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HASAN KALYONCU UNIVERSITY
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DEPARTMENT OF CIVIL ENGINEERING

ANALYTICAL EVALUATION OF SELECTED CONCRETE STRUCTURES AGAINST EARTHQUAKES IN TURKEY

M.Sc. THESIS IN
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Analytıcal Evaluatıon Of Selected Concrete Structures Agaınst Earthquakes In Turkey

M.Sc. Thesis In
Civil Engineering Hasan Kalyoncu Univercity

Supervisor
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ABSTRACT

ANALYTICAL EVALUATION OF SELECTED CONCRETE STRUCTURES AGAINST EARTHQUAKES IN TURKEY

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Anatolian geography, which is one of the most seismically active regions of the world, has hosted many earthquakes until today. The existence of these frequent destructive earthquakes necessitates a technical examination of the building stock and the urban transformation of risky buildings. The study is located on the East Anatolian Fault Zone in the Anatolian geography, some of the reinforced concrete structures in Dulkadiroğlu, Elbistan and Pazarcık districts of Kahramanmaraş province 1. The level assessment was carried out by taking into account the "Principles Regarding the Determination of Risky Structures" published by the Ministry of Environment and Urbanization in the Official Gazette in 2019.

The methods given in these principles are not used for building earthquake performance evaluation and strengthening. According to the methods given in these principles, it does not conclude that the buildings that are not risky meet the earthquake resistant design principles. Within the scope of Law No. 6306, simplified methods that can be used to determine the regional distribution of buildings that can be considered risky in certain areas and to make a prioritization decision, taking into account the characteristics of the building and the earthquake hazard, are given. With this method, calculations were made by taking a total of 120 building samples that make up the urban settlement areas in Dulkadiroğlu, Elbistan and Pazarcık districts of Kahramanmaraş province. In the risk determination of reinforced concrete structures, which are included in the principles for the determination of risky structures, 9% of the buildings examined were determined as very risky, 66% as medium risky, 24% as risky and 1% as risk-free

This study will be a source for the building stock studies to be carried out for the province of Kahramanmaraş.

Keywords: Kahramanmaraş, Building Stock, Earthquake Risk, Street Scanning Method, East Anatolian Fault Zone

ÖZET

TÜRKİYEDE SEÇİLEN BETON YAPILARIN DEPREME KARŞI ANALİTİK DEĞERLENDİRİLMESİ

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Dünyanın sismik olarak en aktif bölgelerinden biri olan olan Anadolu coğrafyası günümüze kadar birçok depreme ev sahipliği yapmıştır. Sıklıkla yaşanan bu yıkıcı depremlerin varlığı yapı stoğunun teknik olarak incelenmesini ve riskli yapıların kentsel dönüşümünü zorunlu kılmaktadır. Çalışma Anadolu coğrafyasında Doğu Anadolu Fay Zonu üzerinde yer alan Kahramanmaraş ili Dulkadiroğlu, Elbistan ve Pazarcık ilçelerinde bulunan betonarme yapılarının bir kısmı 1. Kademe değerlendirmesi Çevre ve Şehircilik bakanlığının 2019' da Resmi Gazete' de yayımladığı "Riskli Yapıların Tespit Edilmesine İlişkin Esaslar" dikkate alınarak analizler yapıldı. Bu esaslarda verilen yöntemler bina deprem performans değerlendirmesi ve güçlendirilmesi amacıyla kullanılmamaktadır. Bu esaslarda verilen yöntemlere göre riskli bulunmayan binaların depreme dayanıklı tasarım esaslarını sağladığı sonucunu çıkarmamaktadır. 6306 sayılı kanun kapsamında belirli alanlarda riskli sayılabilecek binaların bölgesel dağılımının belirlenmesi ve önceliklendirme kararı verilmesi amacıyla kullanılabilecek, bina özelliklerini ve deprem tehlikesini dikkate alan basitleştirilmiş yöntemler verilmiştir. Bu yöntem ile Kahramanmaraş ili Dulkadiroğlu, Elbistan ve Pazarcık ilçelerindeki kentsel yerleşim alanlarını oluşturan toplam 120 yapı örnekleri alınarak hesaplamalar yapılmıştır. Riskli yapıların tespit edilmesine ilişkin esaslarda yer alınan betonarme yapıların risk tespitinde incelenen binaların %9' i çok riskli %66'sı orta riskli %24'ü riskli ve %1 i risksiz olarak tespit edilmiştir.

Bu çalışma Kahramanmaraş ili için yapılacak yapı stoğu çalışmaları için kaynak niteliği taşıyacaktır.

Anahtar Kelimeler: Kahramanmaraş, Yapı Stoğu, Deprem Riski, Sokak Tarama Yöntemi, Doğu Anadolu Fay Zonu

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LIST OF SYMBOLS/ ABBREVIATIONS

Mw	Plain concrete
PCDRB 2019	Principles Concerning the Detection of Risky Buildings
N-S	North – South
EAFZ	Eastern Anatolian Fault Zone
DSFZ	Dead Sea Fault Zone
RCF	Reinforced Concrete Frame
RCFC	Reinforced Concrete Frame Curtain
n_{sk}	Number of Floors
SSS	Structural System Score
S_{DS}	Spektral Design Short
Oi	Negativity Parameter
OPi	Negativity Parameter Value
PS	Performance Score
TDK	Turkish Language Society
TBDY	Turkish Building Earthquake Regulation
INFORM	Risk Management Index
WRR	World Risk Report

CHAPTER 1

INTRODUCTION

1.1 Background

Among the most important natural phenomena that have affected human activity since the existence of life have been earthquakes that have occurred within the geomorphological evolution of the earth's crust. Due to their destructive effects, they cause loss of life and property from time to time, which has been defined as a natural disaster by people. Although it has devastating effects, it has had positive effects on human life directly and indirectly in the formation and development of fertile plains, abundant water resources, healing waters and mineral resources [1].

Turkey is located in the most important seismic belts in the world, located in the young and active Alpine-Himalayan belt. Earthquakes that occur within 1 year on the neotectonic structure where it is located are 23% of the earthquakes that occur in a year in the world. These earthquakes, which occur in our country, which has 92% different degrees of earthquake risk, are severe every 1.5 years, very severe in 2.5 to 3 years, and destructive earthquakes in 30-40 years [2].

In our country, which was exposed to destructive earthquakes, the magnitude of the earthquake with the intersection of North and Eastern Anatolia in 1866, which was "X", was the last earthquake that occurred above 7.0. Although there have been earthquakes ranging from 6.0-7.0 in DAFZ so far, it has remained silent in terms of its potential to produce destructive earthquakes until the February 6, 2023 earthquake. After this silence, on February 6, 2023, Pazarcık Mw: 7.7 earthquakes occurred in Kahramanmaraş at 04:17 and ElbistanMw: 7.6 earthquakes occurred at 13:24. The provinces of Hatay, Gaziantep, Malatya, Diyarbakır, Kilis, Diyarbakır, Şanlıurfa, Adıyaman, Osmaniye and Adana were also affected by this earthquake with devastating damage. Then, Elazığ was added as the 11th province and the provinces of Bingöl, Kayseri, Mardin, Tunceli, Niğde and Batman were added as disaster areas. According to official figures, 50,783 people lost their lives, 115,353 people were injured and 37,984 buildings were reported to have collapsed due to the earthquake. The losses in Kahramanmaraş are higher than the losses in the 1939

Erzincan Earthquake (Mw: 7.9) and 1999 Kocaeli Earthquake (Mw: 7.6), which are among the biggest earthquakes in our country [3].

In order to minimize the loss of life and property caused by such earthquakes, a risk assessment of the existing building stock should be made. The "Principles for the Identification of Risky Structures (RYTEİE 2019)", the first of which was published in 2013 and then entered into force in 2019 by making updates, should be examined in detail and the existing building stocks should be evaluated according to the regulation [4]. Within the scope of this thesis, the first evaluation method specified in Annex-A of the Regulation is discussed and information is given about how it is applied to the structures and the parameters to be considered [5].

This study gives information about how the first stage evaluation method should be applied to the structures and the parameters to be taken into account. In order to minimize the possible loss of life and property in such earthquakes, risk assessments of existing building stocks should be made. The Principles for the Determination of Risky Buildings (RYTEİE 2019), first published in 2013 and the last version in 2019, should be examined in detail and existing building stocks should be combined in this way. scope of this regulation. Within the scope of this thesis, the risk assessment was made according to the Principles for Identification of Risky Buildings (RYTEİE 2019) which was designed by taking the average values of some building determinations made in Dulkadiroğlu, Elbistan and Pazarcık districts of Kahramanmaraş province, and the issues to be followed in the risk assessment were discussed in detail [4].

Studies are continuing on different scientific models in order to determine the performance of a settlement in a possible earthquake, structural damage and loss of life, injuries and property. In general terms, such a study should include the following studies:

1.2 Area and Location of the Study

Workspace; It is located in the region between the East Anatolian Fault and the Dead Sea Fault line, which forms the border of the African, Eurasian and Arabian plates and has the character of a left-sided strike-slip fault extending from Karlıova to the Amanos Mountains. In this area, as a result of the 7.8 earthquake that occurred in Kahramanmaraş Pazarcık on February 6, 2023, 7.6 in Elbistan and 6.4 in Hatay

Defne, a great destruction took place in 10 provinces, including Kahramanmaraş, Gaziantep, Hatay, Adıyaman, Diyarbakır, Şanlıurfa, Malatya, Adana, Osmaniye and Kilis. The study was carried out in the province of Kahramanmaraş, which received the most destruction.

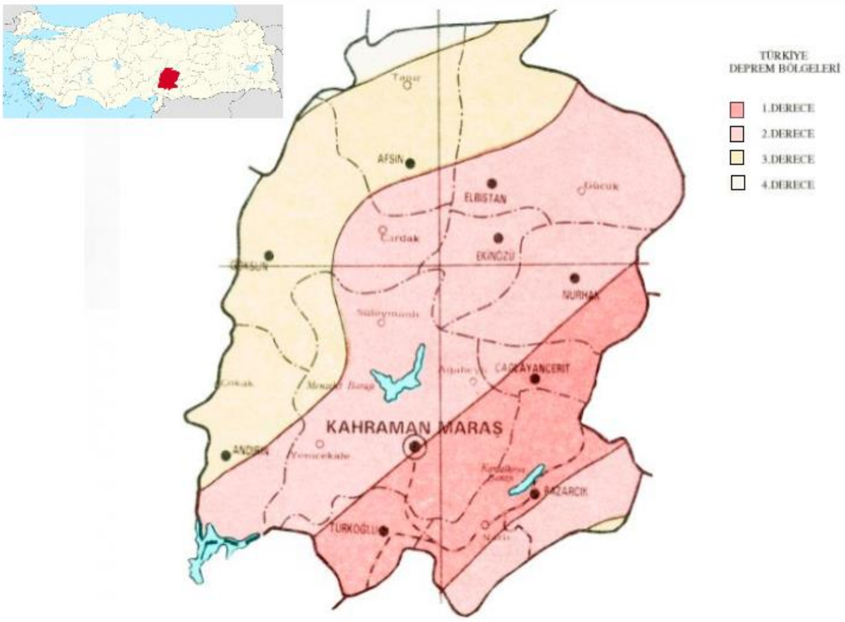


Figure 1. 1: Map of Kahramanmaraş Province

1.3 Purpose of the Research

The aim of this study is to investigate the earthquake risk and hazard analysis of Kahramanmaraş province. The fault lines on which Kahramanmaraş province is located, their locations, characteristics and earthquake situations in history will be investigated. It will be accompanied by information about the recent Pazarcık and Elbistan earthquakes. The risk level of the buildings will be determined by taking into account the "Principles Regarding the Detection of Risky Structures" published by the Ministry of Environment and Urbanization in the Official Gazette in 2019 on a total of 120 buildings discussed in Pazarcık, Elbistan and Dulkadiroğlu, the central district of Kahramanmaraş province, with the street scanning method.

In line with the data obtained, it will serve as a source for studies to minimize the damages that may occur from destructive seismic movements that may occur in the region. A resource will be created for the building risk assessment of the region, especially for the regions with earthquake risk.

1.4 Objectives of the Research

After the February 6, 2023 earthquake disaster, it will provide an idea about what should be considered in the structures to be built in place of the destroyed and damaged structures.

Earthquake performance is also considered as the building safety of the result obtained depending on the level and spread of damage that may occur in buildings as a result of the earthquake effect.

Earthquakes that occur in the geography we live in, the earthquake performance adequacy of the existing building stock is at a minimum level. In addition, the earthquake performance of the structures that seem to be sufficient for earthquake performance is not at the required level. Determining the earthquake performance of the existing building stock in our geography, which is located on fault lines, minimizes the loss of life and property from earthquakes that may occur. Of course, the high building stock negatively affects the determination of the earthquake performance of the buildings in terms of cost and time. However, it is possible to obtain accurate data by using the right methods and accelerating the process. [4th source]

1.5 Structural Analysis

Located on active fault lines, 45% of the geographical population 1. It is located in the highly seismic zone. This means that earthquake-resistant building analysis and design that will minimize the loss of life and property is important [7]. In addition, it constitutes the detailed extraction of all values of the structures to reduce the damages caused by the earthquake and the determination of the damage risk status. Many parameters are based on finding the earthquake damage risk of buildings. Some of these parameters are; Soil features, seismicity of the existing region, cross-section, geometry and material properties of the building, type of load-bearing system and details of structural elements. In the light of these parameters, the most accurate method in determining the status of existing buildings is the exact analysis methods. In addition, the fact that there are thousands of structures that need to be examined and the inadequacy of experts in their fields increase the cost of such methods. In this case, the use of methods that we can get fast results in accordance with the purpose with reliable parameters and numerical evaluation is among the economically possible solutions. It is important to determine the earthquake performance of existing structures in order to minimize the damages that may occur in case of earthquakes that are likely to occur in the coming years and will affect living spaces. In line with the data obtained, strengthening heavily damaged buildings that need to be strengthened, otherwise demolishing them and building earthquake-resistant structures are among the important steps to reduce the harmful effects of the earthquake [8].

