Ukrainian Journal of Ecology

Ukrainian Journal of Ecology, 2018, 8(3), 191–198

ORIGINAL ARTICLE

Weather and climate effects on structures

M.Y. Kalashtary

Instructor of Islamic Azad University of Kish Island, Iran.

E-mail: mehdi_dna@yahoo.com

Received: 02.05.2018. Accepted: 20.06.2018

Iranians have long been familiar with the climate impact on the building. They took advantage of the climate in the construction of urban buildings and structures to reduce the effects of ill-treatment. They also designed and implemented the benefits of a particular architectural climate. For example, the use of dome roofs, or masonry and mud walls or elevation from the ground and... . These are obvious indications of the climate's impact on architecture, which has made itself in structural compounds of ceilings and walls and building foundations. Currently, due to the population growth of the country and the need for housing, the need to design and construct a building to accommodate compatriots is required. Most of the country's economy is related to civil engineering activities. Therefore, increasing the useful life of the building will not only help the national economy but also respond to the need for housing in the community. In order to increase the useful life of the building, attention should be paid to the twenty laws and regulations of the national building regulations and the earthquake regulations. It is also important to pay attention to proper construction of the skeleton and to maintain it properly. Currently, in our country, architectural design is based on the climate well known to engineer architects. The need to pay attention to the climate in the design, construction, and execution of the skeleton of buildings has remained largely obsolete. It has not been adequately addressed. In this paper, we have tried to address the climate impacts on the choice of the type of structure, including the metal and concrete structure, and the choice of the type of pipe, as well as the connections and modifications to be made in the design of the structure. It also offers suggestions for extending shelf life.

Keywords: Climate; concrete structures; steel structures; concrete; corrosion

Introduction

The 9th subject of the national building regulations relates to the design and implementation of reinforced concrete buildings. In this subject, the issues of how to maintain and remove concrete aggregates as well as the enhancement of concrete quality are stated. In the same set the environmental conditions governing the reinforced concrete structures are divided into 5 environments. These environments are 1. Mild environmental conditions, 2. Medium environmental conditions, 3. Extreme environmental conditions, 4. Very severe environmental conditions, 5. Extraordinary environmental conditions. For each of the different types of environments, the situation is expressed in terms of the climate and conditions of the concrete structure at the end of the run. This situation indicates the importance of the environmental effects of the structure. Unfortunately, however, for each of the environments described, there is no clear geographic area, except for the matter of the extraordinary extreme environmental conditions that surrounded the Persian Gulf and the Oman Sea. In the following, only the conditions and limitations of concreting in hot and cold weather are discussed. While executive issues that occur during the execution of building skeletons and the conditions required maintaining a post-construction structure can be directly related to construction costs. The owners, especially those who are involved in construction work, are not subject to charges. On the other hand, it does not identify the climatic and geographic range for the stated conditions, instead of any definition and interpretation by the agents involved. You cannot easily become an expert in this field. In the case of metal structures, in the tenth chapter of the national building regulations, the limitations, and rules for the execution of metal structures in cold and rainy and also hot weather are discussed. Unfortunately, the questions and problems of its implementation are also not clear. In some cases, it can be interpreted by administrators and observers.

The importance of the climate impact on the building requires comprehensive studies and researches in this regard. In our country, the diversity of climatic conditions is quite evident. Extensive research in this field is inevitable. In general, these studies are done both theoretical and practical. In the first side, theoretical discussions on climate and building will be examined. In the second side, Tests and calculations are carried out using climates from different regions and conducting climatic divisions, as well as building examples of different climatic zones. Experiments are carried out within the framework of the tasks of the research institutes. This is only possible by allocating adequate funds and time from relevant organizations. Also, due to the lack of practice facilities for carrying out these programs and the lack of statistics and weather information in different regions, the present research will be more based on the first side. In some cases, the research has been carried out by the Housing and Residential Research Center uses the information and data. The environment, cities, and even the monuments of these climatic zones have specific characteristics that fit their climatic conditions. They should pay attention to the construction of buildings and skeletons of buildings during their maintenance and afterward. The report seeks to address, with regard to the designation of different climatic regions of Iran in relation to architecture and the provision of climatologically information on them. Also, the problem of determining the type of structure and its implementation is

affected by the climate and according to the shortcomings and conditions of each climate, use the structural system and its structural components appropriate to it. In this report, the impact of each of the climatic elements - which is being addressed in architecture - (weather, solar radiation, humidity, and wind) on the structure of the building during installation and maintenance are reviewed.

Theoretical foundations of research

Research methodology

The present study is a descriptive-applied study that has been used to collect information through library and field research.

Research aim

Regarding the observation of executive problems, as well as severe corrosion and disregard for the proper functioning of the skeleton and even the choice of the type of skeleton that exacerbates the corrosion phenomenon: It was considered necessary with the help of the books and publications of the Research Center for Building and Housing Executive Issues that, if they observed, would increase the shelf life of the building and cut the corrosion and structural cracks in a satisfactory way. Also, suggestions are needed to improve the skeleton performance based on the climate impact on it.

