling and heating. Natural ventilation is an essential need for each human being however arrangement and detailing of fenestration systems in order to obtain proper ventilation should be carefully done with having the essence of proper air velocity in mind. Since entrance space does not contain diagnosis, surgery and treatment applications, the sterile environment is not strictly required; and even not possible because of the existing crowd and circulation pattern from outdoor to indoors. This fact also makes using the possible natural ventilation idea feasible for the entrance space. However it might be insufficient to use only natural air circulation when today's entrance spaces with a considerable volumes are concerned. Therefore there is another option that makes use of mechanical systems which are close to provide to perfect climatization, however, their placement requires a clever organization and pre determined space planning. The air circulation through doors should be considered when heating, cooling and air conditioning of the entrance.

The essence behind energy efficient building design should be comprehended clearly, since these systems are ecologically harmful in long term purposes and their energy consumption is very high. It would be very convenient to pay for proper insulation systems that might save much energy in long term planning; also to make use of contemporary shading devices which would please both providers and users since they have loosen the thermal load of the hall dramatically.

It seemed obvious that these systems of heating, cooling and air-conditioning would have some problems through the use of healthcare facilities. As reported in Malkin (1992: 54), according to the researches done by the National Institute for Occupational Safety and Health, there is a relationship between poor ventilation and a number of illnesses including headaches, fatigue, sinus congestion, eye irritation, chest tightness, nausea, dizziness, and dermatitis. Many diseases that are originated from hospitals were traced to this condition. These problems are common in large buildings with non-operable windows and ventilation systems that filter only about 85 percent of the air. A variety of pollutants such as smoke, hair spray, perfume, body odors, air-borne bacteria, and formaldehyde resulting from the off-gassing of synthetic building materials are re-circulated and inhaled by the building's inhabitants. As Sherrott (1993: 200-226) continues, air conditioning systems have received much unfavorable publicity in the wake of outbreaks of Legionnaires' disease (1), humidifier fever (2), and other respiratory diseases. However, air conditioning and ventilation systems may play a part in the aetiology of some diseases but it is clear that in general the benefits far outweigh the small risk to health. Well designed systems in hospitals and other establishments prevent illness by reducing cross-infection and by removing contaminants such as anesthetic gases. Risks to health are minimized if systems

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(1) Legionnaires' disease usually starts as a flu-like illness with fever, profuse sweating, muscle pains, and headache. Within a few days a cough develops which may be dry at first but later usually becomes productive. Breathlessness and confusion occur in about fifty per cent of cases at this stage. Commonly patients are admitted to hospital within a week of onset of symptoms because of their severity and failure to respond to routine treatment.

(2) Humidifier fever disase is composed of febrile attacks occurring when exposed to water from humidification systems contaminated with bacteria and algae.

are properly maintained and operated; particular attention should be paid to humidification and cooling water systems. Furthermore unnecessary dependence on wholly artificial means of air control can impose intolerable difficulties when sophisticated systems break down and prompt and efficient maintenance cannot be relied upon. Total dependence upon it can quickly render a building uninhabitable in such circumstances.

The new emerging favorable atrium type hospital entrances require special attention when the subject is energy efficiency issues. According to Bednar (1986: 81-82) although there are many reasons for the current resurgence of atrium buildings, none is more significant than the inherent energy potential of this spatial type. An atrium contributes to passive heating, is useful in an overall ventilation and cooling strategy. An atrium has certain built-in features which heighten its potential for achieving energy efficiency. These are orientation control, aspect ratio, generated perimeter, and stratification. They must be used to advantage in a coordinated system for the true energy potential of the atrium to be realized.

Most atrium buildings are thermally heavy (high internal heat gains) and used during the hottest part of the day, making cooling a very important concern. There are potentially four passive cooling techniques available for use in atrium buildings. They are expressed by Bednar (1986: 90) as the control of solar heat gain such as shading, use of thermal mass, radiative cooling, and convective cooling. None of these techniques, alone or together, can be relied upon in its natural form to completely or effectively cool large scale, enclosed atrium buildings. However they can be very helpful in reducing cooling needs and thereby aiding the mechanical cooling system. In this way, the use of these concepts can contribute to energy efficiency. Shading is a defensive cooling strategy which relies upon keeping solar heat out of the space to be cooled and explained in detail within the lighting topic. Secondly, the thermal mass of a

building can aid in the cooling strategy by reducing building temperature at night so that internally generated heat can be absorbed during the day. Additionally, the cold night sky and the polar sky during the day can serve as a heat sink for the radiative cooling of a building. Heat flew from a warm atrium to cooler areas of the sky. Finally, convective cooling is the most useful direct technique for passively cooling atrium buildings as Bednar (1986: 90-92) states. Thermally driven convection is based upon the stack effect in atria with high section aspect ratios. Wind induced convective cooling can also be functionally effective.

Besides cooling, the atrium can contribute to the heating function of the building it serves through passive solar heating, more efficient mechanical system operation, and/or conservation of building heat. As in most commercial buildings, entrance spaces of hospital buildings have a heavy thermal load because of existence of large amounts of heat generated by occupants, artificial lights and office machines. Thus in general, heating considerations play only a tertiary role in the design of atria. According to Bednar (1986: 94-96), in terms of passive solar heating, the most effective mode of operation for an atrium is as a sunspace within an isolated gain system. In this passive heating scheme, the solar energy is collected and stored in a space separate from the living space, with provisions for its transfer to the living space as needed. A more economical strategy is to use the advantages of an atrium to augment the mechanical system which is necessary in large scale buildings. Using the space as a return plenum has proven to be a very useful scheme. Conserving the heat within is the final consideration in heating atrium buildings. The exterior enclosure is the primary concern, since it usually has a high percentage of glazing. Insulating glass is certainly to be recommended as being cost effective in terms of energy savings.

Taken together, an analysis of these factors can lead to an effective energy strategy for the project in question. It is the essence of the design act, to

weigh the factors and create a scheme leading to a balanced solution. Establishing programmatic goals regarding energy conservation before design begins is aided in the process of evaluating alternative design schemes and developing the finished space. However although the entrance space use may be relatively constant throughout the year, the dynamic changes of the climate make it difficult to produce a static architectural solution which would be optimal under all conditions. Hence, conservation of building operating energy is increasingly a design goal of owners, therefore designers whether atria or different typology, the entrance designs must utilize the energy used for heating, cooling and ventilating the space. Designers should held a collaborative work with the engineers and the importance of natural air through the hospital life should be understood clearly.

### II.3.4. Fire Control Performance through Main Entrance Space

Fire-safe building development is gaining importance through the design process since the danger is understood by many unfortunate experiences. Designers cannot know all the fire and safety regulations but they should search and obtain the required information when design task has been proceeding. Besides, there is a well documented scientific and statistical evidence of the fire behavior in order to obtain a sufficient organization for fire safety. This title explored the fire behavior in Turkish health care environments and sample precautions should be taken for entrances as well as the fire safety issues for atrium type hospital entrances since they exhibit certain unusual fire hazards.

The fire precautions and the issues to be considered when fire occurs in the entrance area of hospital environments is arranged by Turkish municipal building codes, however applications are suspicious to be done. In many circumstances it is observed that fire routes are decided after the initial planning has done; in order to take approval from municipality to begin the

construction process. These routes are complicated to follow in a panic position and they are usually not designed properly like fire-rated surface covering treatments, easy to handle routes and efficient escape door designing. The fire distinguisher systems or sprinkler systems have started to be used, as a positive point to consider that clarifies the comprehension how important to fight against fire; however maintenance of these systems have not been done properly which make them ineffective within few years if there is not an existing reminder. Unsatisfactory definition and lighting of emergency routes, improperly designed fire escape doors, the unawareness of fire and smoke preventing entrance space design, the inappropriate finishing choices of designers and finally the improper arrangement of fire tubes might be counted as some common flaws done by architect and construction engineers when the subject is fire control.

Smoke control is the first necessity for life-safety in buildings. But in order to control smoke, Saxon (1986: 109) suggests that the size of any fire which breaks out must be strictly and rapidly limited. Once life safety requirements have been met, and all endangered occupants have escaped, then fire control measures are more concerned to limit the spread of the fire within the building or to the adjoining structures. Response can be manual or automatic in order to detect the spread of fire at an earlier moment. Where automatic detection is necessary it is better to rely on smoke-detection rather than heat-detection to alert emergency systems as stated by Saxon (1986: 110). However he also claims that in hospital entrances where 24-hour human surveillance is available, manual response with portable or fixed extinguishers is the most sensitive and effective, just as the human nose is the most accurate detector. As fire defense systems for a great majority of spaces uses water sprinkler systems that are effective, knocking down the fire sizes, or at least containing the fire size, before the arrival of fire department. Gas protection systems also exists but they are more costly and difficult to be applied since the gas is dangerous also for human life so the use of is this system is not common

for hospital settings. Even the fire size is controlled by sprinklers there is a risk of fire spreading to other levels of the building. Saxon explains that, the best policy remains early detection and fire-fighting to limit fire size, and the use of toughened glass to use the breakage danger, however this last way is very expensive and difficult to use for Turkish health care environments. Besides, it is always worth considering the provision of a safe route and extra safe stair for fire fighting access.

The issue of fire safety is very significant to the design and development of every atrium building. There, the certain unusual fire hazards presented by these atrium type buildings that have been stated by Bednar (1986: 103):

1. Smoke buildup in the atrium and smoke spread between floors via the atrium;
2. Rapid fire spread between floors via the unrestricted atrium; horizontal and vertical fire spread within the atrium (Figure II. 39);
3. Unprotected egress when the atrium is part of the escape route via galleries and/or stairs,
4. Fire-fighting problems due to the unrestricted nature of the fire and smoke source.

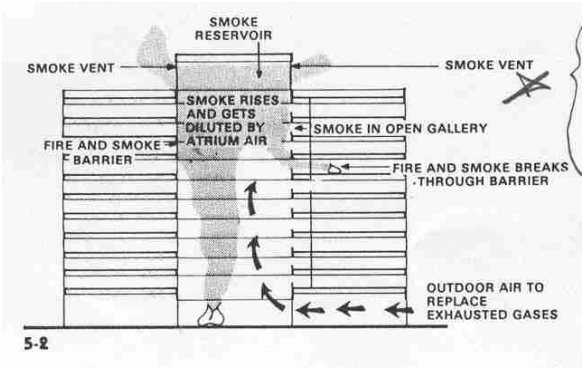



Figure II.39. The way of smoke when developing within the atrium (Bednar, 1986: 106)

Therefore all building codes require an effective means of both smoke control and smoke exhaust. Furthermore a fire suppression system, smoke detectors, manual alarms and/or manual controls may be used. Limiting the spread of fire through enclosure and suppression gives fire fighters the time to extinguish the blaze. Furthermore an electrically supervised automatic fire suppression system is required in all floor areas directly connected to the atrium-including the atrium itself- which are not separated from it by two hour fire rated construction. The final and ultimate concern is the safety of occupants. As Bednar (1986: 107) states they need a readily available, easily understood, protected route from almost anywhere in the building to the outside. The use of the atrium as part of this route is not wise according to him, because of the smoke problems previously mentioned. For all intents and purposes, the required exit way should be separated from the atrium by protected corridors leading to enclosed stairs with fire doors. This route should be thoroughly thought out by the designer so as to be easily executed by all people. What is positive according to Bednar (1986: 108) is the execution of modern day atrium buildings has to come to rely upon complex electronic and mechanical solutions to fire safety problems. Hopefully these systems have enough built in redundancy and /or backup measures to render them effective when an emergency situation occurs. He claims that many atrium buildings could not be constructed were it not for the availability of these safeguards. The precautions should be seriously taken care when entrance space has not been designed as an atrium also, since the life of humans is the main concern.