CHAPTER 2

LITERATURE REVIEW

2.1 Introductions

The region, which is located within the boundary of the Eurasian, African and Arabian plates, has been moving in the N-S direction approximately from the Late Cretaceous to the present. As a result of the compression caused by this convergence movement, the northward movement of the southern branch of the Neoplant Ocean, which is located between the Eurasian plate and the African-Arabian plates, has been closed. Starting from the Middle-Late Miocene and along the Bitlis-Zagros, a continent-to-continent collision took place. Due to the convergence movement, the Anatolian block turned towards the east, causing the formation of the East Anatolian and North Anatolian fault lines. The study area is affected by the left lateral northern part of the Dead Sea Fault Zone and the left lateral southern part of the East Anatolian Fault Zone. Deformed fault zones were formed and developed according to the movements of the Anatolian block and the African-Arabian plates towards each other [9].

2.2 Eastern Anatolian Fault Zone and General Features

The length of the East Anatolian Fault Zone, which is one of the most important structures of Turkey, varies between 50 km and 145 km, which is a left-sided strike-slip fault between the Anatolian Plate and the Arabian Plate, starting from Karlıova to the Amanos Mountains. It has an upper Pliocene age and an average slip rate of 5-8 mm/year DAFZ, which consists of 6 different segments. In 1114, 1513, 1789, 1866, 1872, 1874, 1875, 1893, 1905 and 1971, surface faulting in different segments on the DAFZ caused devastating earthquakes. The difference in earthquake recurrence intervals is due to the fact that the segments have different slip rates. In this case, the frequency of recurrence of earthquakes varies between 300-600 [10,11]. With a length of approximately 600 km, the DAFZ consists of segments with lengths ranging from 50 km to 145 km. These; Karlıova and Bingöl Segment (65 km), Palu-Caspian Segment (50 km), Caspian-Sincik Segment (85 km), Çelikhan-Gölbaşı Segment (50 km), Gölbaşı-Türkoğlu Segment (90 km), Türkoğlu-Antakya Segment (145 km) [10].

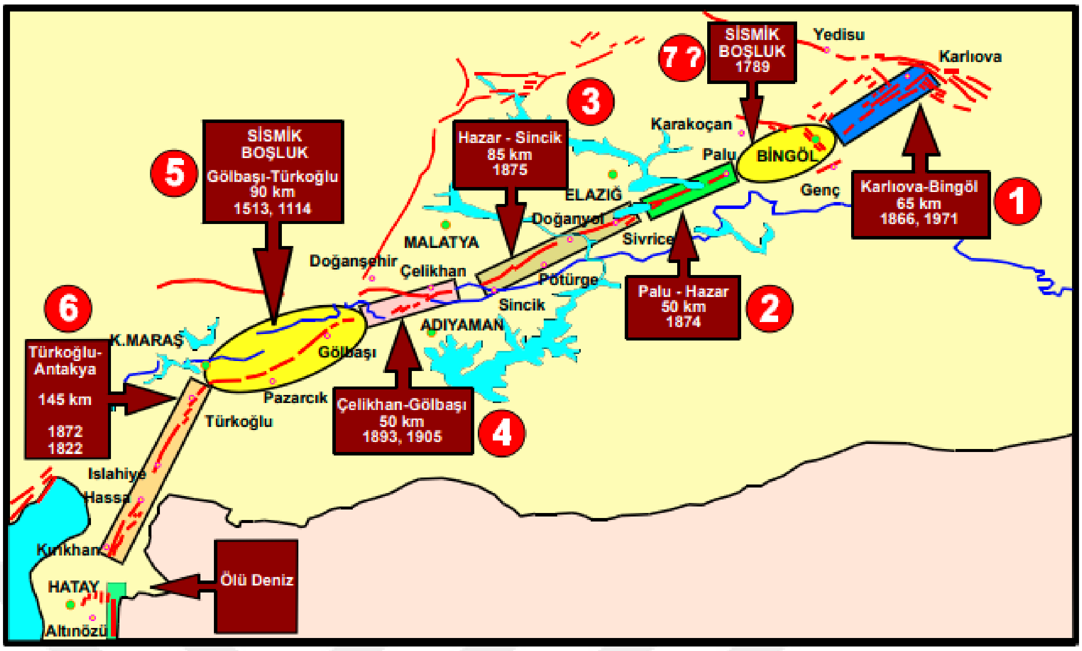


Figure 2. 1: East Anatolia Phase Zone Segments

Sections such as Karlıova-Bingöl, which consist of fault segments of different lengths, have produced earthquakes that cause damage at close intervals. Sections such as Palu-Sincik and Türkoğlu-Antakya, which have long fault segments, were ruptured by both a single earthquake and two earthquakes in short time intervals of 50-100 years. The Gölbaşı-Türkoğlu segment, which has not produced a major earthquake for approximately 500 years, is in a seismic gap position [11]. After the energy accumulated in the faults after the Sivrice earthquake in 2020 spread to the Gölbaşı-Türkoğlu segment, the fault could not withstand the stress and broke its silence with the 7.8 magnitude Pazarcık and 7.6 magnitude Elbistan earthquakes that occurred within 24 hours in February 2023. Sections such as Karlıova-Bingöl, which consist of fault segments of different lengths, have produced earthquakes that cause damage at close intervals. Sections such as Palu-Sincik and Türkoğlu-Antakya, which have long fault segments, were ruptured by both a single earthquake and two earthquakes in short time intervals of 50-100 years.

2.3 Dead Sea Fault Zone and General Features

The Dead Sea Fault Zone, which starts from the north of the Red Sea and travels from the N-S direction of the west of the Orontes River to the Amik Plain and has a total length of approximately 1000 km, extends to the north and merges with the East Anatolian Fault Zone. Although the age of the ÖDFZ is not clearly known, there are different opinions such as early, middle and late Miocene.

2.4 Seismicity of Kahramanmaraş Province

Kahramanmaraş province is located in the northeast of the Adana section in the Mediterranean region, where the Mediterranean, Eastern Anatolia and Southeastern Anatolia regions come closest to each other. The city was built in the north of the plain named after itself, in the southern part of the foothills of Barn Mountain and at an altitude of 500-800 m above sea level. [10]. Kahramanmaraş, which was established in the south of the Ahır Mountain, has spread towards the Maraş plain since 1980. After 1990, it spread east and then west towards the Ceyhan valley. In general, it was formed in the Cenozoic time due to its location. In the northern part of the city, there is an Esocene and Oligocene age formation, while the Quaternary alluvial and colluvial formation is located in the south of the city [12]. In this region, where the Arabian and Anatolian plates converged towards each other, many various events occurred in the region due to the continent-continent collision. This causes it to be a geologically complex region due to its complex location [13]. In terms of its tectonic structure, Kahramanmaraş is affected by DAFZ and ÖDFZ, which are located between the collision boundary between the Arabian and Anatolian plates [10]. Kahramanmaraş has been primarily affected by the earthquakes that occurred in 1513 and 1874 until today. The local soil characteristics of the region show conditions such as lithological, tectonic, geomorphological and hydrogeological conditions of that place [12]. Based on all these situations, the geological position of the region provides significant gains in Kahramanmaraş and the surrounding regions as well as negative effects. One of these gains is the hot water resources in the region and, accordingly, the presence of geothermal areas [13].

There is an important relationship between the geological and morphological feature of the land, that is, the ground feature and the intensity of the earthquake. This is important depending on the structural characteristics of the building and the ground properties in the damages that will occur in the buildings under the effect of earthquakes [12].

While the solid ground ensures that the structures built on it are more resistant to earthquakes, the loose and wet filling of the ground reduces the resistance to earthquakes and causes the intensity to be felt several times more. In this case, it causes it to be more affected by the earthquake than solid grounds. On rock floors, earthquake waves travel at high speed and with high frequency vibration and cause short-term vibration. The structures to be built must be multi-storey high. It moves at low speed on soft and loosely textured floors and causes long-term vibration. In these cases, the structures to be built on loose floors should have a low number of floors. If the oscillation period of the ground and the oscillation periods of the building at the time of the earthquake are close to each other, the damage may increase to the highest level. Because the force to which the building is exposed increases the speed of the building every time. This, in turn, will cause the building to shake more. For this reason, short-term buildings should be built on long-period floors, and long-period buildings should be built on short-period floors [12].

CHAPTER 3

EARTHQUAKE DISASTER OF 2023 IN KAHRAMANMARAŞ

3.1. Introduction

Turkey, located on the Anatolian plate where active seismic activities are located, has been exposed to major earthquakes and 20 earthquakes with a magnitude above 7 have occurred since 1900. The fact that earthquakes are so intense and severe is at the top of the world rankings among the countries damaged by earthquakes. Between 1900 and 2023, 269 earthquakes caused loss of life and property or damage to structures. Among these, the earthquakes with the most severe consequences are the 2023 Kahramanmaraş, 1939 Erzincan and 1999 Gölcük earthquakes, respectively [14].

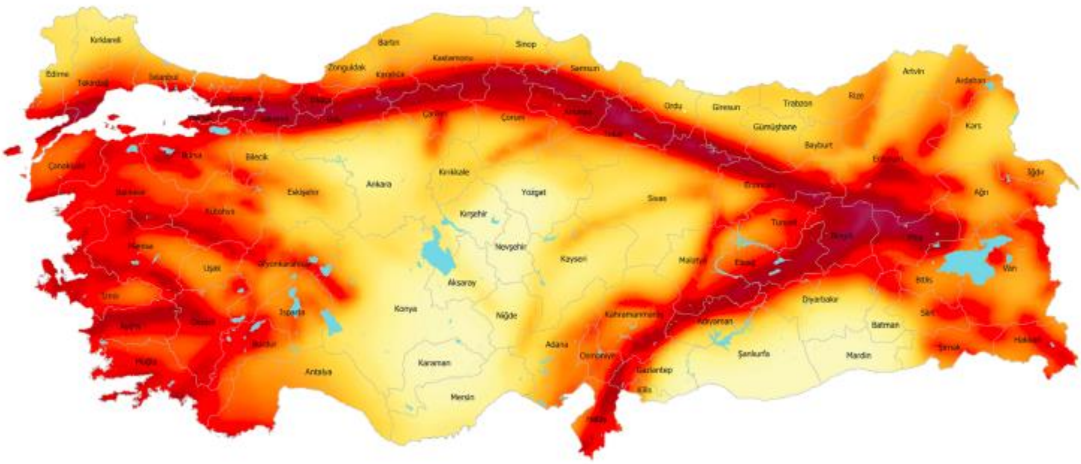


Figure 3. 1: Turkey Earthquake Hazard Earthquake Map

3.2. Major Disasters in Our Country in the Past Years and Their Data

Risk Management Index (INFORM) and World Risk Report (WRR) are among the studies that report the "risks related to disasters and humanitarian crises at the global level" of countries around the world. According to these reports, the risk index is rated as 0-2 very low risk, 2-3.5 low risk, 3.5-5 medium risk, 5-6.5 high risk, 6.5-10 very high risk. Turkey's risk index rating last year (2022) was calculated as 4.9. It ranks 45th in the Risk Management Index score ranking of 191 countries. It is very important to have sub-components in INFORM. In terms of the hazard and exposure score of 7.9 calculated among these sub-components, Turkey ranks 8th among 191 countries. It takes its place as a risky country. As a result of the vulnerability calculation, it is 57 with a score of 4.8. In the calculation of the lack of coping capacity while in the ranking, it is 137 with a score of 3.1. It is located in the queue. As a result of these evaluations, we can say that Turkey is in the very high-risk group in terms of danger and exposure, while it is in the medium-risk group in terms of visibility to the damages that will occur and in the low-risk group in terms of coping capacity. Natural disasters that occur in Turkey are mostly geological and historical. An average of 70% of these disasters are earthquakes and floods. Due to the presence of active fault lines in our geography, it is possible to say that the damages caused by earthquakes are 65% compared to other disasters. (In this percentage, the Kahramanmaraş earthquakes on 02.06.2023 are excluded), depending on the surface area of the region, the areas where the earthquake hazard is the most dangerous constitute 66%, while the areas where different types of earthquake hazards will occur constitute 96% [13].

DAFZ, which experienced a seismically active period in the 19th century, last entered a calm period with the Malatya earthquake in 1905. In the period to date, moderate magnitude earthquakes between $5.0<Ms<7.0$ have occurred. DAFZ, which did not produce earthquakes greater than 7 in the 20th century, was 19. It produced 13 earthquakes between $5.0 <Ms<6.8$ that did not produce large earthquakes but caused damage. With this behavior, DAFZ almost forgot about itself. At the beginning of the 21st century, DAFZ 2003 Bingöl with a magnitude of 6.3, 2005 Karlıova (Bingöl) with a magnitude of 5.8, 2007 in Doğanyol (Malatya) with a magnitude of 5.7, 2010 Kovancılar (Elazığ) with a magnitude of 6.1, Sivrice (Elazığ) in January 2020 with a magnitude of 6.8, and in June 2020 Karlıova (Bingöl) with a magnitude of 5.7 were experienced destructive earthquake disasters. Figure 3.2 shows earthquakes greater than 6 on the DAFZ from 1900 until the February 6, 2023 earthquake [3]

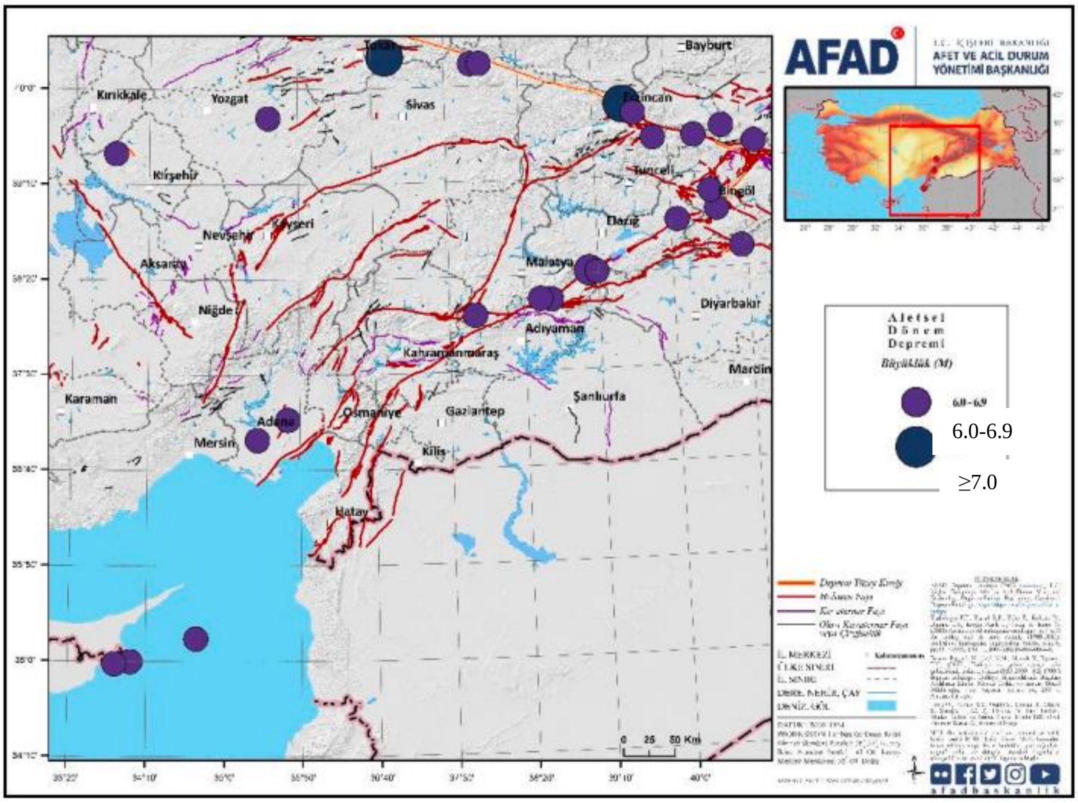


Figure 3. 2: Significant earthquakes with a magnitude above 6.0 that occurred in the region from 1900 to the 06.02.2023 earthquakes.