Research hypothesis

In this research, it assumed that all calculations of buildings and their supervision are carried out by competent persons. There is no discussion about his performance in the affairs. Climatic issues raised about the increasing attention of construction professionals in the country. From the beginning of the time, the design and construction of the building should be considered in conjunction with architectural and structural design.

Literature of study

The climatic divisions of Iran are classified into four moderate and humid climates (the southern shores of the Caspian Sea), cold climates (western mountains), warm and dry climates (central plateau), and warm and humid climates (southern shores). In this section, we describe the features of the four Iranian climates and, in brief, the characteristics of each climate are evaluated.

Moderate and humid climate

The Caspian Sea coast has a mild climate and heavy rainfall, high humidity, and temperature moderation. The weather is usually between 25°C and 30°C and in the nights between 20 °C and 23 °C, and in winter it is usually above zero. Precipitation in the summer is also often rainy. The cities of Rasht, Bandar Anzali, Babolsar and Gorgan are in this area. Of course, in recent years, due to the phenomenon of climate change, the average summer temperature was above 30 degrees. A more detailed review of the temperature of day and night in the summer and winter seasons require further review by the meteorological experts and the assessment of data and climate change.

Cold climate

Western mountains include the western slopes of the central mountain range of Iran. Considering that the average temperature in the warmest month is more than 10 and the mean air temperature in the coldest month is less than -3°C. In this climate, the winters are long, cool and hard, and for several months of the year the earth is covered with ice. There is little rainfall throughout the year. Spring is short and separates winter and summer. The cities of Tabriz, Urmia, Sanandaj and Hamedan are in this climate.

Hot and dry climate

In this climate, most semi-equatorial regions are included. Because of winds, the air is very dry. Direct sunlight is intense in these areas. The sky of these areas is, usually, a year without clouds. Usually in the afternoons, due to the warming up and movement of air layers close to the ground, a fog and dust storm arises. The low humidity and the absence of clouds in the sky make the range of temperature changes very high in these areas. In the summer, sunlight during the day warms up the surface to 70 degrees centigrade. While at night it reaches 15°C or lower. The winters are hard and cold and the summers are warm and dry. This climate includes the desert and semi-desert region.

semi-desert region

The slopes and foothills of the northern, western and southern heights use such of the humidity of the wet winds that pass through it. Of course, the closer we get from the west to the east, the effect of the winds decreases and the air dryness increases.

Desert region

The central, eastern and southeast holes of Iran have desert dry climates. The high temperature difference between summer and winter weather, as well as the high difference between night and day weather is a feature of the semi-desert areas. The Dasht-e Lut area has the lowest relative humidity in Iran, which is unlikely to be the warmest region. Tehran, Mashhad, Isfahan and Shiraz, including semi-desert areas and cities such as Zahedan and Yazd, are among the desert areas.

Warm and humid climate

The southern coast of Iran, separated by the Zagros Mountain Range from the Central Plateau, has very hot summers and mild winters. In these areas, the maximum summer temperatures reach 35-40 degrees Celsius and the maximum relative humidity reaches 70 percent. In this climate, humidity is high throughout all seasons. For this reason, the difference in air temperature is low at night and in different seasons. There is a lot of sunlight in these areas. The cities of Bandar Abbas, Jask, Abadan and Ahwaz are warm and humid. Generally, rainfall is more regular on the Gulf coast than the Oman Sea coast. The beaches of the Oman Sea are affected by the monsoon winds of the Indian Ocean, with irregular rain and many droughts.

Climate effects on the choice of structure and implementation

Unfortunately, so far, the climate effect on the type of skeleton selection and the way the joints have been applied in metal skeletons has not been investigated and qualitatively evaluated. This is while the ancients have taken creative approaches to tackle the climate impacts that reduce the well-being of the inhabitants of the home. Increasing the thickness of the masonry and mud walls and the type of dome cover of the ceilings, although they lead to climate-related debates. In this way, the old buildings were resilient to earthquakes in the land of Iran. The fact that Iranians have increased the thickness of the walls of the brick walls in order to meet the goal of coping with the earthquake, as well as reducing the climatic influences, and other climate issues that have been considered in the construction, should be examined in a separate article. This section examines the effect of each climate on the type of skeleton choice and its design.

Moderate and humid climate

This climate is based on the ninth chapter of the national building regulations in the medium environment. Moderate environmental conditions refer to conditions in which concrete is exposed to moisture and sometimes sweating. Components that are permanently exposed to non-invasive soils or water, or submerged with a pH greater than 5, are considered environmentally friendly.

Concrete structures of cement and aggregates and water are formed. The combination of their proper combination is based on the mixing plan and the timely use of the execution of concrete structures. In the meantime, attention to the storage place of materials and their maintenance before the mixing plan can have significant effects on the durability of concrete structures in the long run. Moderate and humid areas always have a damp environment. It can be dropped into objects and the environment as dew. Therefore, attention to staying, concrete materials such as cement and aggregates from this dew is necessary to maintain the initial quality of concrete. The cement is damaged by the influence of moisture and loses its first quality. According to paragraph 12 of the National Building Regulations of the Ninth chapter, "in areas and in seasons where there is a chance of rainfall, cement bags should either be stored in sheltered warehouses or be covered with plastic laminates. These sheets are firmly secured around the area. In these areas and in these seasons, doors, windows, and ventilation system should be closed to prevent humid air flow in the warehouse.