Therefore for the issue of fire fighting, Saxon (1986: 110) expresses that the building's own defenses are a prelude to the arrival of fire department. He continues that, final victory over any fire is depending on the department gaining quick and safe access to the seat of the fire. To facilitate these provisions must be built in at the initial planning stage, during discussions on the concept with the fire department. Finally, the problems should be

considered properly by the designers on fire fighting within taking care of human life on mind, there has to find proper solutions sensitively according to building codes and the possible fire behavior defined by experts through books to the entrance space of the existing facility.

### II.3.5. Performance of Operating Systems

Entrance space contributes a very important function within its physical boundaries as establishing a transition from out into the hospital facility. This functioning clarifies the importance of a properly designed entrance door that serves for thousands of people each day. Besides another component of this process with lighting, ventilating and viewing functions is window features which have special importance in atrium entrances. The problems of these operating systems and some issues to be considered in designing each case are covered within this title.

The operating system usually have set a different task for the designer of Turkey since client does not allow the application of required costly system for the intended use, and the heavy use pattern of the inhabitants of hospital does not allow a long term efficiency for selected systems. The manually operating systems were common, and they were used within the hands of even thousands of people entering the building, therefore it was difficult to make them function through long service periods. The automatically operating systems are available in the market nowadays, however they are not designed properly with considering the requirements to operate them properly (Figure II. 40).

As an example, sliding doors serving for these complex buildings with many inhabitants have to be designed within precautions taken about the appropriate climatization. Besides these sliding doors might become ineffective

if there is a heavy traffic since it stays open through the day and even it has been left open to ease the operation of the system.

II.40.A. Ankara Educational Hospital, Ankara.

II.40.B. Ibn-i Sina Hospital, Ankara.

II.40.C. Ankara University Cebeci Campus, Women Hospital, Ankara.

II.40.D. Ankara University, Cebeci Campus, Oncology Hospital, Ankara.

Figure II.40. Improper entrance door design.

In order to organize proper operating systems; information about the capacity and the use pattern of that particular space might perform as a valuable input through entrance door design. The opportunities are restricted with what technology can serve. The heavy use pattern of entrances that enables thousands of people to use these doors, remind security and climatic

conditions to be concerned. If sliding or manually operated doors have used, to obtain security would be very difficult since four or five people might enter together. Also that heavy use pattern prevents door to be closed, the cool air in winters or hot air in summers will penetrate inevitably although it is not desired. Solution of climatic disturbance might include an introduction of a buffer zone, and setting mechanical climatization above the opening. However, security can only be obtained by additional staffing and machinery. Therefore revolving doors might establish a good opportunity, today there are automatically operated revolving doors serving high capacities; that allows people and air with a more controlled manner. However, turnstiles and revolving doors, for example, may prove hazardous to those who move with some difficulty and may be inaccessible for someone with a wheelchair or pushing a baby stroller. Therefore a manually operated door might be designed to use at these circumstances. Furthermore, doors, and windows g1azed just from the level of floor shall be constructed of the safety glass, wired glass, or plastic glazing material that resists breakage and creates no dangerous cutting edges when broken. In addition, special consideration should be given to the base of these doors, however there might be existing stepped platforms which may cause injure to the users. Sudden transitions inappropriate stairs or single steps might be missed by stressful users moving with panic, therefore there has to be safe platforms without slippery surface properties should be employed by the designers in order to facilitate them also for disabled individuals (Figure II. 41.).

The large-scale glazed surfaces used in contemporary entrance halls and especially for atrias are significant design components which create spatial drama and exciting views. Bednar (1986: 113) clarifies that the development of glazing systems has progressed very rapidly in recent years, expanding design possibilities while solving difficult technical problems. It should be underlined that for entrance spaces, the window treatments should permit for natural ventilation, since sterilized environment has no use within this space.

II.41.A. Hacettepe Education and Research Hospital, Ankara.

II.41.B. Bayındır Hospital, Ankara.

Figure II.41. Successfull entrance door designs.

These systems should allow the enclosure of space while retaining the desirable light and view but prohibiting the undesirable effects of climate. Bednar (1986: 114) further explained a number of design requirements which have to be met by these systems.

1. Climate protection: Resistance to rain, snow, and wind infiltration;
2. Safety: Resistance to wind and snow loads; resistance to breakage and/or safety to occupants when broken; resistance to fire;
3. Cleaning: Self cleaning exterior; means of cleaning interior;
4. Economy: Balance of cost and value in materials; reasonable installation cost;
5. Energy: Control of solar heat gain and radiant heat loss; optimal daylight availability; view opportunities, glare control;
6. Appearance: Compatibility with building image, aesthetics, and geometry.

Finally, it should be noted that, these features have to be considered carefully, the operation efficiency has to be maximized with achieving the

intended goals and the maintenance and ease operation should be eased within a proper design for both of these systems. In addition, the glazing in windows and doors for the entrance area should be professionally designed by stained-glass windows and as many areas in the hospital they should be made shatterproof by affixing an invisible film to the inside of the windows or more expensively. Therefore to serve for the main purpose as transiting people from out to in would be achieved only through proper design of these two operating systems where doors allow people in and windows allow out features into; in order to make use of them in the interior space of an hospital entrance.

### II.3.8. Performance of Furniture Components

Furniture has to be retained and used creatively since it represents the major investment and hospitals of any size have quantities of the stuff. An affordable, comfortable and maintable furniture in a healthcare environment seems to be the timeless need of the space. The issues about furniture that contributes negatively to the design environment to the entrance spaces in Turkey hospital settings, the features of a well designed and arranged furniture for this special place is discussed within this title. The aesthetic appearance and the low price of a component as furniture could mean a little when selecting in contrast with what designers think about the priorities of criterion of choosing such design element.

The furniture employed in hospital environment mostly involves seating and desks; so careful consideration should be given in order to make convenient decisions about these topics that are reflecting the image of the facility and setting the expectations of further environment by being a very essential component of this image as they are placed in the entrance. Their durability, detailing, overall contribution to the designed space, welcoming appearance, material and the way of arrangement became very important. Mostly information and reception desks are manufactured especially for that

constant hospital with proper special dimensioning fitted to the arranged space for the desk, so its detailing is left to the designer of the space instead of buying something from the market. However the durability or aesthetical feature usually underestimated for the sake of low price, so this kind of an essential feature became a disaster within a few years because of heavy use (Figure II. 42.). Beside; both desks' and seating elements' harmony with overall appearance of the setting; assumed to be just a color adaptation that brings up a chaotic panorama of the entrance space. Furthermore these seating arrangements are accepted as the features that bring warmth to the design of entrance space, however they are usually arranged as repeating elements of the same type of single seating element placed just where thought to be needed without any design consideration behind, in fact where staff believed to be convenient to use. They lack variety and comfort in such cases since it would be economic to buy a big number of the same element than buying different kind of furniture in fewer numbers that would cost more. Their fabrics are not durable as required by such kind of a setting, also they are not adaptable for a easy change, therefore when management wants to get out of this old appearance, they get rid of the seating furniture itself.

As Marberry (1997: 124) states, the majority of furniture required for the health-care environment is for seating; naturally many different approaches to accomplish the requirements are available on the market. But the he argues the universal list of requirements seems to always contain these following items. They have to contribute replace components which provides end users with the ability to replace or repair furniture right at their facility and eliminates the need to provide loaner furniture while waiting for repairs and prolongs the life of the chair. Besides, recoverable seats might be useful. What is more, Kantrowitz (1993: 84) claim that modular furnishings would be advantage for the design of this special space because of the advantage of predictable dimensions, controlled variation, and consistent approaches to connections.

II.42.A. Seating units, Ibn-i Sina Hospital, Ankara.

II.42.B. Seating units, Traffic and Travmatology Hospital, Ankara.

II.42.C. Information Desk, Ankara University Hospital, Cebeci Campus, Women Hospital, Ankara.

Figure II.42. Improper furniture components.

As a result, they reduce problems with technical fit, dimensional consistency, provide functional flexibility, and facilitate replacement of furnishings. However, the essential appearance depends on the variety and aesthetical properties of furniture for entrance space and also there are not many restrictions about these furniture properties as valid for the entire facility. Therefore, the use of some specified items might be more logical for this important space; also by providing a variety of furniture, the facilities meet the full range of staff, patient and visitor needs like child sized chairs in the children's waiting area according to the author. They have the added advantage of aesthetic compatibility. Kantrowitz further suggests using multicolored

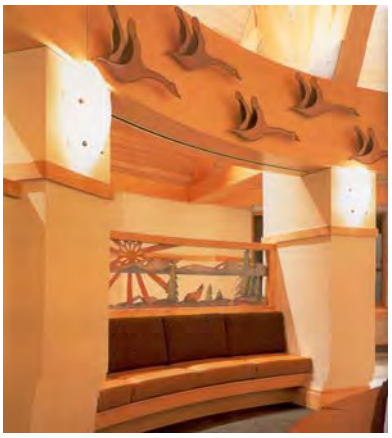
patterns on carpeting and upholstery to mask dirt and wear, which patterns are not strong or easily discernable; instead they appear as mottled single colors or subtle tweeds.

Another important subject is the textiles used in upholstery of curtain in the entrance space of a healthcare environment as Marberry (1997: 173) express that in today's rapidly evolving health-care environment, many types of these products developed that address infection control, stain resistance and cleanability, fluid control, flammability, and durability. Naturally healthcare textiles continued to be specialized and upgraded but the budged constraints should be thought in accordance with the long product life cycle with proper care and maintenance guidance. In addition, all fabrics used for public premises have to be fireproofed differently from the fabrics used for the domestic purposes whereas the foam of used within these seatings should have poor flammability.

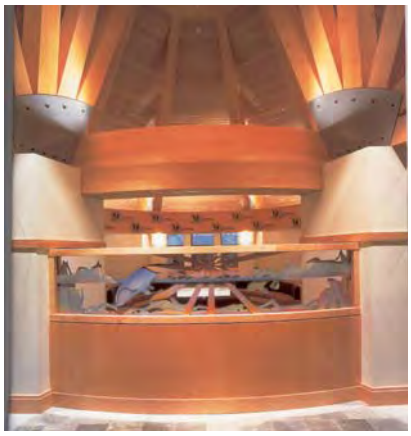
Finally, importance of these features can be understood when they are thought as elements setting the overall image of the space in healthcare entrance environment, besides they are features that should look more aesthetic than any other component of the space (Figure II. 43). However the long performance criterion list including durability, flammability and so on should be tried to be satisfied since beside their aesthetic responsibility inevitable to serve, they has to resist against a heavy pattern usage in this special space of the hospital that is used by the whole hospital community.

### II.3.7. Performance of Surface Design and Covering Materials

Surfaces can be noted as ceilings, floors and walls that define spaces through setting the boundaries of these components of the whole environment.Development of surface design, finishing materials and related



II.43.A. Main Lobby.



II.43.B. Information Desk.