3.3 February 6, 2023 Pazarcik and Elbistan Earthquakes

On 06.02.2023, within 24 hours, two earthquakes with a magnitude of Mw: 7.7 (focal depth: 8.6 km) occurred at 04:17 in the Pazarcık district of Kahramanmaraş, and then at 13:24 in the Elbistan district with a magnitude of Mw: 7.6 (focal depth: 7 km). Then, on 20.02.2023, another earthquake with a magnitude of Mw: 6.4 occurred in the Yayladağı district of Hatay province at 20:04 [14]. The earthquake was felt with high intensities in

Hatay, Adıyaman, Gaziantep, Malatya, Kilis, Diyarbakır, Adana, Osmaniye, Şanlıurfa and Elazığ, especially in Kahramanmaraş, causing loss of life, destruction and heavy damage. [3].

Table 3. 1: General information about earthquakes

06.02.2023 04:17:34 (TSİ), Pazarcık (Kahramanmaraş) Earthquake Mw: 7,7		
Latitude: 37.288	Longitude: 37.043	Depth: 8.60 km
06.02.2023 13:24:47(TSİ), Elbistan (Kahramanmaraş) Earthquake Mw: 7,6		
Latitude: 38.089	Longitude: 37.239	Depth: 7 km
20.02.2023 20.04:27 (TSİ), Yayladağı (Hatay) Earthquake Mw: 6,4		
Latitude: 36.037	Longitude: 36.021	Depth: 21.73 km

These earthquakes left great destruction and damage in 11 provinces. These earthquakes that occurred in Kahramanmaraş are unique earthquake disasters when we look at the earthquakes in the world [14]. These earthquakes, which occurred in 11 provinces, according to the data of the Turkish Statistical Institute; The fact that 14,013,196 people were affected by this disaster covers a very wide area. According to official figures, 50,783 people lost their lives in these disasters. According to the statements of the Ministry of Environment, Urbanization and Climate Change, "12 thousand 920 buildings in the region, 7 thousand 295 in Hatay, 3 thousand 826 in Kahramanmaraş, 5 thousand 826 in Adıyaman, 4 thousand 197 in Malatya and 3 thousand 805 in Gaziantep, 35 thousand 964 buildings were destroyed at the time of the earthquake. A total of 311,000 buildings, consisting of 872,000 independent sections, have become unusable due to the damage they have received." [15]. Figure below 3.4 Mw: 7.7 magnitude Pazarcık earthquake has a revised AFAD-RED estimated intensity map, while Figure 3.5 Mw: 7.6 Elbistan earthquake has a revised AFAD-RED estimated intensity map.

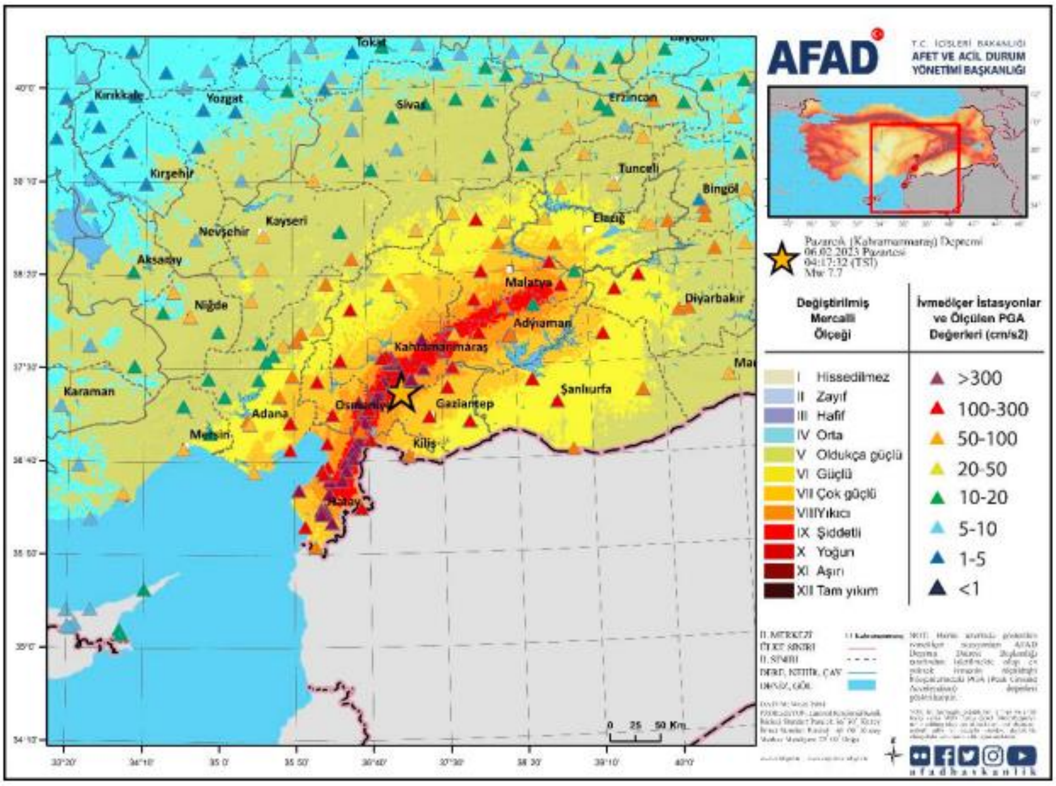


Figure 3. 3: Revised AFAD-RED estimated intensity map of the 7.7 magnitude Pazarcik earthquake

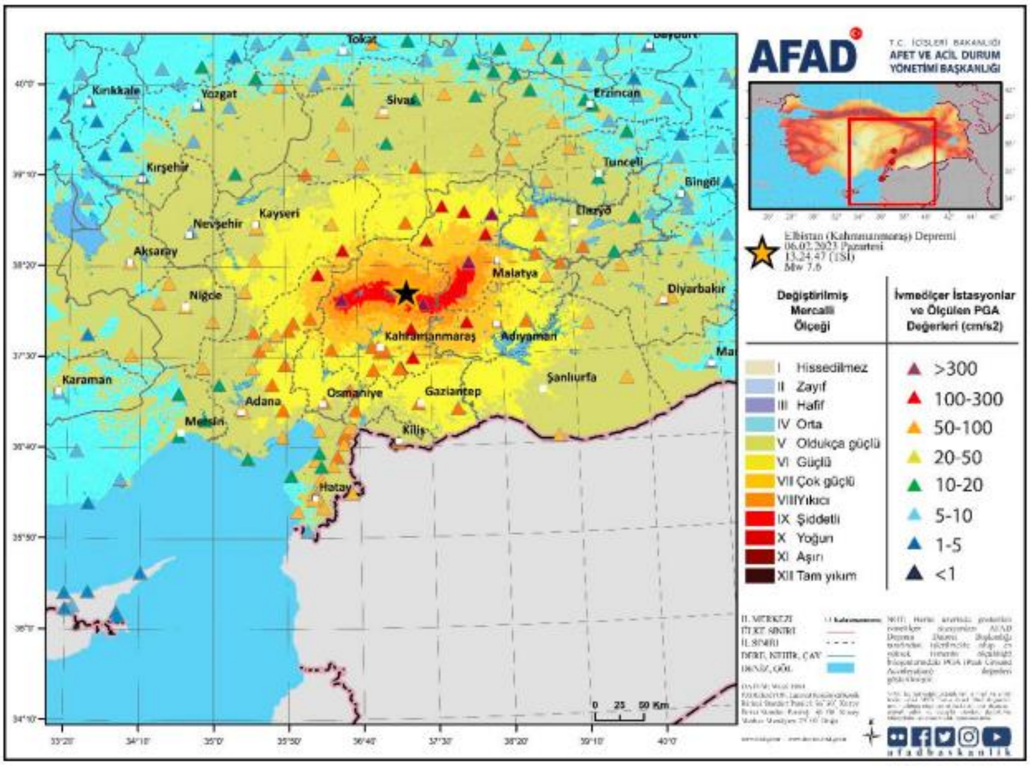


Figure 3. 4: Revised AFAD-RED estimated intensity map of the 7.6 magnitude Elbistan earthquake.

When the epicenter and aftershock distribution of the seismic effect on the DAFZ were examined, it was found that the earthquake that occurred in Pazarcik, the epicenter of which was in Pazarcık, broke the line including the Çelikhan-Gölbaşı segment, Gölbaşı-Türkoğlu segment, Türkoğlu-Kırıkhan segment of the DAFZ and the Narlı part in the northern part of the ÖDFZ; It is estimated that the second eccentric earthquake that occurred in Elbistan immediately afterwards was connected to the Çardak Fault and the Doğanşehir Fault Zone [15].

Mw: 33,591 earthquakes were recorded in the three-month period from the 7.7 magnitude Pazarcık earthquake to 06 May 2023. (Figure 3.6)

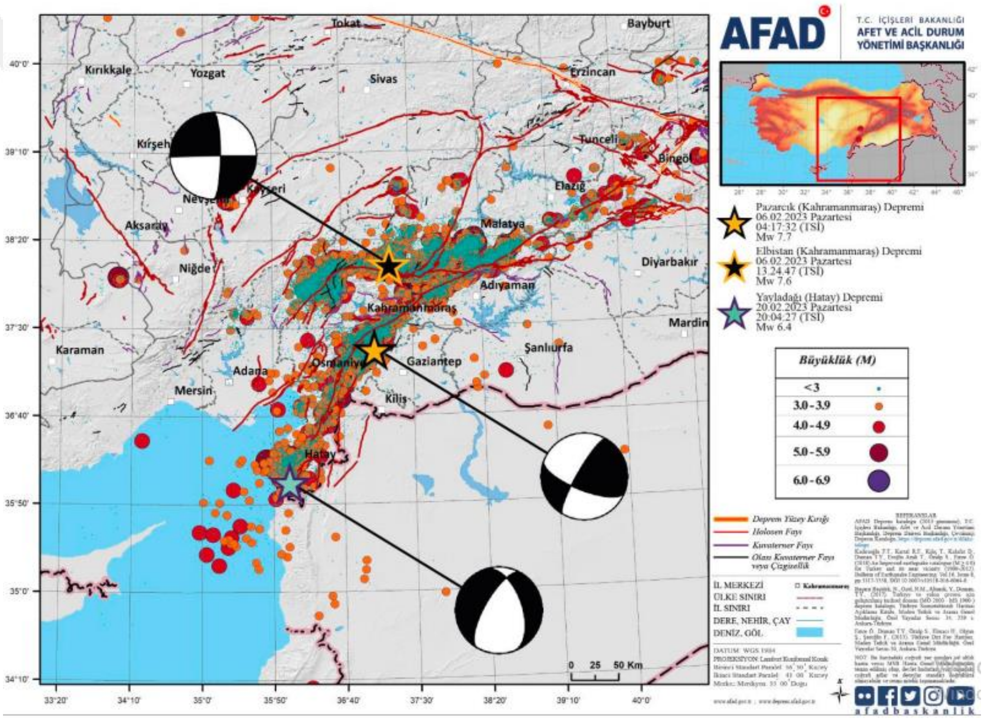


Figure 3. 5: Earthquakes with magnitudes of Mw: 7.7, Mw: 7.6 and Mw: 6.4 magnitudes and subsequent aftershock activity that occurred in Pazarcık and Elbistana Yayladağı (Hatay) in Kahramanmaraş province (6 February-6 May)

DAFZ, which experienced a seismically active period in the 19th century, last entered a calm period with the Malatya earthquake in 1905. In the period to date, moderate magnitude earthquakes between 5.0<Ms<7.0 have occurred. DAFZ, which did not produce earthquakes greater than 7 in the 20th century, was 19. It produced 13 earthquakes between 5.0 <Ms<6.8 that did not produce large earthquakes but caused damage. With this behavior, DAFZ almost forgot about itself. At the beginning of the 21st century, DAFZ 2003 Bingöl with a magnitude of 6.3, 2005 Karlıova (Bingöl) with a magnitude of 5.8, 2007 in Doğanyol (Malatya) with a magnitude of 5.7, 2010 Kovancılar (Elazığ) with a magnitude of 6.1, Sivrice (Elazığ) in January 2020 with a magnitude of 6.8, and in June 2020 Karlıova (Bingöl) with a magnitude of 5.7 were experienced destructive earthquake disasters. Figure 3.2 shows earthquakes greater than 6 on the DAFZ from 1900 until the February 6, 2023 earthquake [3].