Also considering that in the concrete mixing plan, the percentage of water absorption of aggregates and sand is calculated and added to the amount of water required for the mixing plan. To debris on materials that penetrate the aggregate aggregates, the amount of water absorption in the mixing plan is reduced by materials and finally the amount of water used in the mixing plan could increase, This will reduce the compressive strength of the concrete. Unfortunately, neglecting the environmental conditions and the location of building materials reduces the useful life of the structure and concrete structure.

In the case of reinforced concrete structures and buried bars in concrete, the environmental conditions of the retaining of the bars are also important for increasing the life of the structure. The accumulation of bars in construction workshops so that they are located between dirt and exposed to damp air are prohibited under the ninth chapter of the national building regulations. Of course, attention to this issue should be taken into account in the implementation of the operation after the relocation of the bars from the warehouse to the project site and carelessness in protecting the rails during work in the workshop and at the time of the operation interruption.

In warm and temperate regions of northern Iran and coastal areas of Hormozgan province, high groundwater level is one of the important issues of foundation design and its height. In many designing regions, attention is paid to the depth of the groundwater level and the location and bedding of the project (which sometimes requires excavation of the site for soil and vegetable gathering). After excavating and determining the floor and on the building in the position, if the excavation is done to meet a solid soil layer, often, it is exposed to groundwater levels and some part of foundations are take placed in watery soil. However, it is necessary to dry the bedding then foundation concreted. However, after the first rainfalls, the whole or part of the foundation is again subjected to rising and subsurface water. This, in turn, can cause non-homogeneous sitting and damage to concrete foundations due to chemical compounds of water or cold air erosion. In general, it is necessary to use a stripped foundation for sitting control to cut the heterogeneous mixing effect of the structures in place of a single foundation. One of the important issues that must be considered in structural calculations in coordination with executive agents is the foundation's position after excavation and execution. In many cases, after removing dirt and reaching layers with sufficient resistance to run concrete, there is evidence of foundation flooding or water uplift in the foundation floor during run-up. It is necessary to discuss this with the engineer in order to control the design and to consider the conditions of the uplift and the substrate of the structure so that the design conditions should matched with the condition of the ground. Also, raising the groundwater level to freeze and freezing it and increasing the volume of water during freezing can be one of the factors that greatly reduce the useful life of the foundation. In the meantime, the use of aggregates that have high water absorb in foundation of concrete leads to more water penetration into the concrete and eventually the bursting of concrete due to the freezing of water in the aggregates in concrete.

In metal skeletons, disregard of the rules and method of joints, and even the type of used profiles so that during the operation and at the time of the operation of the skeleton, the collecting and the humidity of air and rainwater in the fitting area, which would lead to exacerbates of corrosion exacerbates. It will eventually reduce the useful life of the buildings ,this cases and will be widely discussed in the hot and humid climate.

The disregard for the metal skeleton and its welding during rainy and slender welds and the wetness of steel profiles during welding are one of the things that occur in a moderate and humid climate. To monitor the skeletons, attention to the above atmospheric factors is essential, which unfortunately many contractors are unaware of.

Cold climate

This climate due to the long period of cold and low thermal temperatures should be considered in the design of structures to the extent of its effect on the structure during its implementation and afterwards at the time of exploitation. The low temperature and cold temperatures affect the aggregate used in concrete as well as the freezing of water used for the quality of concrete production. For this reason, in such areas, the use of antifreeze in concrete and heating aggregates or water prior to mixing is recommended, This prevents the freezing of concrete and reduces the hydration of cement. Also, curing, concrete and watering in this climate can also be one of the problems of running concrete structures in a cold climate. The presence of frozen water and celestial precipitation on aggregates can also, in aggregate, be similar to the hot and temperate climate, which increases the water used in concrete and ultimately reduces the strength of the concrete. Also, the freezing of the foundation concrete and the bursting of concrete and contraction stresses in the metal structure, especially the bolt and nut structure, which can cause secondary tension in the joints, should not be ignored too. In the implementation of metal skeletons using welded joints, it is important to pay attention to the need for preheating sections in cold seasons and the dryness of the welding site from any kind of contamination and freezing. Also, according to the Welding Code 228, the welding should be under the tent and cover and warmed up within the temperature range of 0 to -18°C. For example, for steel st37 between 20 and 65°C, the preheat temperature for the base metal is recommended. Under the temperature of -18° C, welding is completely prohibited.