Figure II.43. Properly designed and detailed furniture components for entrance space, Alaska Native Medical Center, Anchorage, Alaska (The Images Publishing Group, 2000: 156-157).

detailing work are very important since this finishing-work contributes greatly to the final impression, whereas it functions in order to satisfy to the multitude of requirements of this specific environment. Furthermore, since a health care environment is mentioned, choosing the appropriate treatment, form and color can play an important role in healing, stress reducing, which are very necessary and primal for healthcare settings. However, there are several aspects that should be considered unique to the healthcare settings such as functional, financial, and aesthetic considerations. Functional considerations include flammability, toxicity/environmental regulations, indoor air quality (IAQ), specific maintenance needs, and replacement needs. The financial concern relates not only the cost of the product, but also defines long versus short term approaches as surface preparation, renovation needs and also customer attraction by presenting specific image and ambiance. Finally, there are aesthetic considerations that sets a very important point because of the facility's healing and diagnostic role. Appearance and aesthetics of the space has a behavioral and psychological impact on staff, patients and patients'

families (Marrberry, 1997: 201). This title has explored the definition of these surfaces, the case of Turkey within the evaluation of the performance of these surfaces covered, performance criterion when designing the surfaces of the entrance space in healthcare environments and some selected examples of commonly used finishing materials in Turkey.

The heavy use pattern of entrance space in hospital facilities requires high performed ceiling, flooring and wall covering materials obviously. The performance not just based the cost of these materials which contradicts with the common belief in Turkish health care environment. The common use of expensive brittle materials as flooring, such as granite or granite ceramic tiles, would result with slippery surfaces and the insufficient fugas in between which can contain dirt and bacteria in a this heavy used space inevitably. Especially for the drop of areas, the flooring material directly exposed to outer climate conditions, and snow, cold air conditions through the winter session and/or exposed to the cleaning procedures may cause great danger for all users of the facility. These tiled materials can be laid without jointing between; however common application required very difficult maintenance that is hard to cope with, in this heavily used area. What's more, for wall treatments, designers prefer commonly paint which is easy to apply and renovate, however the kind of paint which can also be used for residential purposes might be inconvenient for the use pattern of this special space. Although latex composed paints or textiles that can resist against harmful acts, these brittle compositions are not capable of tolerating crushes, therefore damage commonly occurs because of vandal acts or possible wheelchairs hits and these kinds of staff.

Another cost of improper research that creates improper results for finishing purposes might be named as insufficient detailing which gives way to shorter life span of the material on the surface with an unaesthetic appearance. The full range of requirements for the base of material, the way of applying the material to the surface and these work need to be done in order to properly

operated surface for intended results seems to be underestimated in many circumstances. Even some skirting details, some corner utilizations or details of electrical appliances used in ceilings contains simple faults and this situation affect the whole ambiance of the space, which may be designed with most expensive materials obtained from the market. Furthermore the use of these expensive, shiny, brittle materials usually results with institutional image that rather seem as an expensive office space which lacks the properties of a friendlier healing environment. This can be related with the nature of the materials used as well as the talent of the architect. In rural areas of Turkey this technology of materials and their detail appliances may not exist and usually there are many limitations about budget utilization, designers usually prefer traditional materials which may tend to give way ordinary look. Although it is the designer responsibility to combine these materials with priceless components such as variations of color, patterns and arrangements, most circumstances involve the same dead, leak appearance in the entrance space of hospital facility that sets the image of the entire clinic. Finally, the intention of the client has to be oriented properly. In Turkey the client that directs the decisions about the facility, can be a governmental institution itself, a firm, a group of firms or even a single person who may have improper information about the performance of the material, or final look might be the reason of this desire as well as its reasonable cost. Many health care facilities in Turkey are based on short term valid, subjective decisions of the owner of the facility. That’s why designer have to held the subject carefully with thinking the essential requirements of this special space which have to give some opportunities to all of the decision makers and users of the facility. Within these choices, designer must be able to challenge the functional and aesthetical requirements of the space, the organizators must pleased with its feasibility, ease of operation and maintenance and patients and visitors should find the environment motivating with its whole appearance.

Performance criteria to be considered when selecting the finishes for entrance in hospital environment such as:

1. Durability;
2. Safety;
3. Toxicity;
4. Acoustical;
5. Adaptability;
6. Optical;
7. Hygiene;
8. Cost and
9. Quality of life.

**Durability:** Marberry (1997: 203) claims that the most important single factor in selecting appropriate finishes is the activity that took place in the space. Heavy/high use spaces obviously subjected to more abuse, wear and tear and require more frequent cleaning and renovation. It would be useful that the designer check the manufacturer's product specifications for each product and evaluate whether a particular product would stand up for the demands of space. A designer should require product tests results on literature showing product performance regarding common staining agents and should review abrasion testing.

In selecting finishes that are suitably durable for entrance area, it is important to discuss the housekeeping aspects of the problem. The data about how often it requires cleaning is important to define the serviceability of the product. Maximum period should be twice a day, in the morning and at the evening, since entrance space is crowded through daytime and additional cleaning might result with excessive workers. Furthermore the possibility of following factors might cause damage:

1. Water, water vapor, or other water-soluble spills;
2. Grease spills or splatters;
3. Blood, urine, chemical spills, or splatters;
4. Impact;
5. Point loading;
6. Abrasion;
7. Cigarette or other bums;
8. Adhesive tape, stick pins, ball-point pen etc.

Further important considerations are the ability of the finish to maintenance integrity when cracking occurs in the substrate and the likely success of the damages of this type. Kızılcan (1996: 128) argued the ways to minimize damage as indicated below:

1. Select finishes which would resist possible damage.
2. Select finishes which concealed or hide possible damage. Color or texture might be used to hide this possible damage as well as having a chance of hiding possible dirt.
3. Protect finishes by installing bumper guards, comer caps, chair mats, etc. Specifically, in order to preserve their fresh appearance without the need for excessive repairs, entrance hall finishes must be quite durable and adequately protected. They are exposed to a variety of damages; spills of all kinds, intensive traffic, scrapes, scratches and soiling being the principal sources.
4. Select finishes are capable of being easily and inconspicuously repaired or replaced, preferably in- house staff.
5. Train housekeeping and departmental staff in the proper maintenance of finishes. This would be most successful if staff is allowed input into the selection of the finish initially.

***Safety:*** Most floor finishes are safe underfoot when dry but many become unsafe when wet. Especially outside routes, the stairs and also the drop

off area which in fact had to be protected from snow and so on, anyway might became a very slippery surface in winter conditions. Cleaning is one of the most important concerns when selecting non-slip floor finishes. Most non-slip floors depend on surface texture or roughness to achieve the non-slip quality. The rougher the surface texture, the more difficult it would be to clean. Therefore, in selecting a rough textured, non-slip floor for safety, the desired level of hygiene must take into account. Besides, contrasting floor pattern can be confusing and should be selected carefully. Lastly, slip resistance and sufficient resiliency to make falls less dangerous are necessary requisites.

When safety is a concern for choosing covering materials, another important consideration is how any proposed finish would affect the hazard to the life of the occupants in the event of fire. Since entrance is a possible escape route, special attention should be paid the finishes in the case of fire. Particular attention must also be paid to 'smoke develop' characteristics, since smoke is the greatest hazard in hospital fires. Smoke which is immediately and abundantly in even the smallest hospital fire represents a more common risk than the possibility of a major conflagration according to Kızılcan (1996: 125). For that reason finishes should be examined with great care with respect to their potential of developing smoke or toxic fumes. Marberry (1997: 112) mentions about the flame spread rating of the component to consider in selecting these safer finishing. Flame spread rating is indicator of a material's surface burning characteristics, displays how quickly a flame would spread across the face of a ceiling panel.

***Toxicity:*** The overall approach for the design industry must be the balance building's complex chemical, physical, and biological processes that affect building occupants' health and well beings. The correct selection of safe building materials is one aspect of this approach to crate a healthy indoor environment with minimum exposure to toxic materials. The best floor coverings for the health concerns is stated as the hard and smooth ones that

don’t release chemicals into the air are easy to clean, and do not collect dust or support mould growth according to Marberry (1997: 246). Solid wood flooring is a good option when it comes from a supplier that has planned the reproduction since it has a long life cycle and can easily be refinished. Ceramic tiles can be used since they are natural because they are made from the natural abundant earth sources. Vinyl sheet floorings or wall coverings are made from 100 % PVC and can slowly offgass throughout its lifetime, so it would have to be sealed to mitigate its emissions. Therefore it is important for all surface coverings to be chemically stable and do not offgass through air within their life cycle.

***Acoustics:*** the noise limits and the control techniques of noise within entrance space has been mentioned through previous chapters. When acoustical privacy is required, the treatments of surfaces have their essential role affecting the intended performance of the finishing. The fact that a quiet environment helps to promote healing makes the acoustic performance of finishing materials a very important consideration in health care environment and performance in this area can be indicated by two values generally according to Marberry (1997: 111). First of them, NRC (noise reduction coefficient) is the measure of the average sound absorption of a material. It represents the amount of sound absorbed by a material when the sound is incident from all directions. It is also average over a frequency range of the speech. The value ranges from 1.00 to 0.00. An NRC of 0.50 means the material absorbs 50 percent of the sound strikes it. Ceilings with NRC’s between 0.50 and 0.70 are considered good sound absorbers where those with an NRC of 0.85 or high are considered excellent. Secondly there is the Ceiling attenuation class (CAC) which is a measure of the sound transmission loss of a ceiling and plenum combination. It is a single number in decibel units that represents the loss in sound level as it is transmitted through a ceiling, into the plenum above the ceiling height partition, and back through an adjacent ceiling (e.g. from one partition room to an adjacent partition room).CAC values range from 15 to 45. Ceilings with

CACs 30 to 35 are considered good sound barriers; those with CACs of 40 and higher are considered excellent. Therefore these two values are important in evaluating the acoustical properties of finishing materials that is used in entrance spaces for calm, relaxing environment.

***Hygiene:*** Before selecting finishes for a particular area such as entrance, the required level of hygiene must be determined. Kızılcan (1996: 126) expresses that there are three levels of hygienic maintenance which should apply to any health facility areas:

1. Visually clean as in offices and public areas;
2. Hygienically clean as in kitchens and areas for the direct physical care of patients;
3. Aseptic as in invasive treatment areas and areas where sterile material is handled.

Entrance space requires being visually clean as explained by Kızılcan since any procedure of hospital environment about treating and diagnosing does not exist. However it is a place still located in this kind of an environment where hygiene is the initial requirement of the processes going on; designer should take care of selecting easily cleanable finishing which does not tend to permit growing of harmful organisms. Besides, only one or two percent of all micro-organisms are pathogenic (cause human disorders). Some of them can cause deterioration of finishes and produce molds and mildew. While they have no threat to human health, they are unsightly and offensive. If the floors, walls, and ceilings are smooth and non-porous, and the room is given routine maintenance, mildew would not become a problem. To minimize the possibility of hospital-generated infection, allergic reaction, odors and mildew, finishes must be selected which is prevented the build-up of moisture and nutrients that enable microorganism to grow.

***Adaptability:*** Some finishes are more adaptable to change than others. Adaptable finishes should be selected if there is a probability that the function or partition layout of an area would change in the future. For example, walls or drywall and steel stud construction are much more easily arranged than concrete block walls. It is expressed before that hospital design should contain flexibility because of the rapid changing of technology and community, adaptability feature gains importance. The expected use pattern of the entrance spaces increase the possibility of renovations happening quite often through the life period of the hospital. When renovations are undertaken, the selections of finishes require special attention. Some finishes are not well suited renovation. For example, ceramic tiles raise the finished height of the floor in relation to adjacent areas. The resulting step, depending on its height and treatment, may become obstruct to wheeled traffic. The finishes selected should lend themselves to alterations. F or instance, it should be possible to add or delete doorways or glazed screens without leaving any conspicuous marks. The finishes recommended can be utilized in general renovation work in most situations, provided that dust and odors are controlled. Flooring and wall base adhesives can also be a problem. Therefore carefully obtained renovation time and required renovation procedure of the finishing material should establish an important concern for designers.