CHAPTER 4

MATERIALS AND METHODS

4.1 Introductions

The level of risk is proportional to the magnitude of the hazard and the vulnerability of the affected elements. In this case, it can occur anywhere under the risk of earthquakes and the negative parameters of the existing structures in that place will also cause the hazard to increase its value. In addition to the destructive waves caused by the earthquake, the vulnerability of the structure will maximize the degree of damage that will occur. In this case, it shows that both the magnitude of the earthquake, the fact that the safety of the building has not been established and the presence of structures built without complying with the earthquake regulation will directly reveal the damages that will occur. When calculating the loss of life and property that may occur due to earthquake risk, the characteristics of the structures to be located in the current region should also be taken into account [8].

In addition to the destructive waves caused by the earthquake, the vulnerability of the structure will maximize the degree of damage that will occur. In this case, it shows that both the magnitude of the earthquake, the fact that the safety of the building has not been established and the presence of structures built without complying with the earthquake regulation will directly reveal the damages that will occur. When calculating the loss of life and property that may occur due to earthquake risk, the characteristics of the structures to be located in the current region should also be taken into account [8].

If the seismic force that may occur in the future is severe, it is possible that the results will be more effective by examining the behavior of the existing structures that will be under this effect beforehand. In the light of these examinations, it will provide important approaches to minimize the damage that will occur in the buildings in the event of a possible earthquake effect. After the first stage, soil surveys, another stage is to determine the damage risks by removing the inventories of the existing structures [8].

There are many important parameters in determining the damage risk situations. A few of them are; The structural elements of the carrier system, its type, geometry, cross-sectional feature, material feature, seismicity of the region where the building is located and the characteristics of the ground are included. In the light of these parameters, there are many analysis methods, but the most precise method is the definitive analysis methods. Of course, these methods make it difficult to examine thousands of existing building stocks both financially and due to the shortage of expert personnel. As a solution to this situation, it is possible to use reliable and economical parameters and methods that will give fast results with numerical evaluations [8].

When the general structures are evaluated, a very low part of the buildings in Turkey were built in accordance with the current building code. In order to minimize the loss of life and property that may occur in the future, to determine the damage risk levels of the existing structures urgently and to remove these possible risks, there is a need to determine the building stock in the light of fast and reliable parameters. In line with these determinations, first of all, there is a need to calculate the earthquake performance score of the building. As a result of the calculations, if the building is in a state of collapse or heavy damage, if it can be strengthened, it will be strengthened, if it is not found economical and efficient, then the possible risks of demolishing and building a safer structure will be minimized. When calculating the earthquake performance of the buildings, it is necessary to know the current status of the building. This situation is considered as the detection of seismic hazard and the determination of damage to the building system. [8]

4.2 Material

This study was determined as the study area of reinforced concrete buildings located in Pazarcık, Elbistan and Dulkadiroğlu regions of Kahramanmaraş province. According to the "Turkey Earthquake Zones Map" published by the "Ministry of Environment and Urbanization, General Directorate of Disaster Affairs, Earthquake Research Department", Kahramanmaraş province is located in the 1st and 2nd districts. It is located in the earthquake zone. The building stock of the buildings in the examined regions in Kahramanmaraş province was examined and the evaluation was made taking into account the "Principles on Determination of Risky Buildings" published in the Official Gazette by the Ministry of Environment and Urbanization in 2019. Evaluation of earthquake resistance of buildings. The buildings examined were carried out in Dulkadiroğlu, Elbistan and Pazarcık districts of Kahramanmaraş. There are also satellite photographs of the regions in Figure 4.1, Figure 4.2 and Figure 4.3.

Figure 4. 1: Kahramanmaraş Province Dulkadiroğlu District Satellite Image

Figure 4. 2: Kahramanmaraş Province Elbistan District Satellite Image

Figure 4. 3: Kahramanmaraş Province Pazarcık District Satellite Image

While evaluating the building stock for Kahramanmaraş province, the three districts that suffered the most damage in the February 6 earthquake were selected. In this direction, the central regions with a dense population were selected from each district and evaluations were made using the Tier I method. The main purpose here is to determine the risk that will occur in the existing structures before the earthquake in the calculation of the earthquake safety of the buildings and to decide on the improvement methods in order to increase the targeted performance value. Considering the characteristics of the areas where the current building density is located, the loss of life and property in terms of danger, it is directly affected by the loss of life and property. In this direction, the buildings used by people as residences are important. [8]

4.3 Methods

The study area was carried out within the borders of Dulkadiroğlu, Pazarcık and Elbistan districts of Kahramanmaraş province.

The street scanning method, which is one of the rapid scanning methods performed on the building stock, was used as an office study. These simplified methods, which can be used to determine the regional earthquake risk distribution of buildings, are used for reinforced concrete buildings with 1 to 7 floors. In line with the data obtained through street survey and literature review, the geographical location of the examined regions, local ground characteristics, existing fault lines and speed zones were also determined. In the light of these parameters and with the data required to use the method, the earthquake risk score of the buildings was calculated. In the buildings examined, plus points are given according to the number of floors and the speed zone in which they are currently located, and these points are reduced for each negative parameter. The parameters taken into account according to this method are listed below [16].

- Type of structural system
- Number of floors
- Building visual quality
- Soft coat/Weak coat
- Vertical irregularity
- Irregularity/Torsional effect in the plan
- Short colon effect
- Building order/floor levels in adjacent buildings
- Subject ground slope
- Earthquake hazard zones
- Geographical coordinates

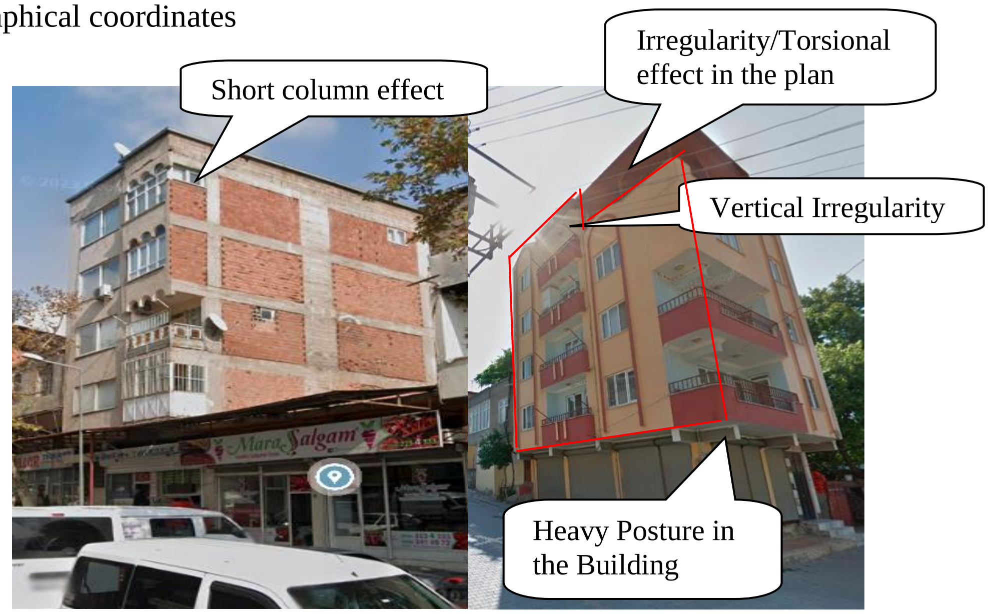


Figure 4. 4: Negativity parameters in the examined buildings

The complete renewal of the existing building stock takes many years, and the renewal of all unsafe structures is economically and engineering-negative. However, systematically reviewing the priority structures and then starting with the buildings that need to be renovated will allow the buildings to be made safe against earthquakes. For this reason, in the thesis study, the evaluation of existing structures to determine earthquake vulnerability has been developed in terms of suggestion. Within the scope of the study, it will be tried to briefly explain the evaluation and analysis process in the light of the data obtained from the earthquake vulnerability risk stages. [17]

Structural irregularities that affect the earthquake performance of buildings are among the critical situations in terms of life safety

4.3.1 Risk Assessment of Structures with Phase I Method

Examinations were made using the Stage I method of the structures evaluated in Dulkadiroğlu, Elbistan and Pazarcık districts of Kahramanmaraş province. In line with these parameters, the earthquake risk status of the buildings was determined by scoring. Below are the parameters used when examining building stocks [8].

4.3.1.1 Number of Floors of the Building

The number of free floors of the building is calculated by taking into account the number of floors on the foundation. In the case of the gradual construction of the building, the number with a large number of floors is taken into account [16]. It is included in the previous observations and studies that the number of floors of the buildings and the damages that will occur are directly proportional. With the increase in the number of floors of the building, the mass of the building increases, and the mass effect causes the seismic force to increase with the increase of the column. If the increases in the number of floors are not taken into account and sufficient strength is not provided, the building will cause damage as a result of seismic movements. Most of the buildings in our country do not comply with the earthquake design, and the fact that they are built with a high number of floors has also increased the damage rate. If the buildings had complied with the earthquake regulations, the relationship between the number of floors and the damage would not have been revealed. This shows that the number of floors of the constructed structures is among the important parameters affecting the degree of damage [18].

Figura 4.5 It is also included in how the floor adenine is calculated. The distribution of the examined buildings according to the number of floors figure 4.6 is also given. Figura 4.7 In the study, the number of gradual floors of the examined building is given.

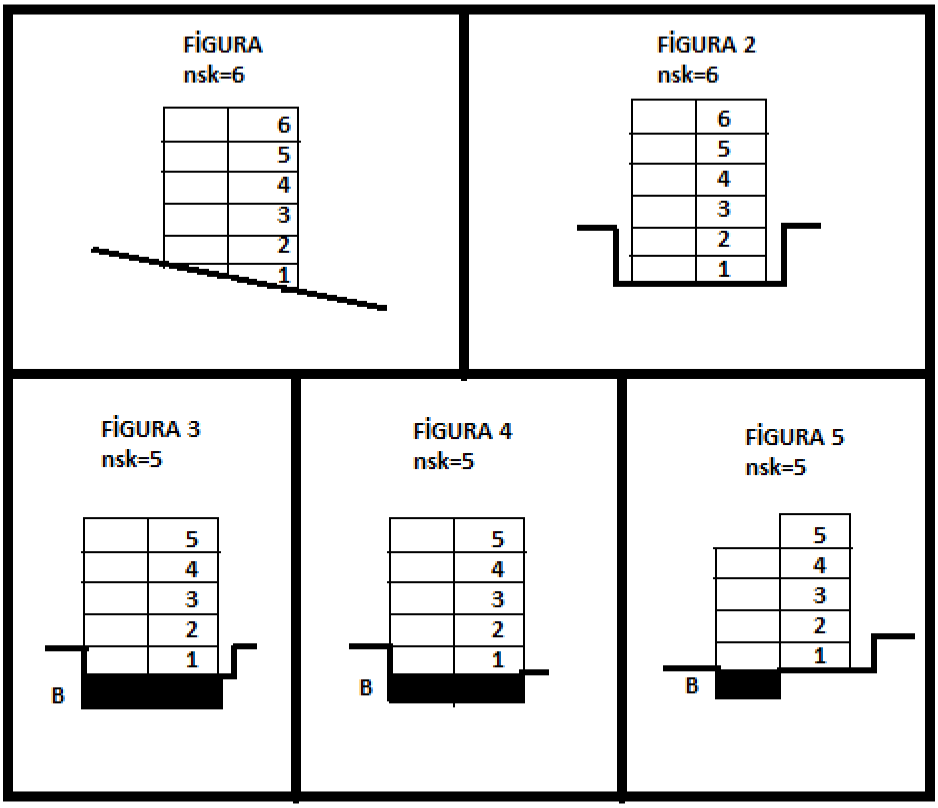


Figure 4. 5: Number of free floors (nsk)

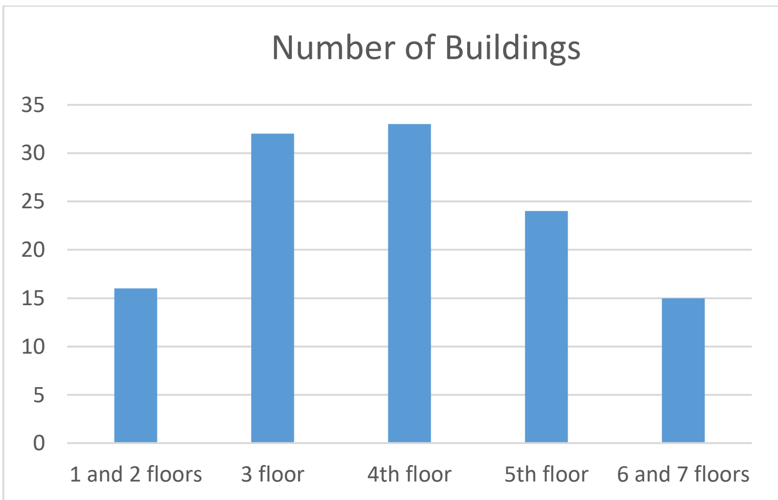


Figure 4. 6: Distribution of the examined buildings according to the number of floors

Figure 4. 7: Number of floors of the stepped building under review nsk=4

4.3.1.2 Visible Quality of the Building

The apparent quality of the buildings, the quality of materials and workmanship reflect the importance given to the maintenance of the buildings. The concept of quality of the structure can be considered in a broad context, but a well-trained observer can classify the apparent quality of the structure as good, medium, and bad

4.3.1.3 Soft Ground Condition

One of the reasons for the collapse of earthquakes in our country is the soft floor condition. The sudden rigid change of the building due to the seismic effect causes serious damage and destruction by concentrating the seismic energy on a single floor. There are many reasons why the structures built in our country and in the world are built as soft floors [19].

In addition, apart from the difference in floor height, it is among the parts specified observationally, taking into account the significant rigidity difference between the floors. In the absence of entrance floor walls of the buildings or if the floor ratio is weaker, it reveals the soft/weak floor situation. [8].