Hot and dry climate

In this climate, changes in the thermal range in day and night are high. In such a situation, the concrete can be difficult to cure. The necessity to pay attention to the ambient temperature and wind blowing during concrete curing is necessary to prevent water evaporation of concrete mix. Properly fresh concrete must be protected from sunlight. When in the case of concrete is executed in, concrete should be used during the early hours of the day. During the day, concrete is covered with wet sacks that prevent water evaporation from hydration. Winding during concrete execution can cause rapid evaporation of fresh concrete. It creates cracks in it, which can lead to subsequent damage to the concrete and the penetration of destructive ions into the concrete. Attention to the warmth of aggregates due to inappropriate supply and the rise of fresh concrete temperature during mixing and evaporation of mixing concrete water , that are added to the mixture for mixing cement and aggregate can reduce the mixing water ,and eventually reduce hydration and decrease the strength of concrete. Based on the ACI305's recommendation in hot and dry weather, wooden casts cannot prevent the evaporation of water. If used with these types of casts, they should be protected with a suitable and moist cover. After the prescribed treatment period (at least 7 days, if possible 10 days better), the coating should remain in place without wetting for several days (4 days recommended). As a result, the surface of the concrete is slowly dried and less exposed to cracking due to shrinkage.

Considering the changes in the thermal range in these areas and the need for seamless contraction and expansion for structures is one of the issues that have not been considered in the implementation of structural structures and joints of the metal structure as well as the joints of the main structure. This causes secondary tensions and problems during the operation of the building. Also, the extreme cold winter temperatures also include issues in the cold climate, which are mandatory when building structures and foundations are implemented. Given that the climate is in the desert and semi-desert region of Iran, armed storms, along with fine grains of sand, can cause gradual erosion of skeletons. Gradually, the concrete cover and the protective coating of the metal skeletons are removed and the surfaces are vulnerable to later corrosion.

Given the low rainfall in this climate, there are usually no serious measures to collect surface water and direct them; therefore, during the equipping of the workshop, the location of the warehouse of concrete materials and cement and steel bars should be chosen to avoid flooding in the sound of rain during the cold season.

Warm and humid climate

This climate is located on the Persian Gulf and the Oman Sea and is very high in corrosive areas. Due to the high humidity of these areas and their proximity to the Persian Gulf and the Oman Sea, ion chloride, along with salt particles, has penetrated the entire environment to a distance of two kilometers from the coast (K-370, Building and Housing Research Center Magazine). This moisture is high on buildings and skeletons of buildings. Considering the importance of the topic of studying the effects of hot and humid climate on concrete and steel structures separately are researched.

Concrete structures

One of the most important issues in concrete structures is the degree of permeability of the corrosion factors are on concrete. The following factors can be considered as influential factors in permeability:

1. The effect of water to cement ratio: The ratio of water to cement is obviously an effective factor in permeability and, if this ratio is greater than 0.45, the permeability is significantly increased (K-370, Building and Housing Research Center Magazine). Storing building materials in indoor areas that prevent humidity from absorbing humidity by aggregates and ultimately increase the amount of water used in concrete are very important and must be taken into consideration.
2. The effect of cement type on permeability: In general, mineral impurities and pozzolans reduce the permeability of concrete. Considering the type of additive and cement type in this area can reduce the impact of environmental impacts.
3. Cement smoothness effect on permeability: The cementitiousness of the cement is measured based on the specific surface area of the cement particles, which is the total particle surface, which forms a cement weight unit expressed in terms of Cm2 / Kg. The cement's softness affects the properties of concrete ,because softness is an important factor in the rate of hydration. On this basis, with a slight increase, the thickness of a large amount of defects and cracks is reduced.

Pay attention to the type of chosen cement and the correct calculation of the water-to-cement ratio in the mixing scheme helps to reduce the permeability of concrete and more resistance to extreme environmental conditions.

In this regard ,pay attention to the situation and condition of deposits of materials is necessary because of the direct exposure of the sun ,make the aggregates warm and water evaporates from the mixing plan. Finally, the hydration is done incompletely or due to the absorption of air moisture that sits dewy or sultry on its body,So it also increases the water volume