***Optical:*** High use pattern of entrance might require the use of shiny surfaced material for their ease of maintenance and hygienic properties. However as well as the process of registration, filling the forms out, and waiting on the lobby might be disturbed by the excessive glare that would create an uncomfortable environment for the users. Therefore this large space which had to be blended with natural light should neither be disturbed by the glare nor have a dull, dead look. The optical properties of finishing materials and their colors should be selected with special attention to introduce a fresh, bright and both a relaxing and calm space serves satisfactorily to its users.

***Maintenance**:* Maintenance is perhaps the single most important factor in the success or failure of a finish in the post-occupancy period. Even if a finish is properly specified and installed, improper maintenance can impair the quality of life, acoustics, hygiene, safety, and the durability of the finish. For this reason, it is critical to have input from the maintenance staff when selecting finishes. Proper maintenance for a finish might require special equipment or training; if it is not possible to provide these, perhaps another finish should be considered. It should been always kept in mind that too many different finishes in a entrance space make daily maintenance, repairs, and replacements more costly and difficult.

***Cost:*** Cost is a very important factor in Turkey since the major investment of the budget seems to be spent on the finishing materials, because of their possibility to change the ambiance radically. Finishing is the final touch of a design; and users are exposed to this environment therefore their evaluation usually based on the quality of finishing materials. This criterion is usually related with its cost, however evaluating the finishing material with only its cost might lead designer to a great failure. Inıtial cost, operating cost, maintenance and renovation costs should be cared as a whole and decision for finishing in the entrance space should satisfy long term objectives usually.

***Quality of Life:*** In order to create this environment for that initial space used by the whole community in the hospital environment, finishes should not look either too spare or too delicate. This does not necessarily demand more costly finishes but rather a more thoughtful and imaginative approach. Color, texture and visual comfort might be stated as the components of the quality of life of a covering material. An important issue, color has been discussed within the previous chapters.

Textures are most commonly used in the walls of entrance spaces and they can either be smooth or rough. In hospital cases, it is preferred to be

smooth so that it can be kept clean. But more often some irregularities are desirable and visually pleasurable in places like entrances. In fact, bold textures can only be used in these special areas where people would spend much of their whole day time such as auditorium, lobby etc. In such situations, the best thing to do is to use fine textures. Because it is possible to clean fine textures as long as the indentations are not too deep or too narrow.

Smooth walls seem to be hard and slippery as a surface. It seems unapproachable and an assailing. It gives an impenetrable and strong impression and acts as a protective layer. The smooth surfaces reflect and shine, and so dominate the space (Figure II.43.). Although smooth surfaces are needed for hygiene in health care facilities, irregular surfaces have more healing intent among patients. Just the opposite of the smooth wall surfaces, fine textures seem soft, warm and do not reject to the touch (Figure II.43.). Fine textures seem more to be coming from nature because in nature, nothing perfectly smooth exists. The small irregularities of textures, more often are psychologically desirable and visually pleasurable (Weinhold, 1988: 71). According to Evenson, coarse texture gives weight to the wall and also gives a rejecting look but in a different way than a smooth wall. While smooth wall seems to protect something within, coarse wall draw the inner substance of the wall to the surface nearly in an aggressive way. We do not want to get close to a coarse wall because its surface is so rough that we may hurt ourselves. So it represents its resistance, its own power and weight in the space. But similar to the fine textured walls, it also seems to be coming from nature (Figure II.44.) (Evenson, 1987: 99).

Texture at a larger scale becomes pattern. According to Tanrıöver (1998: 31), Just like the texture, pattern adds visual interest and pleasure to the spaces according to most people. Patterns applied on the surfaces the walls are grouped in three categories: an abstract character dictated by independent patterns of lines, grids or curves, figurative drawings which are based on the

representations of people, animals or things, and the last one is rooted in the materials and building methods that indicates how a wall is built up. And all of these three categories can be organized horizontally, vertically or diagonally; appear as a pattern flush with the wall itself; or be composed of various plastic reliefs. The pattern according to it, being abstract, figurative or constructive has been given the wall a different weight expression .

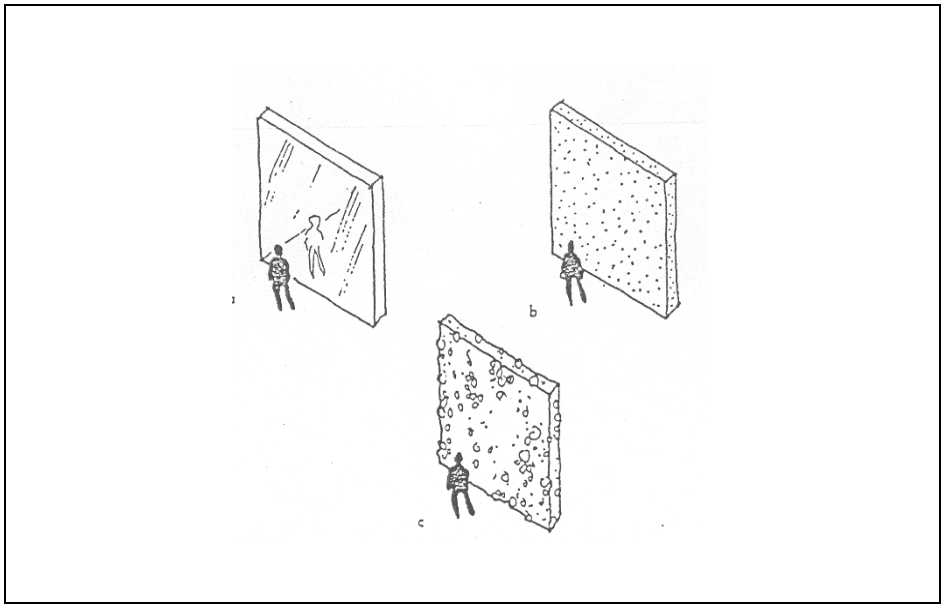


Figure II.44. Surface Texture of Walls
(Tanrıöver, 1998:78)

For the textures used in flooring materials, Underfoot comfort should be taken care especially in entrance space where people work; stay or move through the health facility .Resiliency is the most general need in this regard. Carpeting is often still the first choice of the users in lobby areas because of its comfort and attractiveness. However, the friction of carpet or unevenness of a rough carpet surface is made these floors less comfortable for wheelchair users and for personnel using wheeled equipment. Much can be done to ease the

movement of wheeled traffic, choosing very dense, low pile carpets can be used. Furthermore deciding whether to use carpet in a healthcare facility, we have to know where it is appropriate from a hygiene standpoint. We should know that it might not be appropriate in the common use areas that should be easy to maintain the cleanness and the related indoor air quality.

Another component of the reflectivity of the surface that influence the visual comfort is its light reflecting characteristics and it can be said that low gloss finishes are better suited to the performance of all visual tasks. Patients are reacted to the fact of hospitalization with some apprehension. This feeling is reduced when they encounter familiar finishes in their environment such as natural wood, fabrics or carpet. In order to make a good impression the finishes must look bright, fresh and intact. For example, there should be no smudges and scrapes on the wall surfaces.

# CHAPTER III

# CONCLUSION

The initial influence of a health care facility on each user of the building has begun to be perceived with experiencing entrance space. That's why an improper organization of this specific place, might negatively orient the general perception of each individual, about the understanding of space and facility; which might set obstructions to the healing process of that individual than obviously to the health of the community. Within this century, the paradigm shifts within the community, the brand new understanding of health through the power of media sources and finally the changing priorities of people, hospital settings have started to evaluate. Therefore architecture of the spaces emerges as a strong tool in order to reflect the change of new ideals.

Entrance space as being designed with the criteria and restrictions of architectural design displayed its importance within the entire facility since the character of the facility and the new ideals might be clearly reflected by this space. Besides the people who are mostly stressful about the problems of their own or a lowed one, found chance to experience a space that is in the facility, however apart from the facility with sensitive, functional and comfortable approach to the design problem.

The essence of the entrance space, also contributes many problematic issues. Functioning and aesthetical space that resists against the high use pattern with serving physical and psychological comfort might brought about many problems within design and performing processes. Among many of these issues clarified through thessis waiting for careful analysis in order to deal with, researcher has attempted to emphasize three of them because of their great validity for Turkish cases. Initially the most remarkable failure about these spaces, is the stifling ambiance which establishes a very disturbing condition for even a healty person starting from the first moment of experience. This owercrowded, chaotic appereance became as an inevitable result for many of the facilities' entrances which might depend on the unsatisfactory capacity planning, spaces designed without a notion of flexibility, and inappropriate functional proggramming that gave way to unnecessary repetetation of routes for many procedures. Improper detailing sets another necessary obstruction for the entrance spaces. Since the architects of the space might not comprehend the use pattern of these spaces, therefore not properly analyzed the most convenient application of materials, or because of short term valid desicioning, it took only a few years to meet with a space that is urgently in need of renovation. Third and probably the most important problem that has to be immediately solved, has begun to be appeared when the entrance space has started to be used. As soon as management team handles the overall control of space, renovations as they think that might ease the procedures and the security control or the desires of the staff became into realization without a control of an architect. Natural outcome is the space filled with many irrelevant units and which lacks the notion of quality. In some cases, it also gave way to another chaos, the seating groups located everywhere in an haphazard manner, people sitting in each gap left from other functions through the entrance sets as a remarkable example of this kind of an situation.

Obviously these conditions could not only associated with the improper architectural design, but also they has pointed out the importance of

collaborative effort through problem solving process. It is the responsibility of each people, entity or organization contributing to the process to seek for optimum conditions for creation of such well designed and well performed environment. Besides, the employement of an interior designer or interior design team depending on the size of the project might be echoed because of their inevitably required contribution to the process. However, this thesis has tried to obtain right problems for the concerned environment for the architectural point of view, and some proposals are presented in order to serve well in the case of Turkey. It is important to indicate that all these problems have analyzed and evaluated starting from the concept stage, than run through the project and functioning stages. Therefore these proposals established a list of solid data that can be benefited by designers and researchers for further expansion.

First of all entrance space should anticipate further expectations of changing design ideals in order to obtain a long term validity. It is inevitable that, the new frontier in health care design will be the creation of environments that support and enhance healing therefore entrance space has to envelope a combination well balanced components for a humanized environment as nature, color, art, spaciousness, air quality and so on. It should present the ability of adjusting future requirements which means that entrance organization should contain enough flexibility in order to serve for rapidly changing priorities. Besides, health care professionals, including architects and interior designers specialized in this field, should meet the essential requirements of patients initially, however this shouldn't give way to the serving patients totally as clients with market-based purposes. The idea that health care is about people, not investor profits, is off to a good start.

Through designing the entrance space, architects should carefully organize the pieces to achieve a sufficient work through a consistent criteria. The studies related with entrance space planning for a health care facility

should be contributed to the design process, since it is a very complex study that might require obtaining some additional technical knowledge. Codes and standards should guide designers in order to obtain a standardized required quality and safety for people who are deserved to serve such as. The financial planning should be comprehended clearly, therefore it should be noted that, restrictions of the budget does not establish the only criterion. Instead, architect should make long term decision making within this essential process. The depressing, crowded and insufficient entrance space panorama might be analyzed carefully within a proper capacity planning and functional programming. Furthermore, essential arrangement decisions should be taken with enough care and information, since overall organization directly relates with this process.

In order to satisfy humanistic criterion, first of all buildings should be functional, safe and convenient for all potential users, especially for the disabled and elderly patients. There should be a proper organization of a color schema which has not left to chance or personal feelings, but related information about. An orientation system should be developed with a clear organization scheme and other components of wayfinding design, that make it easier for patients, doctors, and staff to find their way through entrance space without getting lost.