These include the use of the basement of the buildings for commercial purposes and the use of them as parking lots. The fact that the inner filling wall is sparser than the upper floors due to the use of glass instead of the outer wall of the ground floors or the wider interior of the building causes rigid irregularity between floors. This rigidity poses a danger in terms of risk in structures built without curtains. At the time of seismic effects, deformations and earthquake energy due to irregularities are concentrated on a single floor, causing the loss of stability of the structure [19]. Figura 4.8 soft/weak floor conditions in buildings.

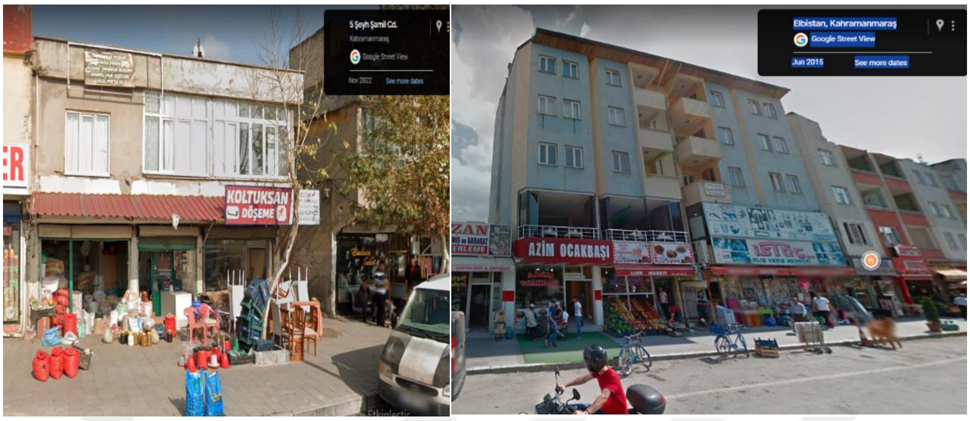


Figure 4. 8: Soft/weak floor condition of the examined structures

4.3.1.4 Heavy Posture in the Building

One of the parameters to be taken into account in the evaluation of reinforced concrete buildings is heavy overhangs. The fact that the floor area of the building sitting on the ground and the floor areas of the parts above the ground are different from each other creates a heavy overhang. The areas of the first floors of the buildings are built in a smaller way than the areas of the upper floors. This is a situation that poses a danger to the structure [8].

Heavy protrusions, which cause mass and rigidity irregularities in the structures, also lead to beam discontinuity. The façade beams, which protrude beyond the frame axle, follow the overhangs and are stuck in the columns in an eccentric form. In this case, the necessary rigid transfer cannot be achieved. When the earthquakes experienced in the past are examined, the structures with heavy protrusion caused more damage than the structures without heavy protrusion [18].

Especially in buildings with a high number of floors, the fact that the balconies are located outside the frame system creates irregularity. Accordingly, surrounding it with balconies surrounded by reinforced concrete parapets will shift the center of mass direction upwards and increase the effect of the earthquake that will occur. In most of the existing buildings, the heavy protrusion above the ground floor causes the irregularity of the mass in the building and the upward movement of the moment. In addition, it creates discontinuity in the frame as it will cause the beams between the columns on the outer wall to be shifted.

The due diligence of the heavy protrusions in the examined buildings is shown in the figure 4.9 below is also located.

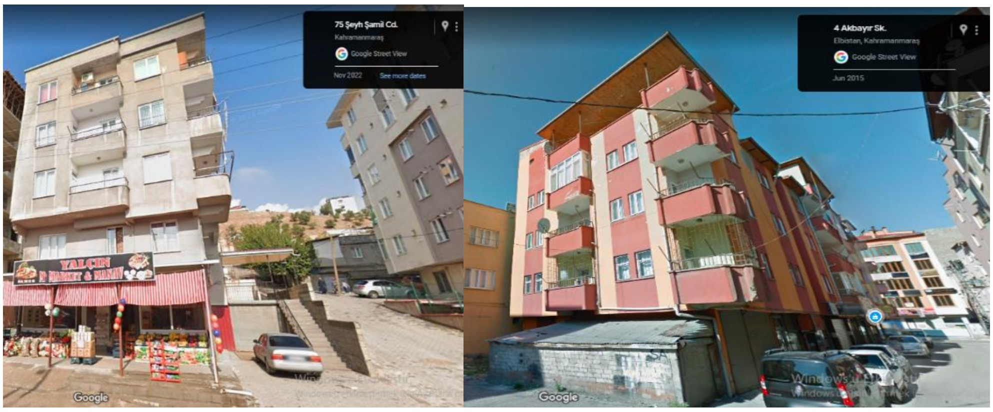


Figure 4. 9: Severe protrusion conditions in the examined structures

4.3.1.5 Collision Impact

The population is increasing day by day in the geography we live in. Due to the increase in population, the need for shelter also arises. In addition, in areas with a high population density and in settlements in the center of these regions, buildings are built adjacent and multi-storey in order to save space [20]. Adjacent structures adversely affect earthquake performance due to collisions. This situation is important in terms of examining the buildings whose building order is adjacent to it. The fact that the floor levels of adjacent buildings are different or that the floor levels are different even if the floor levels are the same creates the collision effect. The collision effect of structures is determined in two ways, either in the middle or on the adjacent edge. The most dangerous of these is that the building is on the adjacent edge. The structures with the impact of the collision were determined by external observations.

Building order / determination of the status of floor levels with adjacent buildings figure 4.10 in the buildings examined is also shown.

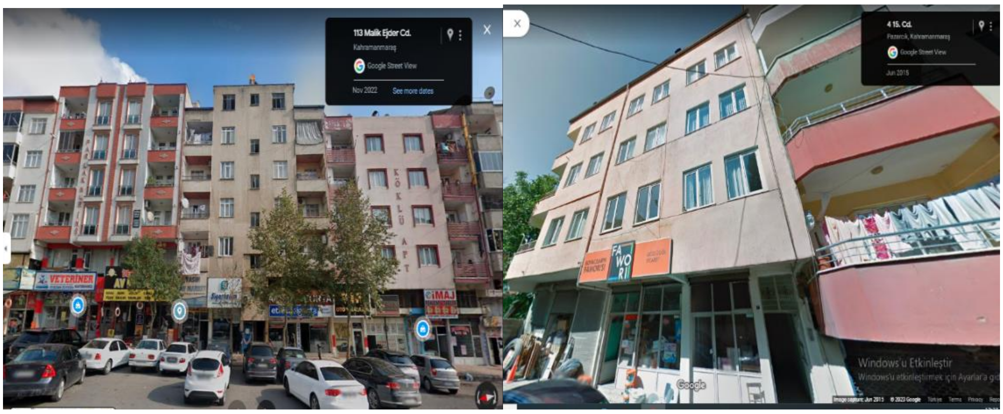


Figure 4. 10: Slab levels in the building layout/adjacent buildings under investigation

4.3.1.6 Short Column Effect

In our country, the usage area of reinforced concrete structures is of great importance. Concrete and steel, which make up reinforced concrete, are quite different from each other and are in great harmony with each other. Concrete resists compressive stress, while steel resists tensile stress. The forms of damage that occur in the structures also show which material exhibits the behavior of the structure. It can be said that if a form of damage to the degree of collapse of the structure is caused by concrete, it is brittle damage, and if it is caused by steel, it is ductile. The short column behavior that occurs in the structures is also treated as a brittle break. In this case, brittle fracture occurs when the steel does not flow sufficiently and the energy that cannot be sufficiently absorbed due to the seismic effect exceeds the cutting capacity of the element. These situations mostly create the short column effect due to the gaps left for the ventilation of the basement floor, band windows, infill walls and curtain walls that do not continue along the height of the column, discontinuity in the beams, and arrangements such as the construction of the foundation at different elevations due to the slopes of the lands. All these situations shorten the free height of the colon [20].

4.3.1.6 Vertical Irregularity

Another of the parameters taken into account is the state of irregularity at the building level. Columns or curtains that are not continuous at the height of the building create a vertical irregularity effect. It has been carefully identified and added to the calculations to reflect the impact of the buildings' vertical discontinuous frames and changing floor areas. Figure 4.11 There is a visual of how the irregularity of the structures was detected. Figure 4.12 There are examples of vertical irregularities of the structures examined. [8].

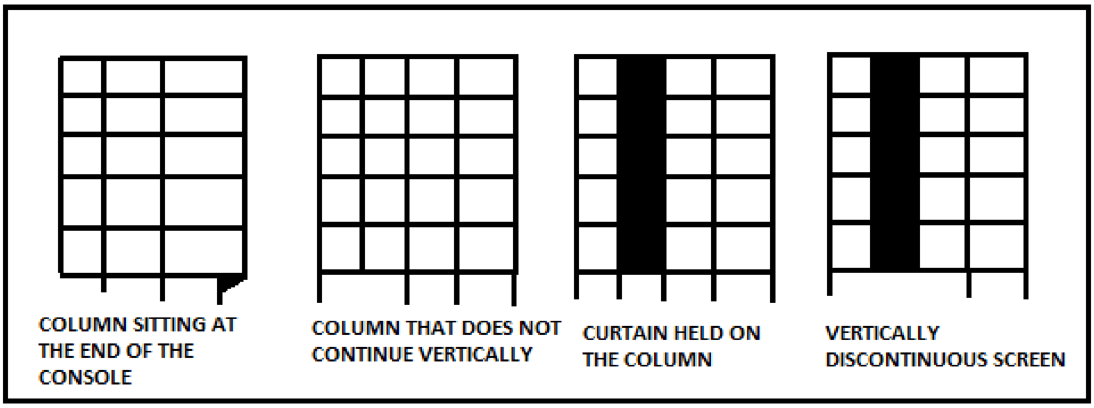


Figure 4. 11: Vertical irregularity

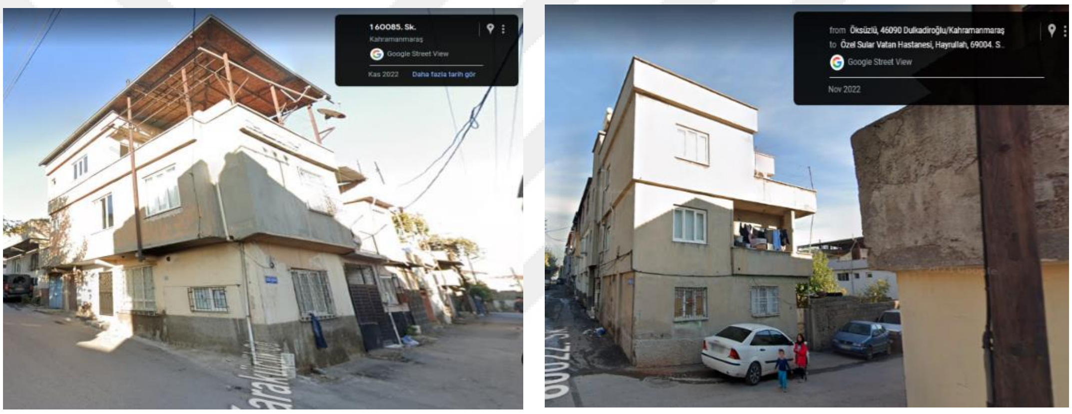


Figure 4. 12: Vertical irregularity of the examined structures

4.3.1.7 Irregularity in the Plan

Another parameter taken into account is the straining/torsional effect in the plan. When the building plan is examined geometrically, the fact that it is not symmetrical or the irregular placement of the vertical structural elements reveals the non-filtering/torsional effect in the plan. While making the calculations, it was determined by taking into account the inconsistencies in the plan that may cause torsion in the structure. How the irregularity situation is determined in the plan is included in the figure 4.13. Figure 4.14 There are examples of irregularities in the plan of the buildings examined. [8].

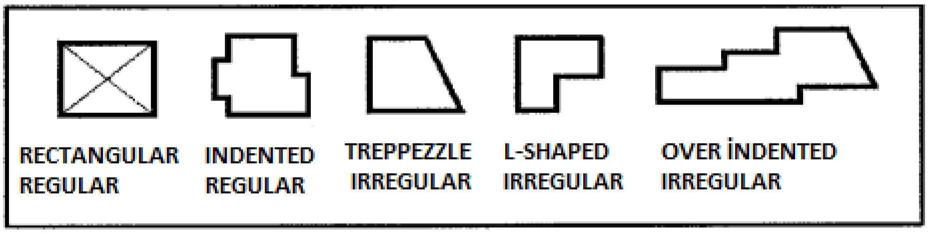


Figure 4. 13: Irregularity in the plan

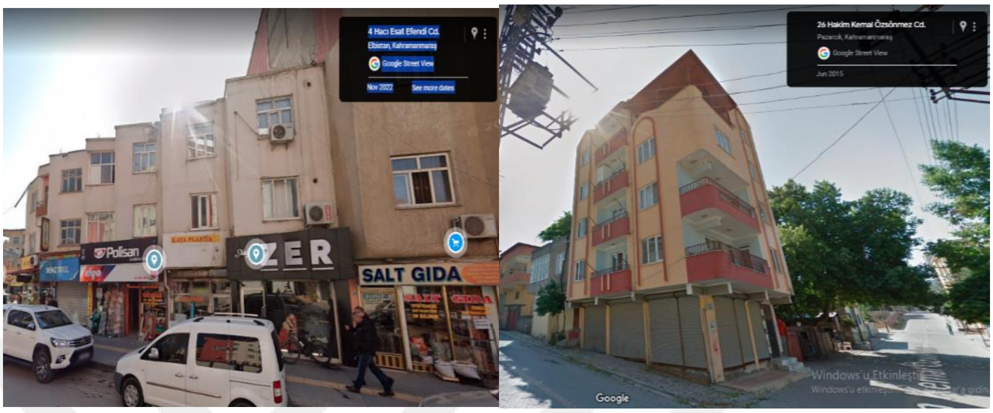


Figure 4. 14: Irregularity in the plan of the buildings examined

4.3.1.8 Peak-Slope Effect

One of the other parameters to be considered when calculating the earthquake performance scores of the buildings is the natural ground slope where the building is located. It was determined as a result of observations, taking into account the fact that the buildings were built on the slopes on a certain slope. If the natural ground slope is below 30°, there is no hill slope effect, and if the natural ground slope is above 30°, it is determined by assuming that there is a hill slope effect. [8]

When using the street scanning method for reinforced concrete structures, the negativity parameters described above were used. In addition to these parameters, the earthquake hazard zones and geographical coordinates of the buildings were determined and the earthquake performance of the reinforced concrete structures was calculated. The coefficients used for the negativity parameters are given in the table 4.1. [8]

Table 4. 1: Coefficients used for negativity parameters

Negativity Parameter no	Negativity Parameter	Situation 1		Situation 2	
		Parameter Detection	Parameter Value	Parameter Detection	Parameter Value
1	Visible Quality	Good	0	Fair(Bad)	1(2)
2	Soft Floor	Has not	0	Has	1
3	Vertical Irregularity	Has not	0	Has	1
4	Heavy Release	Has not	0	Has	1
5	Irregularity in Plan	Has not	0	Has	1
6	Short Column	Has not	0	Has	1
7	Building Regulations	Separate	0	Adjacent/Adjacent at the Corner	1
8	Natural Ground Slope	Has not	0	Has	1

The study was carried out as an office work. First of all, the area to be studied was determined and examinations were made about the structures through Google mabs. The current map and aerial photographs of the area were obtained, and the GPS coordinates of the examined buildings were taken, and photographs were taken from all possible angles and archived. The data collected as a result of the external inspection of the buildings were recorded using the form given in Figure 4.15.