of the mixing plan and eventually weakens the concrete. In hot areas, double glazing silos should be used to avoid cement warming. It is also coated with white on the surface of the silos. Pocket cements should be kept in a safe place under the canopy, away from moisture.
The location of the rails is important as an important member of the concrete structure. The steel bars should be kept away from moisture. The use of bars with a very thin layer of corrosion on them is possible due to the creation of protective compounds with cement paste. If the thickness of the rust is high on the bar or if there is cavern corrosion started , the use of such reinforced concrete in concrete should be avoided. so should use special methods for rusting the bars. The sandstone method, while creating contamination in your environment, creates a cavity at the surface of the bar. This method is not suitable for rusting the bars.
In recent years, the use of lubricants and super-lubricants in ready-made concrete factories has become commonplace. In general, using water reducing agent, the water-cement ratio can be reduced , so finally reduce the permeability of the concrete. Super-lubricants are a group of water-reducing agents that can reduce water abundance and create more psycho sociality. Using this type of material can reduce 25 to 35% of mixed concrete water. By doing this, it is possible to make concrete with a greater resistance than the Mpa100. If the ratio of water to cement is reduced due to the use of the additive, the permeability and concrete shrinkage will certainly be diminished. In the use of additives, attention is drawn to the need for slump and the density of the bars, and the volume and type of additive, that should be taken into account in the concrete mixing plan.
To transport concrete with a mixer truck, it is necessary to pay attention to the air temperature and the transport distance of the concrete to the destination. High distance in warm air during water evaporation the mixing plan increases the total temperature of the mixture and made extremely evaporation of the water in the mixture. In addition, according to the regulations, when the duration of concrete transfer is high, it is better to use a dry mix method. The required water in the workshop is also added to the mixture, which requires careful monitoring. Iron-emitting germs exist in the soils of these regions, and chlorate and sulfate ions penetrate soils, Therefore, it is necessary that the concrete cover is properly applied in accordance with the standard to delay the penetration of carbon dioxide and chlorides. Meanwhile, when corrosion is started, the thickness of the coating can delayed the concrete fragment by enclosing the bars.
Different methods are used for concrete caring, which can be divided into two groups as follows:
Water caring: In this method, the moisture content is added to the concrete and decreasing of the moisture content is also prevented. For pouring water onto the surface of concrete, it is used to create a pond or spray or saturate coatings. In all these ways, it must be ensured that the surface of the concrete is not exposed and does not dry because the more dry process results in less resistance.
Insulating caring: In this method, trying to keep the moisture content of the concrete. Plastic membrane and chemical membrane sheets can be used to keep the moisture content of concrete. The molds also act as insulators and prevent the evaporation of concrete water.
Also, in the Persian Gulf climate and environment of the Persian Gulf, one of the effective factors in the destruction of concrete structures is penetration of destructive materials. Therefore, in many cases, the durability is the function of the surface layer performance of the concrete in the structure. A variety of methods for protecting concrete structures to prevent corrosion or reduce its severity are divided into two major groups:
- Prevent corrosion of the bar, even if destructive elements such as chlorine, clay dioxide and moisture reach the bar.
- Prevent the penetration of destructive elements in such a way that it is not possible to approach these elements to the bars.
Several methods are used to protect concrete structures, the most common of which are:
1-surface protection, 2-inhibitors, 3-cathodic protection 4-covering bars
Of the methods mentioned, only surface-protection methods can prevent penetration of destructive materials. While other methods allow penetrating the destructive elements, they prevent corrosion of the bar. Surface protection and cathode protection methods can be used for constructed structures. But the methods of covering bars and inhibitors can only be used for structures under construction. Therefore, it is necessary to select and execute one of the methods for the protection of concrete from corrosion agents during implementation, taking into account the specific conditions of each project and its requirements.

Metal structures

Metal structures in the air and hot and humid air are susceptible to severe corrosion. If steel structures are used in buildings, then it is important to consider the necessary measures to deal with corrosion at the time of execution of the skeleton and maintenance after the completion of the operation. In coastal areas, sea changes due to tides can increase the corrosion of metallic structures that alternate in seawater. Corrosion is also increased in areas exposed to saline secretion.
In this climate, surface protection and the use of cathode protection in the design process are used. Otherwise, it can be designed to prevent the accumulation of moisture in the air (sultry and humid, which is commonly associated with chlorine ion) and dust. If possible, the drainage cavities should be considered to prevent water leakage. In the photographs below, a design method is proposed to improve the condition of corrosion (Figures 1 to 7).

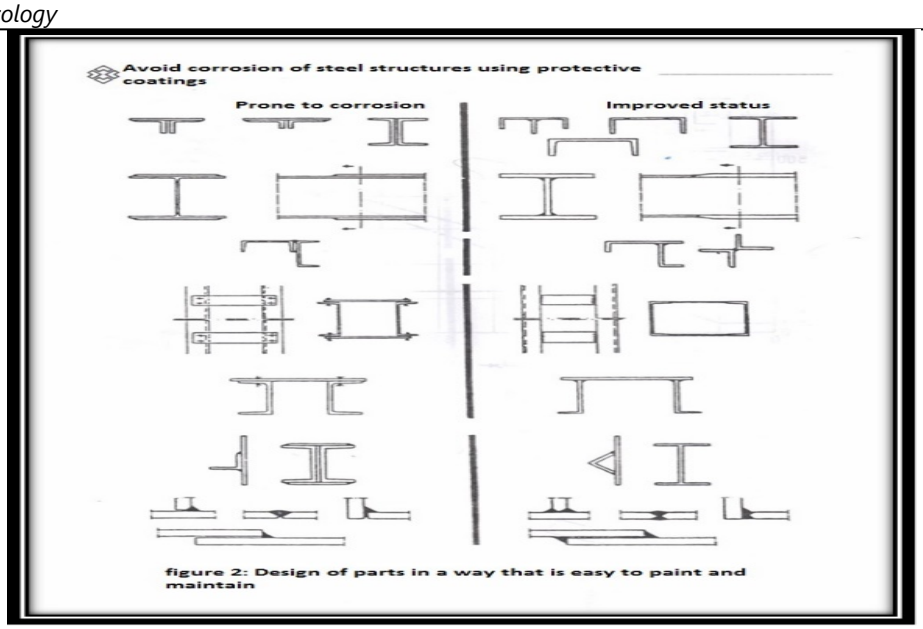

Figure 1. Design of parts in a way that is easy to paint and maintain.