Performance consideration of entrance space should be held carefully in order to obtain a successfully working environment. For example, lighting should be carefully designed and varied. It should not be forgotten that natural lighting is an indispensable part of a healing environment design. Moreover, noise should be controlled through an effective organization; since entrance is a very crowded space through daytime and noise is a very harmful and annoying substance, seriously disturbing the healing potential of environment. In order to serve for fresh air and thermally comfortable environment, appropriate systems should be arranged for these already stressful user groups

in the entrance space environment. Finally, surface design for entrance space should satisfy a long list of related criterion that contributes durable, safe, aesthetical, optical, acoustical, economical, environmental friend and finally qualified attributes for further satisfaction for these essential materials that are mostly effective for the final appearance of the end product.

One emphasis of this study was the significance of the role played by entrance space within the health care environment as a whole. Of even greater concern, however, was to bring together significant information about the various critical but often-overlooked issues involved in the design of entrance physical setting, for the benefit of design professionals, providers and researchers alike. It was also hoped that once rewards of information-based design, as it stands today, begin to be reaped, progress in this area will continue with its own momentum. The most difficult aspect of embarking on this endeavor will be admitting the lack of and need for it and then taking the first step towards realizing it.

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- Unless specified all drawings, tables and photographs are prepeared by the researcher. .

## APPENDIX A

## GLOSSARY

This glossary has added to explain and clarify the terms used in the text for better comprehension of the subject. The terms might be technical so they have been explained with their universal, constant definition. However some terms are defined as what is ment through the text about the word.

1. **Adaptation:** The process which takes place as the eye adjusts to the brightness or the color of the visual field.The term is also used, usually qualified, to denote the final stage of the process. For example, ‘dark adaptation’ denotes the state of the eye when it has become adapted to very low luminances.
2. **After-image:** The visual stimulation by one color can result in seeing another color after the stimulus has been removed. These after effects are called after images.Also used objectively for the chromaticity of a truly white surface illuminated by the source.
3. **Ambulatory care:** The treatening method of patient without taking him/her bed for medication purposes.
4. **Architectural design team:** The team that realizes the architectural project of a building. This team may be composed of architects, interior architects, landscape architects, drawing and modelling technicians.

5. **Atrium:** A centroidal, interior daylit space which organizes a building.
6. **Buffet (Kiosk):** A small sized room for displaying and selling newspaper, food, cigarettes and more if required.
7. **Color appearance (of a light source):** Subjectively, the hue of a white surface illuminated by the source; the degree of warmth associated with the source color. Lamps of low correlated color temperature are usually described as having a warm color appearance and lamps with high correlated color temperatures as having a cool color appearance.
8. **Decibels (dB):** The basic unit for specifying noise levels.
9. **Decibels-A (dBA):** Commonly used for rating environmental noise, both in buildings and out-of-doors. The unit appears in many noise regulations, and is the basic unit used in more complex rating schemes.
10. **Design team:** The team that realizes the varying projects of a building. This team might be working on electrical, mechanical, architectural, structural projects of the building or this each group might be defined totally as a design team working on the same project.
11. **Diffused lighting:** Lighting in which the flux comes from many directions, none of which predominates.
12. **Directional lighting:** Lighting designed to illuminate a task or surface predominantly from some preferred direction.
13. **Discharge lamp:** A lamp in \which the light is produced either directly or by the excitation of phosphors by the electric discharge through a metal vapor (e.g. mercury, sodium), a gas (e.g. xenon) or a mixture of several bases and vapors.

14. **Drop-off area(space):** Space just adjacent to the entrance door with a shelter and defined hard flooring along to protect people from immediate wheater conditions.

15. **Emergency lighting:** Lighting provided from an independent supply for use when the general lighting fails.

16. **Entrance hall/space:** Whole of the space covered between entrance door and the circulation elements as stairs, elevators, corridors.

17. **Fluorescent lamp:** A low pressure mercury discharge lamp or tubular form in which most or the light is emitted by a layer or fluorescent material deposited on the inner surface or the glass tube and excited by ultraviolet radiation from the discharge.

18. **Food stand:** A small stand to display and sell food within a covered hall.
19. **General lighting:** Lighting designed to illuminate the whole of an area without provision for special local requirements.
20. **Glare:** The discomfort of impairment of vision experienced when parts of the visual field are excessively bright in relation to the general surroundings.

21. **Halide lamp (metal halide lamp):** A high pressure discharge lamp in which the light is produced by the radiation room a mixture of metallic vapor (usually mercury) and the products of the dissociation or halides (e.g. halides of thallium, indium and sodium). These lamps may give better color rendering or a higher luminous efficacy than the corresponding pure vapor lamps,

22. **Healing environment:** A motivating environment that contribures elements in order to ease and support healing process.

23. **Healing process:** Recovery process.

24. **Healthcare building:** Building which is missioned to protect the health of the community as well as treating it from various diseases.

25. **Healthcare facility:** Building or group of buildings initially purposed to protect the health of the community as well as treating it from various diseases.

26. **Humanistic design:** Designed objects or spaces to fullfill requirements of person as a human. These idea covers the physcological needs of a person as well as his/her physical requirements.

27. **Illuminance, *E* (lux):** Luminous flux density at a surface, i.e. the luminous flux incident per unit area. (This quantity was formerly known as the 'illumination level').

28. **Illumination:** The process of lighting an object or surface, so that it may be seen.

29. **Incandescent lamp:** A lamp in which light is produced by a filament heated to incandescence by the passage of an electric current through it. The filament is enclosed in a glass bulb which is either evacuated or more usually filled with an inert gas at low pressure. A tungsten filament is used in most incandescent lamps which consequently are often known as 'tungsten lamps'.

30. **Indirect lighting:** Lighting in which the greater pan of the flux reaches a surface (usually the working plane) only after reflection from other surfaces, particularly from the ceiling. Luminaries with a flux fraction ratio greater than 10 are usually regarded as indirect.

31. **Information desk :** The desk or space where people obtain information about the facility and procedures. It may serve for a social service to cope with the problems of patients and visitors within the facility.

32. **Inpatient :** Patients who are taking medication while they are staying at the hospital.
33. **Local lighting:** Lighting designed to illuminate a particular small area which usually does not extend far outside the visual task (e.g.desk light)
34. **Localized lighting:** Lighting designed to illuminate an interior and at the same time provide a higher illuminance over particular parts of the area
35. **Luminous flux (lumen):** The light emitted by a source, or received by a surface. The quantity is derived from radiant flux (power) by evaluating the radiation in accordance with the spectral sensitivity of the standard eye.

36. **Lux :** SI unit of illuminance, equal to one lumen per square meter.

37. **Main lobby:** Main waiting space for the people in a building.

38. **Mall model:** It is the anology between a shopping mall and healthcare building since this type of familarity will be the key for humanizing the environment. Therefore the design concepts and elements of shopping malls like a grand atrium have used throgh some healthcare building designs starting from mid 1970s (Miller, Swensson, 1995: 51).

39. **Noise Criteria Curves (NC):** A family of curves defining maximum permissible octave band (or one-third octave band) sound levels. Commonly used for specifying background noise from HVAC systems and other sources.

40. **Outpatient :** Patients who are taking medication without staying at the hospital.

41. **Preclinical units:** These are the units where initial examination and diagnosing procedures of patients have realized before having operated within a clinic.

42. **Reception desk (in the hospital) :** The desk where registration of patients, related process and paperwork have realized. Sometimes it is combined with information desk to inform people about the facility and procedures as well.

43. **Reflector lamp:** An incandescent or discharge lump in which part of the bulb, suitably shaped, is coated internally with a reflecting material partly controls tl1e distribution of luminous intensity emitted from the lamp. Incandescent lamps have a metallic reflecting material which gives a beam; discharge lamps have a white or fluorescent reflecting material which gives diffused light. Also, a fluorescent tubular lamp in which one side of the rube is coated with a white reflecting material so that most of the light is emitted from the other side.

44. **Room Criteria Curves (RC):** A recent derivation of NC curves, but more restrictive at the low and high frequencies. For this reason, it is preferred to using NC's in many situations..

45. **Safety and escape lighting:** That part of emergency lighting which is sufficient for movement of staff and patients and for safe and collective escape.

46. **Service illuminance:** The mean illuminance throughout the maintenance cycle of an installation and averaged over the relevant area; this area may by the whole area of the working plane in an interior, or the area of the visual task and its immediate surround.

47. **Speech Interference Level (SIL):** An average of mid-frequency octave band sound levels, once used extensively for assessing speech interference but now losing favor to dBA.

48. **Standard service illuminance (lux):** The service illuminance recommended for standard conditions; it is subject to modifications for special circumstances.

49. **Task lighting:** Lighting so installed, sometimes as part of the general lighting installation, to give particularly appropriate illumination on a specific visual task.

50. **Tungsten halogen lamp:** A tungsten filament lamp containing halogens. It does not require any control gear but may require lo\v voltages. It achieves full light output immediately. The bulb may be sensitive to operating position, small voltage variations and vibration. The envelope surface is liable to deteriorate if touched with bare hands.

51. **Value:** Value is the lightness or darkness of a color or hue, and is defined by the amount of white, grey or black in the pigment of the color.

52. **Visual performance:** The accomplishment of the visual task, usually measured in terms of speed and accuracy. Also, the action of seeing quickly and without error.

53. **Visual task:** The visual content of the work being done

# APPENDIX B

## EVALUATION OF SOME SELECTED FINISHES IN MAIN ENTRANCE SPACE ACCORDING TO PERFORMANCE CRITERIA

The essence of surface covering materials with establishing the overall appearence of the space has discussed in Chapter II. This part has explored the evaluation of some spesific surface covering materials commonly used throgh the period thessis has written. It has aimed by researcher to explain some of the characteristics of these materials in order to prepeare a real guide away from subjective market considerations for further researchers and designers. Therefore an overall outlook to flooring, wall covering and ceiling materials as well as more detailed explanation of some spesific materials from each group has explored below.

### B.1. Flooring Materials

Flooring is the stage for the hospital's daily life, and the only finish that are subject to direct, constant physical use. Entrance, in addition, is subjected to the most heavy use and abrasion throughout the hospital environment. This is why it has been traditionally preeminent concern of those responsible for the design and operation of the physical facilities of hospitals. Within this title some common used materials for covering the floorings of hospital entrance spaces are discussed such as sheet vinyl, linoleum, ceramic tile and granite tile

### B.1.1. Sheet Vinyl

Sheet vinyl flooring is polyvinylchloride (PVC) with additives such as stabilizers, plasticers, fillers, and pigments. Some additives increased the durability of the sheet vinyl; some are decreased it. They are analyzed within two titles since their overall composition varies between these two: homogeneous and heterogeneous. Heterogeneous sheet vinyl is composed of solid PVC chips or granules embedded in a resin of PVC and additives. Thus creates a pattern that would vary with the size and color of the chips. The other sheet vinyl, the PVC and additives are combined in a uniform mixture. These tend to have a marbleized appearance. However within the hospital life including entrances, homogenous types are most convenient for use, since they introduce a uniform composition through its thickness and when tear or a scratch occurs, the overall appearance and durability has not changed unless this tear reach to the bottom line. However for heterogeneous compositions, sheet only forms a wear layer. Once this layer is worn through, the flooring has reached the end of its service life. In products for the health care market the backing to the wear layer is usually a homogeneous PVC composition which also forms a proper composition for entrance whereas the possibility for damage is higher. The thickness of sheet vinyl flooring that can be recommended for hospital use is 2 to 2.5 mm. Sheet vinyl is sold in rolls, and is suitable for adhesive installation over any sound, smooth, dry substrate. Joints can and should be welded. This can be done using either a heat welding or chemical welding technique.