The collected data were evaluated and the performance score was calculated for each building. The results obtained can be used to determine the risk priorities of the regions. In the method used, the earthquake ground motion level was used and this parameter value (SDS) was calculated by taking it from the Turkey Earthquake Hazard Map in force. By using the relationship between the parameter value and the soil class, the earthquake hazard zones given in Table 4.2 were determined.

The effect of the type of load-bearing system of the building was positively taken into account. No additional points are given for buildings with Reinforced Concrete Frame (BAC) system, and Structural System Score (YPS) is given using table 4.3 for buildings with Reinforced Concrete Frame and Wall (BACP) system [8].

Parameters for all other negativity situations other than the apparent quality of the building and the building order status were determined by making determinations as Present or None. Negativity parameter values are given in Table 4.4. The determined negativity parameter values (Oi) were calculated by taking 1 and 0 for the presence or absence states, respectively. Apparent quality evaluation was made by determining good, medium and bad. The corresponding parameter value is taken as 0, 1 and 2, respectively. The building order status was determined as discrete and adjacent/cornered, and the corresponding parameter values were taken as 0 and 1, respectively [8].

After filling out the building information forms, the collected data was transferred to Microsoft Excel software for building performance score calculation. Below is the building performance score equation (1) and the details of the statistical study extracted afterwards [8].

$$PP=TP+\sum_{i=1}^{n}(Oi * OPi)+YSP \tag{1}$$

In Equation 1, TP represents the base score, Oi represents each negativity parameter, OPi represents the negativity parameter value (Table 4.5), and YSP represents the positive parameter value.

As a result of the application of the method in the buildings examined in the study area, the performance score (PP) was calculated for each building. Risk priority was determined between regions using the calculated performance score distribution

DATA COLLECTION FORM FOR REINFORCED CONCRETE BUILDING					
Building Identity Information		History			
		Order			
Building Identification Number					
Province					
District					
Neighbourhood					
Avenue / Street					
Exterior Door Number					
Building Name					
sheet					
Island					
Parcel					
UAVT Building Code					
Building Estimated Age					
Geographic Coordinates	Latitude	Longitude:			
Building Usage Type	Housing ☐	Trade ☐	Industry ☐	Public ☐	Derelict ☐
Building Technical Information					
Structural System Type	Reinforced Concrete Frame ☐	Reinforced Concrete Frame and Curtain ☐			
Number of Free Floors					
Building Visual Quality	good ☐	Medium ☐	Bad ☐		
Soft Ply/Weak Ply	Has ☐	Has not ☐			
Vertical Irregularity	Has ☐	Has not ☐			
Heavy Release	Has ☐	Has not ☐			
Irregularity in Plan	Has ☐	Has not ☐			
Short Column Effect	Has ☐	Has not ☐			
Building Regulations	Has ☐	Has not ☐			
Floor Level in Adjacent Buildings	Separate ☐	Adjoining ☐	Together İn The Corner ☐		
Natural Ground Slope	same ☐	different ☐			
Ground Class	Straight ☐	Inclined ☐			
Building Identity Information	ZA ☐	ZB ☐	ZC ☐	ZD ☐	ZE ☐

Figure 4. 15: Data collection form for reinforced concrete buildings

Table 4. 2: Earthquake Hazard Zones

Danger Zone	S_{DS}	Ground Class
I	$S_{DS} \geq 1.0$	ZC/ZD/ZE
II	$S_{DS} \geq 1.0$	ZA/ZB
	$1.0 \geq S_{DS} \geq 0.75$	ZC/ZD/ZE
III	$1.0 \geq S_{DS} \geq 0.75$	ZA/ZB
	$0.75 \geq S_{DS} \geq 0.50$	ZC/ZD/ZE
IV	$0.75 \geq S_{DS} \geq 0.50$	ZA/ZB
	$0.50 \geq S_{DS}$	All Floors

Table 4. 3: Base ans structural system score table

Total Number of Floors	Base Score (TP)				Structural System Score (YSP)	
	Danger Zone				Structural System	
	I	II	III	IV	BAÇ	BAÇP
1 ve 2	90	120	160	195	0	100
3	80	100	140	170	0	85
4	70	90	130	160	0	75
5	60	80	110	135	0	65
6 ve 7	50	65	90	110	0	55

Table 4. 4: Negativity parameter value

Negativity Parameter no	Negativity Parameter	Situation 1		Situation 2	
		Parameter Detection	Parameter Value	Parameter Detection	Parameter Value
1	Visible Quality	Good	0	Fair(Bad)	1(2)
2	Soft Floor	Has not	0	Has	1
3	Vertical Irregularity	Has not	0	Has	1
4	Heavy Release	Has not	0	Has	1
5	Irregularity in Plan	Has not	0	Has	1
6	Short Column	Has not	0	Has	1
7	Building Regulations	Separate	0	Adjacent/Adjacent at the Corner	1
8	Natural Ground Slope	Has not	0	Has	1

Table 4. 5: Negativity parameter score (OPi) table

Total Number of Floors	Soft Floor	Visible Quality	Heavy Oscil-lation	Floor Level/Independent Building Status				Vertical Irregularity	Irregularity in Plan	Short Column	Ground Slope
				Same		Different					
				Middle	Edge	Middle	Edge				
1, 2	-10	-10	-10	0	-10	-5	-15	-5	-5	-5	-3
3	-20	-10	-20	0	-10	-5	-15	-10	-10	-5	-3
4	-30	-15	-30	0	-10	-5	-15	-15	-10	-5	-3
5	-30	-25	-30	0	-10	-5	-15	-15	-10	-5	-3
6, 7	-30	-30	-30	0	-10	-5	-15	-15	-10	-5	-3

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

5.1 Introductions

The study examined: Kahramanmaraş province, which is located on the Gözlbaşı-Türkoğlu segment on the East Anatolian Fault Zone; It is aimed to examine the risk factors of the buildings in Dulkadiroğlu, Elbistan and Pazarcık districts. In this study, the determination of the risk assessment of the structures was carried out using the Level I Method. In determining the risk assessment of the buildings, calculations were made using the "Principles for the Determination of Risky Structures (2019)" published by the Ministry of Environment, Urbanization and Climate Change of the Republic of Turkey. However, the methods used are not used for building earthquake performance evaluation and strengthening. In this case, it should not be concluded that the buildings that are not low risk are earthquake resistant or comply with the earthquake regulations. Evaluation 1. Since it is a stage, precise analyzes should also be made for the final result.

The results of the building evaluated in this section are shown with graphs and tables to explain them in detail.

5.2 General Evaluation on Data

The investigations were carried out on a total of 120 reinforced concrete buildings in the range of 1-7 floors. The floor distribution is shown in the figure 5.1.

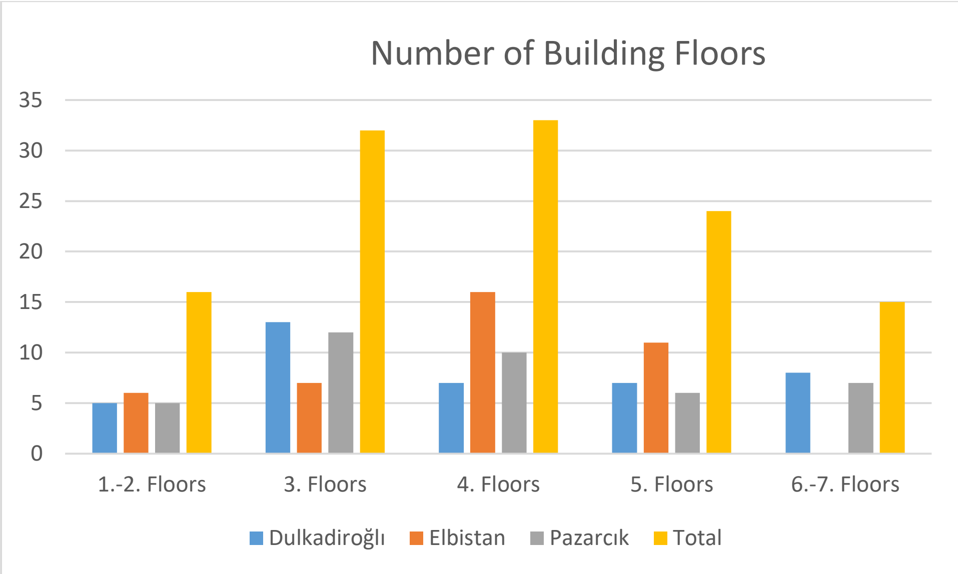


Figure 5. 1: Distribution of the number of buildings of the examined structures

In terms of image quality, 22.5% were good, 45.83% were medium and 30.83% were poor. 59.17% of the buildings were built adjacent to each other. In this distribution, 20% of Dulkadiroğlu district, 29.17% of Elbistan district and 10% of Pazarcık district were built adjacent to each other. The fact that the number of floors is different in adjacent buildings, the floor levels are different and the building is on the adjacent edge increases the risk level.

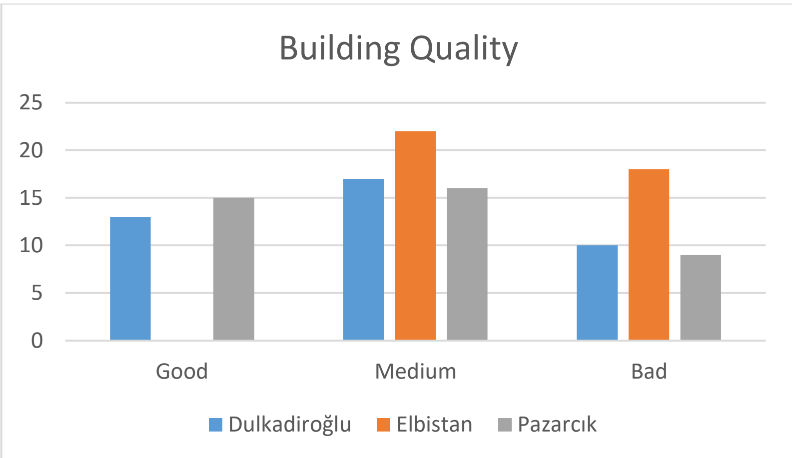


Figure 5. 2: Distribution of the image quality of the examined structures

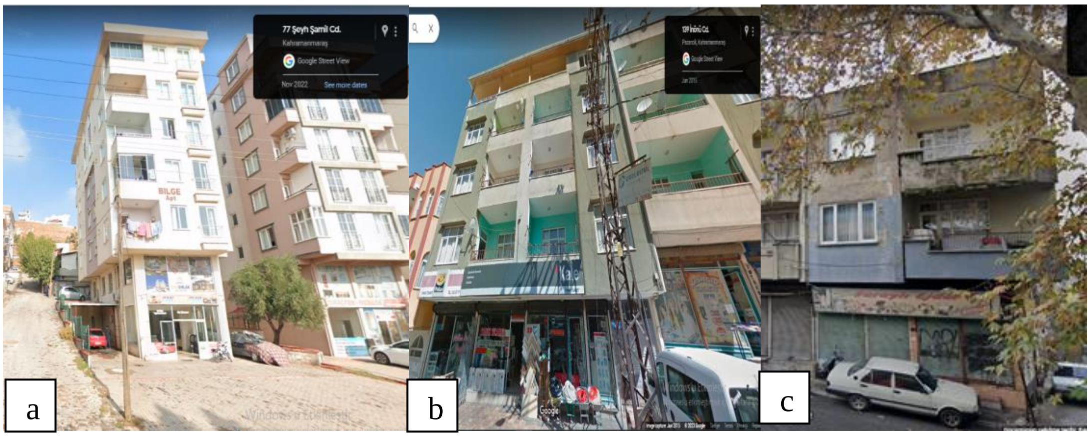


Figure 5. 3: good quality building b) Medium quality building c) Poor quality building

A total of 75.83% of the structures were found to be heavily dislocated. The distribution of this rate to the districts was found to be severe in 20% of Dulkadiroğlu district, 28.33% in Elbistan district and 27.5% in Pazarcık district. Heavy overhangs are among the important factors to be avoided as they strengthen the rigidity of the structure and the balanced carrying of the mass of the structure. Compared to a normal structure, the construction of the building in a heavy way is the situation that causes the most damage in an earthquake. The protrusions of the examined structures are shown in Table 5.1.

Table 5. 1: Distribution of severe protrusions in the examined structures

Heavy protrusion	Has	Has Not
Dulkadiroğlu	24	16
Elbistan	34	6
Pazarcık	33	7

Another condition that increases the risk factor of the structure is the soft coat. 77.5% of the examined structures were found to be soft layers. The general distribution by districts is 19.17% of Dulkadiroğlu district, 33.33% of Elbistan district and 25% of Pazarcık district. The soft floor condition, which causes inrigidity between the floors of the building, is a situation that increases the risk of collapse in the event of an earthquake. In order to prevent such rigidity, measures should be taken such as tightening the stirrups along the vertical of the columns in the buildings, increasing the curtain walls or increasing the number of columns. The Distribution of Soft/Weak Ground Conditions of the Examined Buildings is given in

Table 5.2.