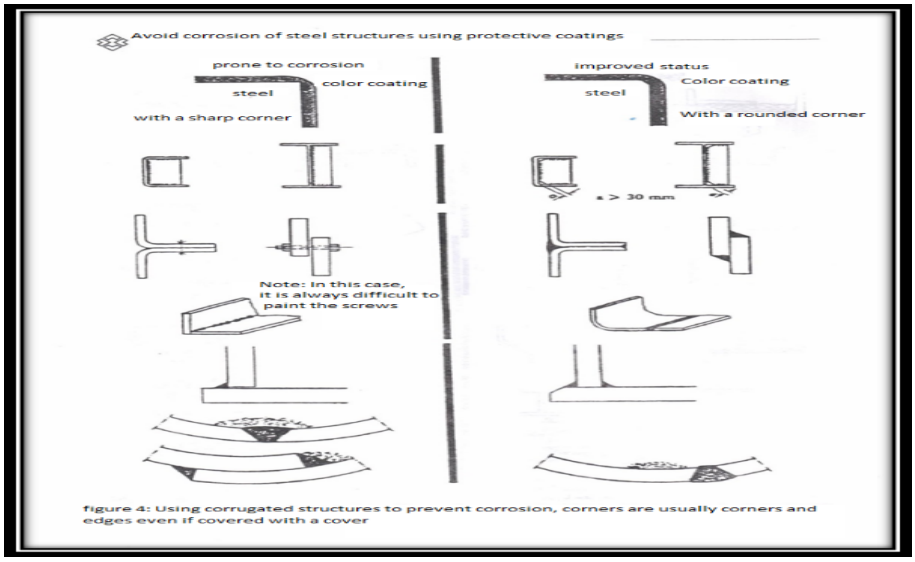

Figure 2. Use of rounded structures to prevent corrosion. Usually, the edges and corners are corrosive points, even if they are protected by the coating.

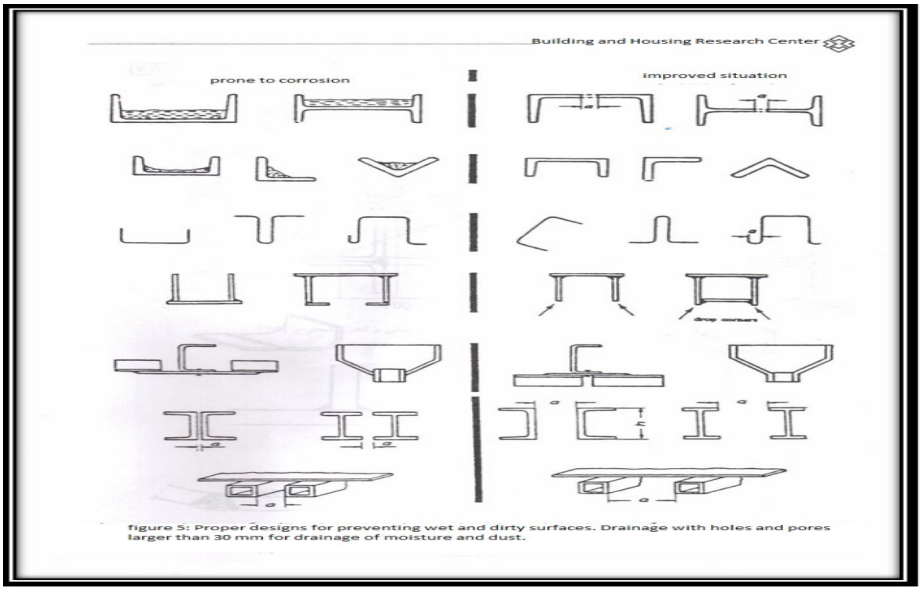

Figure 3. Proper designs for preventing the formation of wet and dirty surfaces. Drainage with holes and pores larger than 30 mm is for drainage of moisture and dust.