Sheet vinyl is sufficiently resilient to offer a reasonable degree of foot comfort, more than vinyl composition tile but less than carpet. Their smooth continuous surface permits an easy flow of wheeled traffic. While only slightly sound absorbent, they would reduce impact noise. The principal advantage of resilient sheet flooring over resilient tiles is that it is seamless, so it precludes the penetration of water and dirt into and through the joints and under the floor.

PVC is waterproof so water can be completely removed from the floor without any absorption into the surface. Sheet vinyl floors can be maintained at a high level of cleanness but then surface color and design would camouflage dirt between cleanings. Safety underfoot is good when the floor is dry, so these floors should not be installed in any areas where staff must work standing on or walking over a wet floor. Furthermore vinyl flooring is susceptible to cigarette burns. If the burn has not penetrated the wear layer the stain can often be removed with steel wool. In case of serious damage, vinyl floors can be patched and the patch welded. Sheet vinyl flooring is widely used in renovation work as it can be applied over existing flooring.

Within many ranges of the color and pattern variety, vinly sheet coverings might give an opportunity for the designer to be imaginative when setting this very important feature of entrance space. They allow different compositions when flooring, can be used to differentiate the spaces with endless color and pattern opportunities. Sheet vinyl is durable but the surface are worn out under concentrated traffic. Even in homogenous compositions it may create many problems within few years. In addition, the jointless characteristic of this flooring type may display an advantage, however in entrance spaces different decorative figures or the logo and the name of hospitals are formed to the hall floorings and this allows many joints. This situation may create many problems about the durability of this finishing in entrance halls. Finally, through hospital spaces, the general appearance of sheet vinyl flooring is well known and accepted.

### B.1.2. Ceramic Floor Tile

Ceramic tile is a pressed or extruded clay bodied unit fired above read heat. Pressed tiles can be as thin as 6mm and dimensionally stable. Extruded tiles, by nature of their manufacturing process, must be thicker, in the range of 9mm to 15mm, and are not precise as pressed tiles. The tile dimensions may

vary, they might be rectangular or square, therefore it would be better to ask manufacturer for the intended use.With the use of glazes an almost unlimited number of colors, textures and patterns are available. If the tile is frost proof having a minimum percentage of water absorption, the material can be extended to exterior entrances and patios. Patterns or even graphics can be achieved by using different colors. With all these possibilities, ceramic tiles can be extremely attractive flooring material and if properly installed and selected are remained unchanged in appearance for years. If the tile is dense, with a tow water absorption percentage, or is glazed, there should be no problem in maintaining a hygienic environment. Solid colors show more surface marks than those with iron spots flashing or any other color variations. Also very light and very dark colors appearance soiled more quickly than medium tones.

Tile has the advantage of being non-combustible and therefore resists cigarette burns. As a flooring material, the safety factor depends on the tile used. Smooth glazed tiles are fairly slippery .Smaller tiles ensure that part of your foot is on a grout line and this offers some resistance. Glazed and unglazed tiles are also available with an abrasive texture or raised patterns such as discs that are more slip resistant. Generally unglazed tiles have a more abrasive surface than glazed, but when sealed, the abrasiveness is reduced. Unglazed tiles have the advantage of being the same color throughout so the appearance changes little with wear. Water absorption is also important in this case. If liquids are not absorbed, tile can be maintained easily. Glazed tiles are the easiest to maintain by simply sweeping and washing. Waxes and polishes should not be used as they complicate maintenance. It is important to check the strength of the glaze and the body in the event that the glaze wears the tile body may rapidly deteriorate. Precautions should be taken to exclude sandy dirt on account of its abrasive action by installing dirt traps at entrances. There are number of commercial cleaning products available that deal with grease, oil, tar and rust and so on. This type of spot cleaning is helped preserve the tile.

The reasons of non-combustibility; non-slip features, color choices and durability provide ceramic tiles an excellent flooring material for lobbies and entrance vestibules according to Kızılcan (1996, 132). In these areas people need not walk or stand for long periods of time. The problems of cleaning ceramic tile floors with the multitude of grout lines limit its use in high spill areas. The features that help make the tile non-slip, usually add to the cleaning problem. That's way ceramic tiles whether they are glazed or not usually convenient for the entrance hall because of these grout lines which creates an unsatisfactory appearance within a few months. Another type of ceramic tiles which are very durable are named as granite ceramic tiles. These tiles also have glazed and non-glazed types and they have the opportunity to be laid without a grout line. Because of their higher performance in durability, larger dimensions available at the market for a large space as entrance and their jointless laying opportunity, give chance designers to challenge the requirements of this special space.

### B.1.3. Granite tiles

Granite is a very durable natural stone, have a high resistance against any disturbing affect, and also have many different pattern and color combinations because they are natural; so they are commonly preferred by designers as a floor covering and even wall covering finishing for public areas of hospital environments. This rich appearance achieved by various color and pattern combinations and also the bright shiny look is thought to give quality to the entrance space. However this choice might be too expensive than other finishing material possibilities. Besides, it is a quite slippery finishing especially when it is exposed to exterior conditions and its adaptability talent is very poor. Final and most probable important failure could be evaluated as its brittle, shiny appearance that lacks a friendly, calm look.

Lobbies are tending to be considered when it comes to ceilings and other interior finishes of them because they give the first impression of the facility. Since aesthetical considerations became essential decisions for the professionals. Regardless from the way they are intended to be looked, the ceiling should be able to pick up the theme of the space. It has to be integrating well with the other interior design features. In considering the design features, a number of developments can be seen in acoustical design industry. The new tiles are acoustically satisfying besides they offer hundreds of design possibilities using standard ceiling panels in different layouts. So up to now, designers became able to echo corners, highlight functional areas and create focal points by using different array combinations of the panels. What is more is the easy fixing techniques of electrical or mechanical systems to these types of ceilings.

### B.2. Wall Covering Materials

The wall finishes for the main entrance halls in hospital environments must meet some complex and, not frequently, contradictory requirements. Finishes may be expected to be homey looking but, at the same time, indestructible. A bright appearance, easy to clean surface and fire safety are universal requirements that must often be combined with very high abrasion and water resistance, not to mention durability, ease of repair and low initial cost. Within this title the materials for wall covering at main entrances available in the market is explored in order to clarify the intended performance.

#### B.2.1. Paint

Paints used in hospital entrance interiors are either alkyd or latex based. Alkyd has better mar resistance and is easier to clean because it is harder. It can be scrubbed harder than 1atex and is not damaged by cleaners. Latex has poor solvent resistance that means it can be damaged by the solvent based cleaning

fluids used by professional cleaners. Coording to Kızılcan (1996, 136), alkyd also surpasses latex in durability, stain removal, abrasion resistance, wash-ability adhesion, and appearance. He continues with stating that the appearance of alkyd is better because of its flow and leveling properties. Walls appear to be smoother. In general, alkyds are recommended for new construction because of their superior wearing and maintenance properties. Latex paints have traditionally been used in repainting of occupied areas because of their low odor due to their water base. Alkyd paints have obnoxious fumes and are too unpleasant for staff and patients in occupied areas. Usually, paint on existing doors and frames only is renewed with alkyd. In recent years, low odor alkyd paints have appeared on the market to meet this demand.

For general use, lower gloss values are recommended in order to reduce glare, to achieve a friendlier appearance and to avoid increasing surface imperfections. Paint offers the greatest freedom in giving a entrance area a fresh look by a change of color. Paint is available in an infinite choice of colors, no matter how small the quantity and, since paint must be renewed fairly frequently anyway, a decision to redecorate can be made without much strain on the hospital's resources what is already restricted in Turkey. Paint should be renewed every three to four years or, depending on exposure, more often. In between paintings, it can be washed down with a commercial detergent. Touch-ups are only successfully in very small areas; otherwise the full surface should be redone. Its relatively low cost makes paint a good choice in most wall applications. A paint finish is appropriate in those areas, where a fresh appearance can be maintained up to the next repainting. However, paint did not withstand the abrasion damage inflicted by wheelchairs, stretchers and carts on doors and door frames. These too should be given a more durable finish or a wall guard material that is located to much exposured levels of the walls.

### B.2.3. High Performance Architectural Coatings (HIPACs)

High Performance Architectural Coatings (HIPACs) include a variety of product types, a number of which have been successfully used in entrance space construction. The materials used in HIPACs consist of pigments, binders, solvents and additives such as curing and hardening agents, plasticizers, stabilizers and fillers. By the composition of their binders, below researcher have listed coatings in the following way:

1. Epoxy Coatings: Epoxy resins are the principal component of the binders used. Other applications of epoxies include industrial paints and adhesives, seamless flooring and surfacing. Epoxy coatings may be reinforced with fiberglass fabric to overcome the relative brittleness of epoxy or unreinforced.

2. Elastomeric Coatings: In these, the principal component is chlorosulphonated polyethylene also used in roofing and waterproofing applications. The distinctive feature of these coatings is their high tensile strength and elasticity.

3. Epoxy polyester Coatings: In these coatings, polyesters are combined with epoxies.

4. Two Layer Coatings, with an Acrylic Top Layer: In these coatings, the base layer may be mastic with high inorganic content or, a vinyl, acrylic and latex combination. The top layer is acrylic that is the plastic used in Plexiglas and similar products. The mostly transparent top layer protects the pigments provides or increases water resistance, adds luster and conceals scratches. Epoxies are usually roller applied, elastomerics usually sprayed. HIPACs are installed by specially trained contractors approved by the manufacturer. It is important to remember that any future work other than minor repairs also had to be done by such an outside contractor, not by hospital staff. HIPACs differ little in appearance from paint. It is less easy to obtain the desired gloss value. Kızılcan ( 1996: 139) further noted that epoxies tend to

lose gloss with time. Fabric reinforced epoxies have an orange peel texture which may show a rather unsightly change at fabric joints. Other coatings are normally smooth but may be textured.

Very heavy coatings, such as reinforced epoxy is excluded from certain areas because of their smoke developed characteristic. In addition to the coating itself the effect of foundation and over glaze coats must be taken into account. Fire retardant grades of coatings containing polyesters would release toxic chlorine gas when exposed to flame. Furthermore HIPACs are normally cleaned by soap or detergent and water scrubbed by soft brush when required and rinsed with clean water. Mineral spirits are removed common stains. HIPACs are recommended for use in all areas such as entrance space in a hospital setting where paint would not stand up and where ceramic wall tile is not desirable or not warranted if compatible with aesthetic consideration. Walls behind sinks should be protected by HIPAC finish which may match the color of paint on other walls. HIPAC finish on walls in all corridor-type spaces in entrance halls subject to wheeled traffic can be recommended, in combination with wall guards and comer guars. Doors and door frames are damaged by carts, stretchers and wheelchairs and should be protected by HIPAC finish.

### B.2.4. Wall Carpet

The qualifying characteristic that distinguishes wall carpet from other wall coverings is basically material thickness which varies from 3mm to 8mm. Most materials referred to as wall coverings are not thicker than 1.5mm. Wall carpet can be installed over concrete, drywall, plaster, and plywood. Concrete block is not recommended as the joints may become visible. The texture would bide some irregularities but a smooth surface is better.