Table 5. 2: Distribution of soft/weak floor conditions of the buildings examined

Distribution of soft/weak floor	Has	Has Not
Dulkadiroğlu	23	17
Elbistan	40	0
Pazarcık	30	10

Adjacent structures adversely affect earthquake performance due to collision. The fact that the floor levels of adjacent buildings are different or that the floor levels are different even if the floor levels are the same creates the collision effect. This situation is important in terms of examining the buildings whose building order is adjacent to it. While 40.83% of the examined buildings were built separately, 59.17% were built adjacent to each other. The distribution of the examined buildings by districts is 20% in Dulkadiroğlu district, 29.17% in Elbistan district and 10% in Pazarcık district. Table on the collision effect (building order) of the regions ? is given.

Table 5. 3: Building order of the buildings examined / distribution of the status of the floor levels with the adjacent buildings

Building Condition	Discrete	Adjacent
Dulkadiroğlu	16	24
Elbistan	5	35
Pazarcık	28	12

In terms of vertical irregularity, 29.17% of the data were determined as vertical irregular. This rate includes 10.83% in Dulkadiroğlu district, 7.5% in Elbistan district and 10.83% in Pazarcık district. The calculated data regarding the vertical irregularity of the examined structures are given in the table below.

Table 5. 4: Distribution of vertical irregularity of the examined structures

Vertical İrregularity	Has	Has Not
Dulkadiroğlu	13	27
Elbistan	9	31
Pazarcık	13	27

In terms of vertical irregularity, 40% of the data were detected as vertical irregular. This rate includes 12.5% in Dulkadiroğlu district, 12.5% in Elbistan district and 15% in Pazarcık district. The calculated data regarding the irregularity of the examined buildings in the plan are given in the table below.

Table 5. 5: Distribution of irregularities in the plan of the buildings examined

Irregularity in Plan	Has	Has Not
Dulkadiroğlu	15	25
Elbistan	15	25
Pazarcık	18	22

When the structural system type of the examined structures is examined, as a result of the examinations, %61,67 was determined as a reinforced concrete frame, and % 38,33 was determined as a reinforced concrete wall and wall. The calculated data regarding the structural system type of the examined structures are given in the table below.

Table 5. 6: Calculated data on the structural system type of the structures under consideration

Structural System Type	BAÇ	BAÇP
Dulkadiroğlu	25	15
Elbistan	30	10
Pazarcık	19	21

As a result of the observations of the structures examined in Kahramanmaraş, the negativity parameter that is close to each other and high was soft floor and heavy overhang. 77.5% were soft coats and 75.83% were heavy coats.

Considering the climatic condition of Kahramanmaraş province while making the examinations, it has a climate with hot summers and warm winters. According to the science of the region, the design of the building proceeds parallel to each other. For this reason, balconies have been identified in many buildings. It is not a parameter added by the regulation when calculating building performance. However, during the examinations, the condition of the balcony should also be examined. It is built in the form of balconies with recesses or protrusions into the structure. The balconies were built by supporting them with beams as a continuation of the flooring. Considering all these situations, the construction of the parapets of the balconies with heavy materials is among the elements that pose a danger by shedding in the event of an earthquake.

5.3 Building Risk Assessment

Another process regarding the evaluation of the collected data is the distribution of earthquake performance scores according to risk classes and risk score limitations are given in the table below. The lowest performance score of the buildings examined was found to be 0, while the highest performance score was calculated as 112.

Below is a sample evaluation of one building.

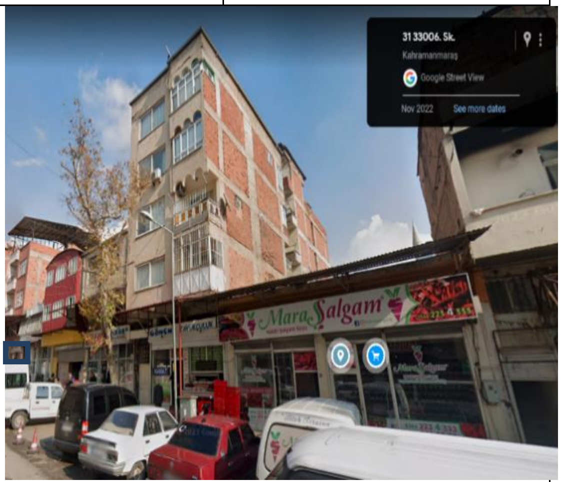
DATA COLLECTION FORM FOR REINFORCED CONCRETE BUILDINGS					
BUILDING IDENTIFICATIONS					
BUILDING ID NO					
PROVINCE	Kahramanmaraş				
DISTRICT	Dulkadiroğlu				
NEIGHBOURHOOD	Hayrullah District				
STREET	33006. Street				
EXTERIOR DOOR NO.	31				
BUILDING NAME	-				
SHEET	-				
INFLUX	-				
PARCEL	-				
UAVT BUILDING CODE	-				
ESTIMATED AGE OF THE BUILDING					
GEOGRAPHICAL COORDINATES	LATITUDE: 37.558456,	LONGITUDE: 36.936560			
USE TYPE OF THE BUILDING					
USE TYPE OF THE BUILDING	HOUSING ■	TRADE □	INDUSTRY □	PUBLIC □	DERELICT □
BUILDING TECHNICAL INFORMATION					
STRUCTURAL SYSTEM TYPE	REINFORCED CONCRETE FRAME □	REINFORCED CONCRETE FRAME AND CURTAIN ■			
NUMBER OF FREE FLOORS	5				
BUILDING VISUAL QUALITY	GOOD □	MEDİUM ■	BAD □		
SOFT COAT/WEAK COAT	HAS ■	YOK □			
VERTICAL IRREGULARITY	HAS □	HAS NOT ■			
HEAVY REMOVAL	HAS ■	HAS NOT □			
IRREGULARITY IN THE PLAN IS SHORT	HAS □	HAS NOT ■			
SHORT COLON EFFECT	HAS ■	HAS NOT □			
BUILDING REGULATION	SEPARATE □	ADJOINING ■	ADJUST ON THE CORNER □		
FLOOR LEVEL IN ADJACENT BUILDINGS	SAME □	DIFFERENT □			
SLOPE OF NATURAL TIME	DÜZ ■	EĞİMLİ (Eğim>30°) □			
GROUND CLASS	Z1 □	Z2 ■	Z3 □	Z4 □	

Figure 5. 4: Data Collection Form For Reinforced Concrete Buildings

YSP(BAÇP)=65	Number of Floors=5		
Negativity Parameter	Negativity Detection	Negativity Value (Oi)	Negativity Parameter Score (OPi)
Earthquake Class Score	2. bölge		TP=80
Soft coat	has	1	30
Building quality	medium	1	25
Heavy overhang	has	1	10
Building Ordinance	Adjacent	1	5
Irregularity in the vertical	Not has	0	15
Irregularity in the plada	Not has	0	10
Ground slope	Not has	0	3
short column	has	1	5

Figure 5. 5: Scoring of Negativity Parameters

$$PP=TP+\sum_{i=1}^{n}(Oi * OPi)+YSP$$

PP=80+[(1*30)+(1*25)+(1*10)+(1*5)+(0*15)+(0*10)+(0*3)+(1*5)+]+65

PP=70

Since the risk level is between 61-105, it is in low risk status.

In the risk determination of reinforced concrete structures, which are included in the principles for the determination of risky structures, 9% of the buildings examined were determined as very risky, 66% as medium risky, 24% as risky and 1% as risk-free (Figure 5.4). After the calculation of the risk situations, classifications were made according to the table below.

Table 5. 7: Building Performance Score Range by Risk Class

Risk Class	Building Performance Score Range	Number of Buildings
High Risk	10	11
Medium Risk	11-60	79
Low Risk	61-105	28
Safe	106-155	1
Very Safe	156	1

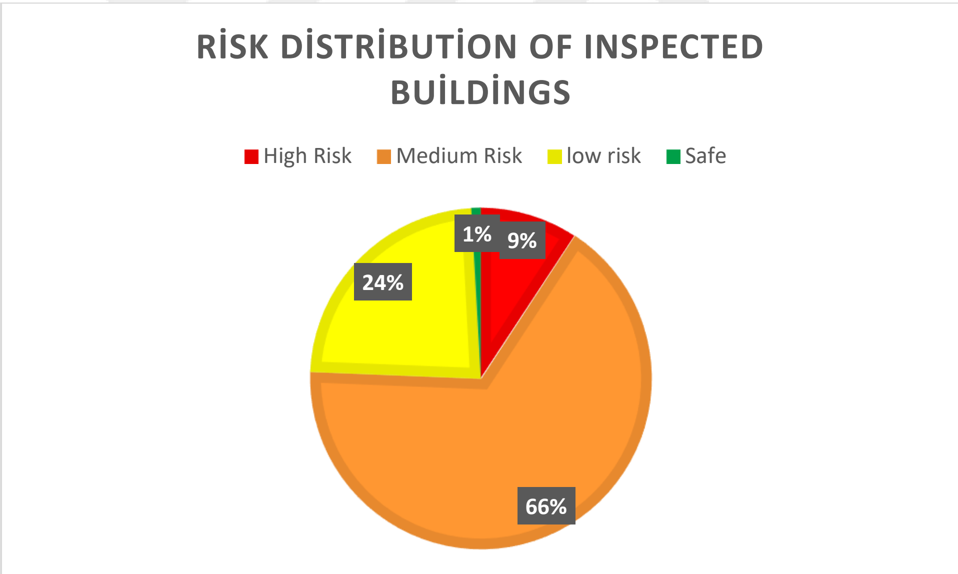


Figure 5. 6: Risk Distribution of Inspected Buildings

5.4. Argument

Damage is a general term that includes material and moral damage. Damage according to TDK; It is the damage that occurs in a good due to unintentional reasons such as breakage, spillage, deterioration [21]. In recent years, there have been many major earthquakes one after another. These earthquakes caused thousands of people's loss of life and material damage due to damage to buildings. A disaster event that causes such great losses also reveals the existence of structural defects [22].

System failures in buildings are among the main causes of damage to buildings. Neglect of the rules stipulated by the regulation on TBDY and structures to be built in disaster areas and inadequacies in carrier elements allow major errors to arise. For example, insufficient or no stirrups in the carrier elements and joints leads to serious damage to the carrier element v node points. Or, due to the lack of sufficient rigidity, it prepares the ground for the collapse of the structures by the occurrence of collapse in areas where strong beams and weak columns are formed. This shows that the direct proportionality of the load-bearing elements of the structures, the presence of stirrups and the adequate tightening of the tightening process are among the important factors for minimizing the damages [22].

Reinforced concrete structures are damaged by many different effects over the years. These effects include earthquake, overloading, corrosion, fire, exposure to harmful chemicals and physical effects, etc. Depending on the severity of the impact of the damage caused by these effects, it may be such as hairline cracks, castings and regional part breaks. In order to determine the cause of these damages, a systematic analysis and evaluation is envisaged: These factors that cause damage to reinforced concrete structures can be grouped under two main headings. These factors are listed as internal and external causes. These; [21]

<u>Internal Factors:</u> Uncontrolled renovations and repairs, user identity and purpose of use of the building, change of building use function, quality and quantity of building materials, etc.

<u>External Factors:</u> Earthquakes, winds, ground properties, environmental climatic conditions, architectural and static reinforced concrete system design and solution, etc.

Earthquakes are caused by the cracking of fault lines. The vibrations that occur at the time of occurrence of these fractures propagate in waves and cause the earth to shake. Earthquakes occur not only due to the collision of fault lines. Mine explosions, nuclear facilities, landslides and volcanic activity can also pave the way for earthquakes to occur. Serious damages caused by earthquakes occur according to the type, intensity, magnitude and impact of the earthquake [21]. Earthquakes, which are at the forefront of these causes, cause structural and non-structural damage to buildings.

Structural Damages: Carrier elements; It consists of columns, beams, floors, foundations, curtains, load-bearing walls, roof elements

Non-Structural Damages: Complementary elements; It consists of elements such as partition walls, doors, lintels, windows, paints, plasters, coatings, parapets, and mortars.

Cracks in the load-bearing systems of reinforced concrete structures; It occurs due to overloads caused by project errors and foundation settlements. When these cracks in the carrier system reach an advanced size, they adversely affect the safety of the reinforced concrete structure. Damaged structures after an earthquake are quickly and carefully identified, contributing to the determination of decisions such as the magnitude of the damage to the building, repair, strengthening or demolition of the structure [23].

5.4.1 Upholstery Damages

One of the safest elements in reinforced concrete structures is slabs. Cracks formed as a result of vertical loads Flexural cracks occur with the appearance of horizontal loads. Floor cracks do not interrupt the safety of the carrier system, except for important ones. Cracks may occur in the lower opening of beamed floors with large spans, at the junction of the beam and the flooring, or in the upper support parallel to the edge of the beam. In this case, the thickness of the slab must be carefully selected in order for rigidity to ocur [24]

Vibrations in the floors caused by moving loads cause cracks and excessive deflection in the middle of the flooring with the presence of vertical loads. Excessive vibration of the load-bearing elements due to moving loads is also evidence that the structure is flimsy. In addition, the fact that the concrete is loaded before it hardens shows that the structure is unstable due to reasons such as early removal of the molds, the thickness of the slab being less than the opening, and the concrete slab being lower than the required strength. Among the slab damages, the punching effect in reinforced concrete should also be addressed. The punching effect is the absence of a beam, insufficient slab thickness, shear cracks in the area where the floor and column meet, or the collapse of the column by piercing the floor. The low area transferred from the slab to the column causes the concrete to be brittle and suddenly the column to pierce and break [23].