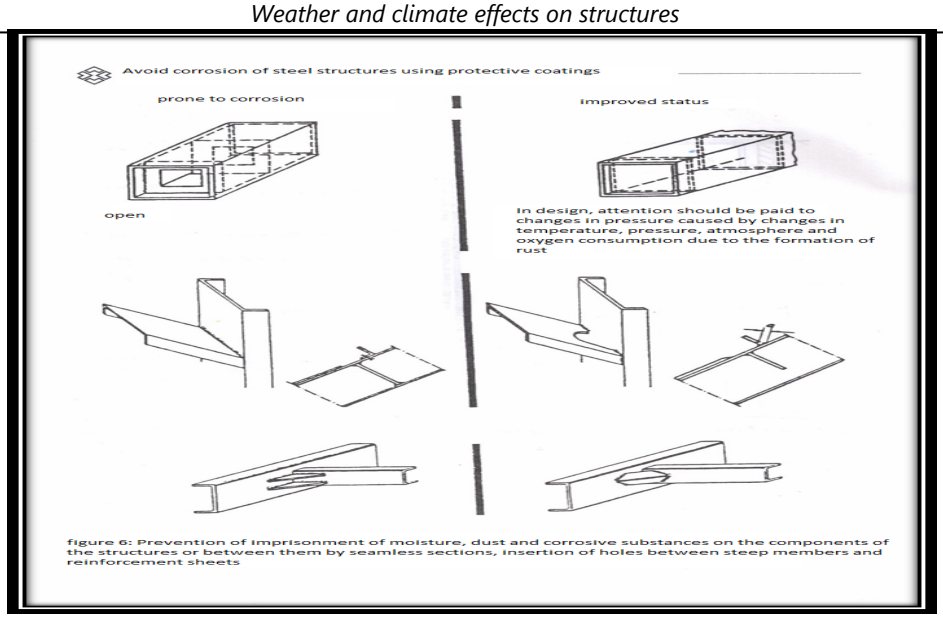

Figure 4. Prevention of soil and moisture content of soil moisture and dust, and corrosive substances on the components of structures between them by hollow sections, the insertion of a hole between the sloping members and reinforcement sheets.

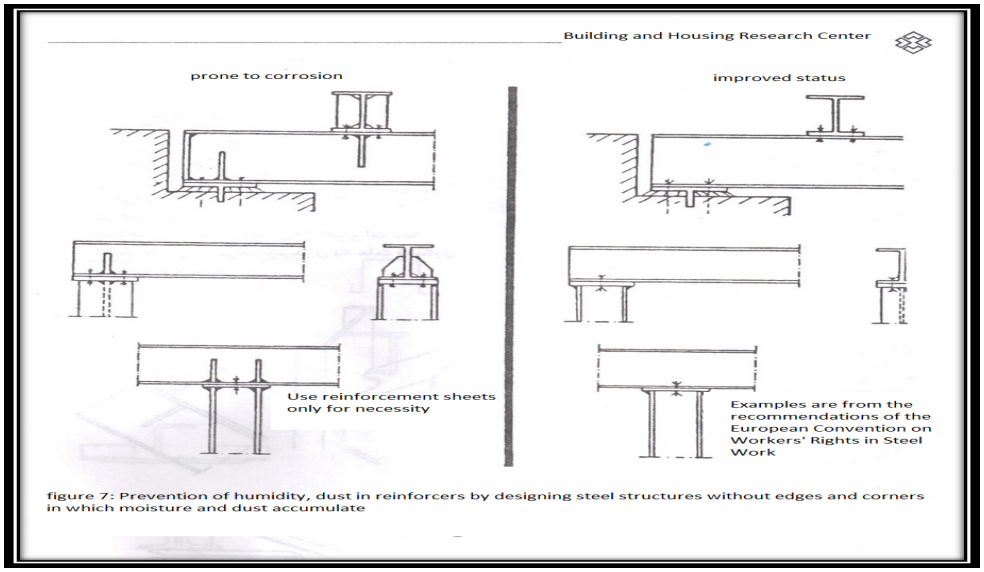

Figure 5. Preventing moisture and dust in the reinforcements by designing steel structures without edges and corners in which moisture and dust accumulate.

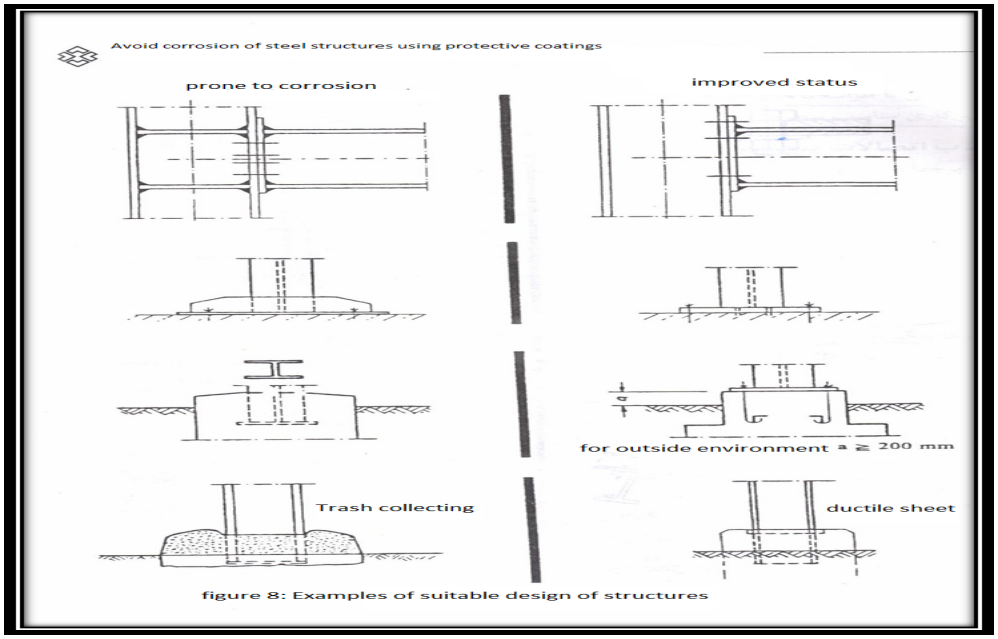

Figure 6. Examples for Proper Design of Structures.