The tufted level loop wall carpets basically look the same as floor carpets with a range of solid colors, natural mixes and stripes. The other types

include horizontal and vertical ribs of varying thickness and some other more non-directional textures, all of which are very attractive and warm in feeling. Acoustic values vary depending on the thickness and texture of the product with an NRC (noise reduction coefficient) of 0.15 to 0.40. If the carpet is installed on 25mm thick acoustic material, the NRC range is 0.80 to 0.90. Additionally, wall carpet, because of its impact absorbing nature, can withstand bumps from carts, and other rolling equipment. The tufted products have the same problem as tufted floor carpets in that loops can be pulled and the yam would unravel. Those carpets with unitary fusion bonding are not susceptible to this problem and are dimensionally stable. Repairs can be made by inselling new pieces to replace damaged areas. The heavier textures are helped conceal the patches. Since the material is stained and the texture is hold the particles of the soiling substances, spot cleaning would have to be constant in order to maintain a visually clean appearance. Vacuuming should be done periodically to remove accumulated dust. It is important to state that wall carpet could successfully be used in areas to provide some wan protection and acoustic treatment if these areas are not high spill areas. In the main lobby or lounges where spillage is not a problem, wall carpet would provide some color and texture to create a warm, softer feeling environment.

### B.2.5. Vinyl Wall-Coverings

Vinyl wall fabrics consist of a polyvinyl chloride surface layer adhered to a cotton fabric or paper backing. The basic indicators of the fabrics quality are the density of the backing and the thickness of the vinyl surface. Vinyl fabrics are installed in the conventional manner. The use of a mild resistant adhesive is recommended. Vinyl wall fabric is a common factory applied finish for demountable and folding partition systems. In lower quality systems the vinyl finish may be unbacked. In a hospital setting, vinyl fabrics were often known to fail to fulfill the expectations attached them. Then main weakness was the tendency to lose adhesion to the substrate at the joints. Once that

happens, they would fray and tear. However, today the wall-covering technology made whole wall papers logical to use within the increased quality, durability, aesthetic and easy to apply and renovate properties. They are applied in a very quick time period, besides they are totally cleanable even washable. They offer the texture and pattern options within a quite wide range of color applications and when it is intended to change a part of the covering pulling up the paper from one corner would be enough to take it off. With these characteristic, vinyl wall papers are seemed to be an attractive idea as a finishing in the entrance setting of hospitals for the designer. It should be noted that the fabric backed coverings are more durable and therefore convenient to use such a high-traffic area of the hospital as entrance halls within proper detailing.

**B.3. Ceiling Finishes**

In the past the ceiling was a functional necessity and so has received what has remained from the budget of the facility after the rest of it carefully furnished. Today ceilings are considered design opportunities, incorporating both form and function. They should complement and enhance the interior if we think the fact that ceiling is a predominant feature within the viewing range of the patients who are spending great time in the facility. So they are begun to take their rightful place on the design agenda. The majority of areas in a modem hospital building have some type of a suspended ceiling. In most suspended ceiling systems the body of ceiling is supported on a concealed or exposed steel frame, which in turn, is suspended off the underside of structure by steel rods. Entrance spaces are tending to be considered when it comes to ceilings and other interior finishes of them because they give the first impression of the facility since aesthetical considerations became essential decisions for the professionals. Regardless from the way they are intended to be looked, the ceiling should be able to pick up the theme of the space. It has to be integrating well with the other interior design features. In considering the

design features, a number of developments can be seen in acoustical design industry also available in Turkey. The new tiles are acoustically satisfying besides they offer hundreds of design possibilities using standard ceiling panels in different layouts. So up to now, designers became able to echo corners, highlight functional areas and create focal points by using different array combinations of the panels. What is more is the easy fixing techniques of electrical or mechanical systems to these types of ceilings.

For highlighting important traffic routes, entrance doors, and other features of the entrance interior, concentrated overhead illumination in the form of cove lighting, luminous soffits or other elements can be successfully incorporated in the ceiling design. For energy efficient illumination, light colored ceilings should be used. A normal, "white" lay-in acoustic ceiling would have a light reflectance of 75 % or more (Kızılcan, 1996: 143). The ceiling space is commonly used as a return plenum in commercial buildings. This method permits micro organisms carried by room dust to be swept through the return air openings into the ceiling space where they are settled, eventually may cause contamination of air supply. In all parts of hospital buildings like entrance spaces, ducting of the return air is recommended. Beside, in this public space as in the entire facility, the intensive use of the ceiling space makes accessibility a mandatory requirement for ceiling systems selected for corridors and other areas where building service equipment must be reached for regulation, maintenance and repair.

Lay-in ceilings are the universal favorite of those responsible for the maintenance of building service systems, since they are readily and almost entirely accessible. When selecting this type of ceiling, the large scale of the lay-in grid making it usually difficult to arrange the lights, diffusers, detectors and other surface elements should be avoided. In most lay-in ceilings, the ceiling panels are rather too weak for their size to permit manipulation without occasional damage. Sound absorbent ceilings are highly necessary in such a

high traffic area, particularly since they are open to the corridor system and to each other. A distinctive ceiling treatment that may take the form of a dropped or raised ceiling, special lighting, color and style of finish can help to establish the needed visual identity for the areas such as reception and control. Certain ceiling types are referred to as "acoustic" ceilings. Because they are soft and permeable, materials used in acoustic ceilings are good absorbent of sound and are reflected less sound back into the room than hard and dense materials. The acoustic material readily admits sound into its porous interior. Disturbing reverberations of sound generated in the room are reduced and space is perceived as quiet.

Kızılcan (1996: 144) stresses one point that materials that are good absorbent of sound are also good transmitters. Because of their loose structure, a greater amount of sound is able to pass through them than through denser, heavier materials. Drywall ceilings can be an option between two spaces since they absorb sound poorly, but reduce sound transfer effectively. The more massive and less porous dry-wall ceiling would reduce the sound when leaving the first room and when entering the second room, and achieve the desired isolation. Such an isolation my be needed for the administrative areas located adjacent to the entrance hall in order to fill out some forms and everywhere requiring sound isolation placed in the entrance section of the hospital settling. Those types are discussed in below are the types of suspended ceilings that are commonly used in the entrance halls as well as the entire hospital settling.

### B.3.1. Mineral fibre lay-in ceilings

Commonly known as "lay-in tile" or "I -bar" ceiling, this system is by far the most popular of all modular ceilings. Framing consists of a suspended grid of supporting members shaped in the form of an inverted T, fabricated from pre-painted sheet steel. Ceiling panels are resting on the flanges of the T's. L-shaped members are used at walls, columns and other vertical surfaces.

Mineral fibre panels are manufactured from compressed wet felted mineral wool. Sound absorption is enhanced by surface perforations produced in a variety of shapes and patterns.Panels are available in standard sizes available at the manufacture and normal thickness is 16 mm.Recessed fluorescent lighting fixtures, diffusers and grills are widely available for installation into the T -bar grid. Adaptation of lighting fixtures to metric grid sizes is still presenting some difficulties. The most widely used surface finish for panels is white vinyl paint. Panels with a color paint finish and matching color grid are also being offered. Textural interest and color may be added by the use of cloth covered panels.

Kızılcan (1996: 146) has been summarized significant advantages for hospital entrance use by the following panel types:

1. First category includes panels that are faced with a laminate or vinyl film over sheet aluminum, bonded to the mineral fibre core, and then perforated. Melamine backing has made the panel impervious to air and vapor passage to the ceiling space and by equalizing the face of finish, would prevent sagging under humid conditions. The finish can be wiped clean and scrubbed like sheet vinyl. Imperforated finish is also available, which excludes vapor, grease, odors from the core and panel particles from room air, but is acoustically inactive.

2. Second option is panels with a vinyl acrylic sprayed-on coating. These too can be easily wiped clean and scrubbed and are available with a melamine backing sheet.

3. Thirdly, panels with a finish that minimizes the accumulation of dust or shedding of material from the surface, also with coated edges and back.

4. Lastly, panels with an antibacterial finish. From a viewpoint of hygiene, good cleanability is more likely to be effective than any germicidal surface properties.

A non-permeable back-coating is a desirable property in any lay-in panels as it would control the migration of moist, conditioned air into the

ceiling space and helps to maintain sanitary conditions above ceiling. Another advantage to use them in the entrance hall is that lay-in ceilings generally look better in larger areas than in small rooms and pose fewer building service coordination problems. Generally, its use is warranted where following circumstances exists so that they might be a good option for entrance spaces:

1. Unrestricted access is needed to the ceiling space;
2. It is essential to reduce from noise;
3. The area is not too small or chopped up;
4. There is no need for a richer or quieter appearance or sterile maintenance (Kızılcan, 1996: 148).

### B.3.2. Acoustic Baffles

Acoustic ceiling baffles utilize materials and types of construction used in conventional-ceiling and wall-panels; except that, being installed vertically; both surfaces are finished and acoustically active. In then, simplest form, they may consist of two mineral fibre acoustic boards, laminated back to back and trimmed with a metal or plastic channel. More sophisticated ceiling baffles are usually made with a glass fibre core, reinforced along the edges, and a surface covering of perforated vinyl fabric or textile material that is wrapped around all sides including the edges. Perforated metal construction is also available. The baffles are clipped to or suspended from the underside of the main ceiling. They may also be used without ceiling above them, in which case they are suspended of the structure or the side walls.

Sound absorption characteristics of baffles are similar to ceiling systems similar construction, but baffles admit sound at both sides that makes them more effective. Acoustic baffles may be added to existing ceilings to upgrade their acoustical properties. In combination with acoustic ceilings, or

otherwise, they can be used to achieve practically any level of sound absorption desired and can therefore be very useful in noisy areas as in entrance space since it is large and noisy (Kızılcan, 1996, 150).

### B.3.3. Open Metal Ceilings

The systems are completely open. In some applications they serve a decorative purpose only by visually separating the ceiling space from the room space below. With appropriate lighting above, they can, also be used to create a luminous effect. In this case the ceiling shields the light sources and acts as a light diffuser. The ceilings are made of prefinished sheet steel or aluminum. They are available in a variety of scale, designs and finishes. The suspension method and hardware varies from system to system. Air distribution equipment and sprinkler heads are placed above the ceiling. Like linear metal ceilings, decorative and luminous ceilings produce a continuous undivided appearance. Acceptable screening of the ceiling space achieved when, from a comfortable viewing angle the solid elements conceal the voids in between. Therefore the design and scale of the ceiling must be selected with reference to the room dimensions and ceiling height. The same principle applies to screening the lights in luminous ceilings.

At steeper viewing angles, i.e., in the area more directly overhead, a measure of screening is achieved by a high contrast in brightness between the ceiling and the space above; hence the typical black painted ceiling above: a white grid with down lights at or below ceiling level. Sound absorption must be provided independently from the ceiling, at a level below and or above it. An open ceiling would permit the dust collected on the top of ducts, pipes, ledges, etc., to come into direct contact with the room air. In addition dust and lint would accumulate on top of the ceiling elements themselves. Open ceilings of

this type are by no means appropriate for general application in hospitals. According to Kızılcan (1996: 151), their use should be restricted to public areas, where they can provide a welcome change from the stereotypes of the hospital design vocabulary. Every care should be still be taken to keep the ceiling space as clear of shelves and ledges as possible. Provided that sufficient ceiling space and funds are available, a good way to overcome the hygiene problem is to install conventional ceiling at some distance above the open ceiling and enclose all equipment above the upper ceiling. Luminous ceilings are effective in highlighting reception areas and in other special applications.

# APPENDIX C

# DESIGN FOR DISABLED

Designing with enough sensitivity for disabled people, is essential for this kind of a building that care for community's health. Within Appendix C, some codes for critical building components effecting mobility of disabled people like external elements, stairs, ramps, doors has explained.

## C.1. External Elements: Pavements

1. To allow for wheelchair users, pavements and walkway should be minimum 1.20 m wide. The preferred minimum is 1.35 m.

2. To allow wheelchair to pass each other or wheelchair to pass attendants with prams, 1.65 m wide pavement is required, and 1.80 m width is preferred.