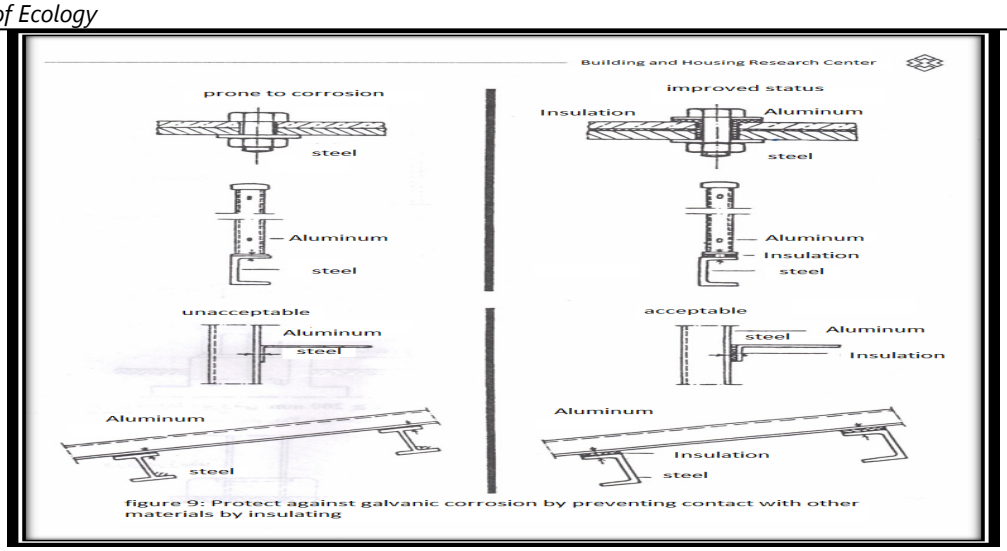

Figure 7. Protection against galvanic corrosion by preventing contact with other materials by insulating.

In the warm and humid climate, another issue should be considered when designing structures, especially the metal structure, The subject is galvanic corrosion in steelworks. In order to reduce the risk of galvanic corrosion it is recommended to use, if possible, fittings of the same material as the sheets or sections to be connected. Screws made of stainless steel should be used in stainless steel sheets or sections, galvanized screws in galvanized structures and up to the end. In this case, if a galvanic cell is created, the larger surface acts like a part of the Anode and before the screwing it will corrode and eventually the structure weakens. High strength friction bolts, contact surfaces of the joints must remain unpainted. Any colors that have been used before should be erased. After attachment, special care should be taken and in order to prevent water entering, all the edges and corners of the connection, as well as screws, nuts and washers are painted. In the case of other screwed or riveted parts, the surfaces to be permanently in contact must be covered with a layer of liners just before mounting. In this case, the surfaces should be connected to each other until it is still damp.

Conclusion

Currently, the choice of the type of building skeleton is usually in consultation with employers and owners who are sometimes not specialized in construction, and even based on their financial basis. Selection of the type of building skeleton according to the climatic conditions in each region and the effects that affect the structure during construction and then during the operation phases are left out of view,and ultimately, it reduces the useful life of the building or creates cracks and flaws in the building, face and interior of it. Considering the above issues, it is necessary to consider the climate and climate governing the location of construction from the beginning by the executor and the competent engineers. Structural and architectural designers, in coordination, will be designed in such a way that the negative climatic effects on architectural and structural design are minimized. Also, in the universities and other educational centers, the impact of the climate on the design and implementation of the structure is trained and its tips for use by scholars. The effects of climate on the 9th National Building Regulations on RC structures and on the subject of the 10th chapter of National Building Regulations on steel structures have been somewhat discussed, More research is needed to select the type of structure in each climate, considering the start of construction and the maintenance of the skeleton, including metal and concrete, and design suitable for different climates of the country.

References

Mansour, P. (2001). Anticorrosive prevention of steel structures using protective coatings, First edition, Publisher of Building and Housing Research Center, Tehran.

Office of the National Building Regulations. (2010). Design and implementation of concrete structures of Armay, Second Edition, Publisher of Development of Iran, Tehran.

Office of the National Building Regulations. (2010). Designing and Implementing Steel Buildings, Second Edition, Publishing House of Development of Iran, Tehran.

Ghodousi, P., Parhizgar, T., Ramezanianpour, A. A., Mozafari, N. (2004). Concrete Technology in Persian Gulf Environment, First Edition, Publisher, Research Center for Building and Housing, Tehran.

Office of the National Building Regulations. (2009). Foundation, Third Edition, Publishing House of Development of Iran, Tehran.

Golsorat, P. (2011). Restoration of Structures (Rehabilitation and Rehabilitation), Second Edition, Publisher Newshanegar, Tehran.

Citation: Kalashtary, M.Y. (2018). Weather and climate effects on structures. Ukrainian Journal of Ecology, *8*(3), 191–198.