3. Where possible pavement gradients should not exceed 1 in 12 (4, 5°). 4, 5° is the preferred maximum gradient to cater for ambulant disabled and assisted chair bound people. Topographical conditions may necessitate steeper gradients, but the need for such steeper gradients is normally avoidable by careful landscaping.

4. For independent wheelchair use, pavements should have a gradient not exceeding 1 in 20 (3°).

5. Pavements, footways, footpaths etc. should be of fixed and firm materials. Suitable surfacing are bitumen macadam, tarmacadam, asphalt and plain or moulded pre-cast paving slabs.

6. Surfacing should have a carborundum or slightly con1lgated finish to give a non-slip surfaces. Quartzite paving slabs are recommended. An inset pattern can provide an attractive non-slip surface.
7. Unsealed gravel surfaces and cobbles should be avoided. Granite setts are not recommended, but are permissible if joints are flush or near flush with sett of surfaces.

**C.2. Staircases, steps**

1. Small differences in level should be avoided wherever possible. The risk of accidents is reduced and the use of trolleys, walking aids and wheelchairs is facilitated where there are no obstructions.
2. Single step must never be used. Double steps ought also be avoided.
3. If small variations in level are unavoidable, suitably graded ramps should be incorporated in preference to steps.
4. Steps less than 10 cm high are hazardous, and must be avoided.
5. Handrails should be provided to wall surfaces adjoining short ramps and short flights of steps. Short ramps and flights of one or two steps are hazardous. A contrasting color to ramp surface or stair riser is recommended, but visual indicators at ground level are often overlooked. The provision of a handrail within the immediate line of vision suggests more effectively the presence of a hazard at floor level.
6. Open riser staircases must be avoided. Open riser can be hazardous to elderly people and others prone to dizziness.

7. If the use of winders is unavoidable they should be placed at the bottom and not at the top of a flight of steps. Winders and splayed steps are particularly hazard to the blind.

8. No door should open directly on to the top of a staircase or swing so as to obstruct the top or bottom step.

9. For natural lighting over staircases windows should give a general illumination of not less than 1 % daylight factor. Windows and artificial lights should throw lights towards and not down staircases.

10. Artificial lighting should give an average illumination level on stair treads of 10 lumens/sq ft (100 lux).

11. Stair rise and going must be the same for all steps in anyone flight.

12. The top or bottom step of a staircase must not encroach on circulation space.

13. The line of the nosing of the top step of a staircase should not be closer than 30 cm on plan to the point where an adjacent wall returns. This is recommended for safety reasons, and also to allow the handrail to be extended horizontally at the head of the, staircase.

14. Surfaces must be non-slip. Carpets if fitted to staircases must be securely fixed. Non-slip nosing should be inserted into solid wood treads.

15. Abrupt square no sings must be avoided. A splayed riser with a non-projecting chamfered nosing is recommended. Where the tread is comparatively shallow the individual descending the staircase tends to place the ball of the foot so that it overlaps the nosing. Where the nosing is sharp there is comparatively little frictional resistance between the ball of foot and the edge of the tread, and there is a greater risk of falling than where the nosing is rounded. On deep treads where the going is greater than 28 cm, the ball of foot normally falls inside the nosing edge and there is lesser risk of accident.

16. For those with sight impairment it is advantageous if the color of the tread contrasts with the color of the riser.

17. For general purposes and to allow for the ambulant disabled, stair rise should not be more than 16,5 cm and stair going should not be less than 24 cm. This gives a maximum inclination of 35°.

18. The vertical rise of any flight of consecutive steps should not exceed 1, 8 m.

19. A landing midway between floor levels provides a safe stopping place which is useful for those liable to breathlessness, and also for cardiac and others who must conserve energy.
20. External steps: The step rise must not be more than 16,5 cm, preferred maximum 14,5 cm. The going must not be less than 28 cm preferred dimension 37 cm.
21. The vertical rise of any flight of consecutive steps should not exceed 1,20 m.

**C.3. Ramps**

To facilitate access to buildings by wheelchair users a level or ramped entrance is essential. A level or ramped access to a building is also advantageous to elderly people, small children, and mothers with prams, furniture removers and undertakers.

1. For general purposes the gradient of any ramp ought not to be steeper than 4.5° (1 in 12).

2. Ramps should be minimum 1,05 m wide. The preferred minimum is 1,20 m. Where ramps are more than 3,60 m long preferred minimum width is 1,35 m.

3. The preferred maximum length of a general purpose ramp is 9,00 m.

4. Platforms: Where a high rise is required a level platform minimum 1,20 m long, preferred minimum 1,35 m, may be provided at intervals. Such platforms provide useful resting places for wheelchairs.

5. Variations in the plane of a ramp can be hazardous to ambulant disabled people and those impaired sight, and the incorporation of rest platforms is not recommended except where ramps turn.

6. A level platform minimum length 1,20 m, preferred minimum 1,50 m, should be provided at the top of any general purpose ramp

7. Area at foot ramps: there must be adequate visibility and maneuvering space at foot of any ramp. A ramp falling to a point immediately at or behind a blind comer can be a source of hazard. there should be a level area minimum length 1,20 m, preferred minimum 1,80 m, at the foot of any ramp whose gradients exceed 4.5° (1 in 12).

8. Handrails should be provided to each side of any general purpose ramps.

9. A kerb should be provided to the exposed side of any ramp where the gradient exceeds 3° (1 in 20). Kerbs should be 5 cm. To avoid damage caused by the scuffing of wheel hubs and footrests the minimum horizontal dimension between the face of kerb and the nearest vertical obstruction, balustrading, should be 5 cm, preferred minimum 7,5 cm . Kerbs may similarly be provided on exposed sides of ramps, e.g. against plastered wall surfaces. Such kerbs should not be installed where the ramp will be used by ambulant disabled people. Care should be taken to ensure that kerbs provided for wheelchair users are not hazardous to others.

They may be colored to contrast with adjacent ramp surfaces.

10. Finishes and protection: Surfaces for general purpose ramps must be non-slip. A rough or textured finish is required and a coarse aggregate not finer than 1 cm open texture finish is recommended. A coarse aggregate bitumen or tarmacadam surface is satisfactory .If asphalt is used a roughened surface should be specified in preference to a sandpaper finish. A coarse aggregate concrete is also satisfactory but sharp and polished stones must be avoided. A polished concrete surface is dangerous and the surface mat be treated with carborundum to prevent slipping when wet. A herringbone pattern may be incorporated to give a non-slip surface to concrete ramps laid in situ.

11. Floor finishes to internal ramps must be non-slip. A grooved rubber tile or sheet is usable. Corrugations should run at right angles to the direction of travel.

12. Where ramps are in exposed positions or liable to be affected by frost or snow a canopy is recommended. Alternatively the surface may be protected by built-in electric heating.

### C.4. Doors

Careful attention must be given to the placing and specification of doors where provision is made for disabled people.

### C.4.1. Side-Hung Doors

1. Doors in corner positions must permit easy approach. There should be an unobstructed space adjacent to the door handle on the trailing face of a side hung door. The unobstructed area to the door handle should be minimum 38 cm, preferred minimum 45 cm. A larger area is more satisfactory and where possible a width of 60 cm should be followed.
2. In public buildings doors to W.C. compartments and changing cubicles opening out into circulation areas can be a hazard. Where a W.C. installed compartment or changing cubicle is designed to accommodate disabled people it should be placed in a position where the out-opening door is not a danger to other users.
3. Doors opening into corridors should be recessed to avoid accident hazards.
4. Doors should not be placed in such a way that door swings conflict.
5. Doors must not open directly on to the top of surfaces.

### C.4.2. Sliding Doors

Where convenient positioning is possible, side-hung doors are preferred to sliding doors. Sliding doors should only be installed in situations where a side-hung door would hinder circulation or maneuver.

1. The single leaf straight sliding door is most satisfactory.

2. Where there is insufficient space for the door to slide to one side only, bi-parting doors operating sympathetically on a single track may be installed. It is important that door rebates meet accurately or that an adequate draught excluder is fitted.

3. Sliding doors may be controlled remotely by means of a cord and pulley, but to be effective a counterweight should be incorporated.

### C.4.3. Revolving Doors

Revolving doors are commonly provided to public buildings because they give more effective thermal insulation than side-hung doors.

1. Where revolving doors are installed an auxiliary side-hung door must be provided.
2. Revolving doors are not usable by chair bound people and are hazardous to the ambulant disabled, the elderly and the blind. Hazards are greatest when door leafs are narrow. Where a four-leaf revolving door is installed the diameter inside the circle should not be less than 1, 83 m preferred dimension 1, 98 m.

### C.4.4. Automatic opening doors

1. Automatic opening doors can be electrically, hydraulically or pneumatically operated. Operation is triggered by a sensing device which can be photo cell or mat contact. Alternatively operation may be by foot or hand pressure, pendant switch, pressure switch or push button.
2. The majority of the installations incorporate a time delay device whereby doors are closed automatically after a prescribed time lapse. Such doors can be hazardous to wheelchair users and slow-moving ambulant disabled people.
3. Contact mats: the most suitable operating device is the contact mat. Doors are held open for as long as the area to either side is occupied. Mats must be sensitive to pressure exerted unevenly, e.g. by crutch users.

4. Where automatic doors are operated by photo-electric cells a Z layout of light beams ensures that doors are remain open if traffics move slowly.

5. To allow for wheelchair users automatic opening doors should give a clear opening not less than 78 cm wide.

6. Door protection: To protect against wheelchair footrest and hubs, a. kicking plate should be provided to a height of 33 cm, preferred minimum 36 cm, above floor level. To protect against all projections including wheelchair handles, protection should be provided. Because of the virtual impossibility of protecting all surfaces against all contingencies the preferability of fixing renewable protective panels, e.g. of laminated plastic, to specific areas as they become marked may be considered.

7. Glazing to doors should be toughened or wired.

8. Doors faced both sides with a plastic laminate are recommended.

9. Architraves and door linings should be of hardwood or protected by a metal angle.

10. Side-hung doors normally provide a clear opening width approximately 5 cm narrower than the width of the door.

11. In the recommendations which follow concerning door widths for wheelchair users a distinction is made between large-wheelchair requirements and small-wheelchair requirements. As a rule small wheelchair criteria should be observed in private dwelling houses and in employee areas of public buildings, and large wheelchair criteria in institutional buildings and public areas of public buildings.

a) A wheelchair passing through a doorway at an oblique angle requires a wider clear opening than a chair passing through at right angles.

b) For large wheelchairs the preferred door size is 93 cm wide door.

12. Automatic door closers should be specified with care. Floor springs, overhead door springs and spring hinges can make doors awkward to negotiate for wheelchair users.

13. To allow for wheelchair users the base of the glazing ought not to be higher than 100 cm above the floor level. Alternatively a vertical strip of safety glass 15-20 cm wide may be inserted. Where children may cause obstruction glazing should be continuous to the level of kick plate.

14. Door handles should not be higher than 1,07 m above floor level T o allow for wheelchair users and children, a height between 90-100 cm is preferred . For wheelchair users a pull handle may be fixed on the trailing side of a side-hung door to enable the user to pull the door as he passes through. The pull handle should be aligned with the door handle and should be positioned approximately 18 cm from the hinge side.

15. An auxiliary horizontal rail is more easily manipulated by wheelchair users and other disabled people than a short vertical handle.

16. Where side-hung doors are self-closing it is preferable to provide a pull handle to both sides of the door in place of a push plate on one side and pull on the other.