5.4.2 Damage to the Colon

5.4.2.1 Bending and Shear Cracks in the Column

If the shear force, axial force and moment acting on reinforced concrete columns are more than the bearing capacity of the column, damage occurs in the column, which is the carrier element. Damage is seen in the column due to the inclined shear cracks being 45 degrees in the column, the formation of gaps due to the inability of the concrete to settle due to the dense longitudinal reinforcement in the column, the lack of strength of the concrete compressive strength between the concrete and the reinforcement, and the insufficient carrying capacity of the shear force in the column [23]. The formation of 45-degree shear cracks is due to the fact that the stirrup is not sufficient in the area where the junction areas of the column are located and the reinforcement sprout lengths are not paid attention to. Oblique shear cracks that occur in case of stirrup insufficiency also cause brittle fracture of the concrete [24]. In cases where concrete and reinforcement do not work together, the reinforcements are separated from the concrete when they do not reach the yield stress. The event that causes them to collapse suddenly occurs due to the crushing and cracking of the concrete before the longitudinal reinforcement of the column reaches the flow level. In this case, concrete pressure fracture damage occurs if the concrete compressive strength of the column or the excessive axial load of the column is very low. [23]

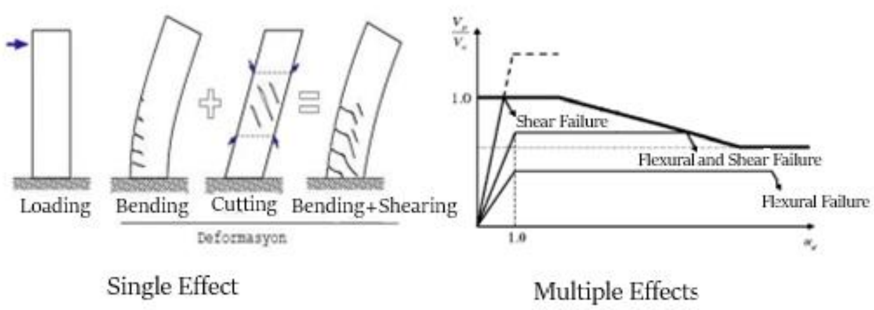


Figure 5. 7: Single and multiple impact injuries in columns

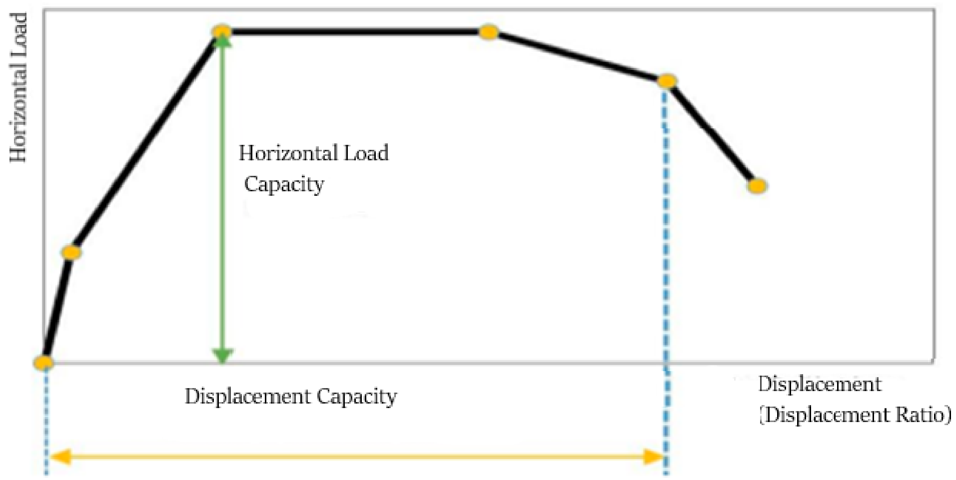


Figure 5. 8: Normal element capacity behavior

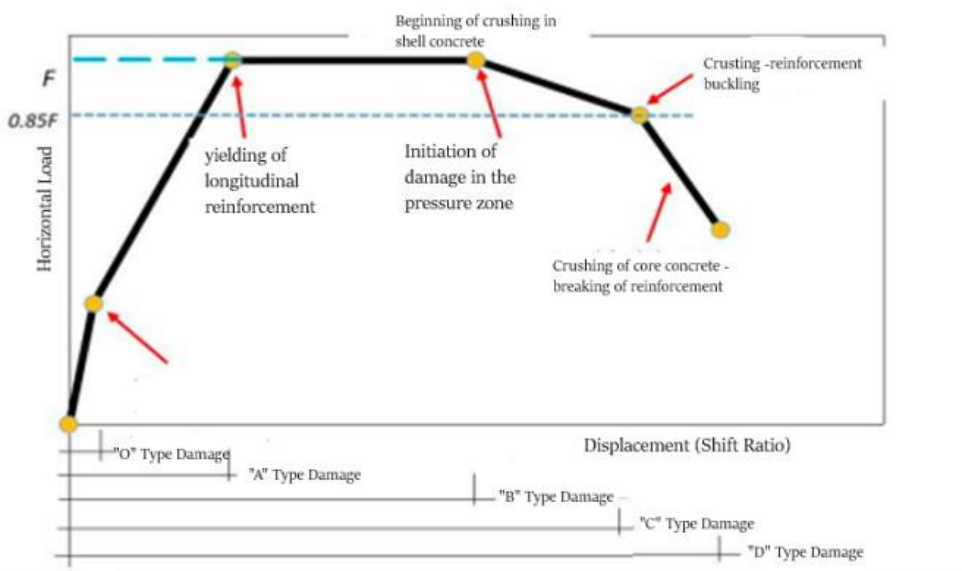


Figure 5. 9: Flexural element capacity behavior

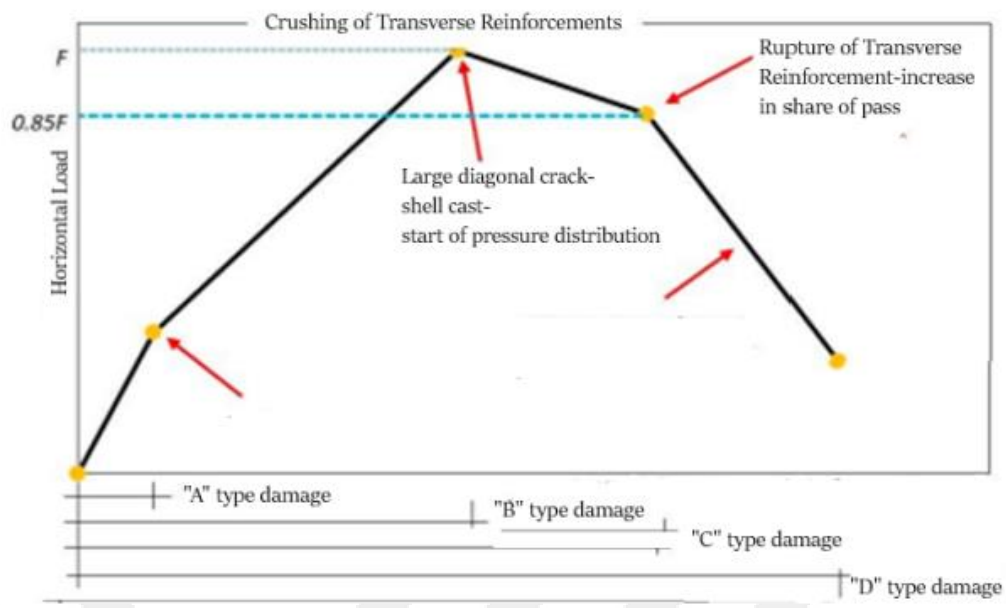


Figure 5. 10: Shear element capacity behavior

5.4.2.2 Sprains Damage to the Colons

Spraint damage to the colons is encountered especially in cases where stirrups are sparse in the end areas of the colon, and this is undesirable. Because buckling of the reinforcement causes the column head to disperse and shorten the column under axial load. Changes in column dimensions as a result of shortening result in a different redistribution of forces [24].

5.4.2.3 Short Colon Damage

One of the structural problems and common damages is the short column. It occurs when the horizontal loads that occur at the time of an earthquake affect the column in terms of shear force and moment. The low moment is directly proportional to the length of the column. In this case, the increase in bending rigidity depends on the short length of the column. This shows that the shear capacity that will occur in short columns is lower than the bending capacity. That is, the cutting capacity of the short column is lower than that of the bending capacity. If the column is short, the shear force is effective in the formation of the damage. In tape windows added to illuminate the basement of buildings such as schools and factories, short columns may occur in cases such as the intermediate wall between the two columns does not continue along the column, And the non-bearing elements add ornamental beams close to the upper side of the column [24].

5.4.3 Damage to Beam

Another load-bearing element with high bending and shear damage is the beams. Beams are among the most difficult areas under earthquake load. In the support areas, bending cracks and diagonal shear cracks occur in the lower and upper parts perpendicular to the beam axis. As long as the bending cracks are not very large, they do not pose a danger. It is necessary to pay more attention to slip cracks. As long as the width of the slip cracks is not too large, it is not dangerous, but the cracks must be controlled. In this case, if the bending cracks are concentrated in the support area, the beam will be badly damaged, in addition, in the presence of shear cracks, it will be heavily damaged and in a dangerous condition. Because the shear crack is an undesirable situation as it will cause brittle fracture in the concrete. Another condition in which bending and shear cracks can occur is the presence of a stud beam. In the event that the stud beam is mandatory, it is necessary to take the necessary special measures [24].

5.4.4 Damages in Column-Beam Junction Areas

Under earthquake loads, the column-beam joint is important for the rigidity of the system. Strong column, weak beam application should provide articulation between the beam ends. This application needs to be designed and built in accordance with the regulations. If the beam is harder and stronger than the column, it creates pressure or tensile damage to the column. In this case, the condition of a weak column, a strong beam, is very dangerous and is undesirable as it will lead to the collapse of the structure. Sufficient stirrups must be placed in the column beam joints, otherwise it will cause the column longitudinal reinforcement to buckle due to the vertical load in the beam width. Longitudinal reinforcements on the beam need to be fixed in the column beam areas. In the case where it is not fixed, the beam end becomes articulated because the beam cross-section cannot reach the moment capacity, which causes the longitudinal reinforcements to separate from the column beam joint area as a result of lateral loads [21, 22].

5.4.5 Curtain Damages

Non-ductile cut cracks occur in the curtains and bending cracks do not occur as much. Shear cracks are X-shaped. This is undesirable as cracks lead to power depletion. Joints formed on curtains built in a caddy manner also cause slip damage. The increase in the damages that occur increases according to the number of floors and height of the building. In addition to the fact that the end moment of the column is strong, the weakness of the curtain also causes shear fractures in the curtain body [24]. Damage to the curtain during an earthquake can occur in three ways. These; [22].

5.4.5.1 Cutting Cracks

Shear cracks are the most common X-shaped cracks. The occurrence of these cracks is the oblique tensile stress created by the shear force. In this case, it will cause the structure to collapse quickly, as power depletion will ocur [23]. However, if the arrangement of the end part of the curtain wall is suitable for the conditions, the curtain can carry a bending moment despite the damage. X-shaped shear cracks, which are mostly seen in low-rise buildings, do not cause bending fractures because the bending moment acting on the curtain wall at the time of an earthquake is less than the moment bearing capacity of the curtain wall [22].

5.4.5.2 Flexural Cracks

Flexural cracks are most common in the ground and basement floors of multi-storey buildings. Such damage is due to the absence of window and door space in the curtain. In terms of structure, it is different whether the curtain wall has a cavity or no gaps in the damages that occur in the curtain. If the curtain wall is hollow, it will behave like two full curtains connected to the floor level in the event of an earthquake. In this case, bending or shear fracture will occur at the ends of the tie beams that interlock the two curtain walls. This becomes two independent curtains as a result of damage to the gapless curtain. The last part of the damage is the bending cracks that occur at the base of the perede. [22,23]

5.4.5.4 Slip Cracks

During the formation of the curtain, cold joints may occur later due to the fact that the curtain concrete is not poured at once, but poured gradually. The reason why this situation occurs is that since it is poured at different times, friction force cannot occur because adherence cannot be achieved between the two concretes. Horizontal cracks do not pose a possible danger in terms of bearing vertical loads [23]. In curtained framed structures, the peredes create elastic energy consumption power, while in frames, they deform the structure and create plastic energy consumption power. In the event of a severe earthquake, the first damage is seen in the curtain wall. Since the displacement of the curtain wall will increase after the damage, it will cause damage to the frame structures. If there is no power to meet the translational movement that occurs in the curtain at the end of the column, articulation may occur at the end of the column [22].

If the curtains are placed asymmetrically while designing, damage occurs in the curtain due to torsional moments in the event of an earthquake [22,23].

5.4.6 Damages To The Foundatıon Of The Buıldıng

Liquefaction of the ground is one of the most common events encountered during an earthquake. This phenomenon mostly occurs in river basins and coastal areas. Since the increase in the groundwater level at the time of an earthquake will increase the water pressure of the space between the ground grains with the effect of vibration, the semin becomes saturated with water and becomes fluid like a liquid [23]. This will destroy a large part of the bearing power on the ground. The structure will collapse towards the ground, causing a large displacement in the ground and at the same time the formation of large cracks. All these show that the ground improvement has not been done, the safety stress of the ground is higher than it should be, and adequate measures are not taken on the ground, such as not sitting on the appropriate ground. The diversity of the ground on which the building is placed can also cause the structure to rotate from hard ground to soft ground [22].

CHAPTER 6

CONCLUSION

In this study, in accordance with the Principles for the Determination of Risky Structures of the Ministry of Environment and Urbanization (2019), the risk assessment of reinforced concrete buildings determined in Dulkadiroğlu, Elbistan and Pazarcık districts of Kahramanmaraş province was carried out. The data obtained as a result of the study are given below.

• The study was carried out on a total of 120 buildings in Kahramanmaraş. The distribution of buildings was 40 in Dulkadiroğlu district, 40 in Elbistan district and 40 in Pazarcık district.

•It should be considered as a study that deals with the evaluation of the risk status of the buildings examined in the region and the evaluation of the risk distribution.

• Buildings inspected in accordance with the specified methods; It is not used for earthquake performance evaluation or strengthening. It does not lead to the conclusion that the methods used in the principles of the regulation provide the earthquake-resistant design principles of the building, which is not found to be risky. In this case, this study is not an earthquake safety calculation study.

• In the risk determination of reinforced concrete structures, which are among the principles for determining risky structures, 9% of the examined structures were calculated as very risky, 66% as medium risk, 24% as risky and 1% as risk-free. The ratio of risk situations is given in a colored way in the graph.

• Due to the sad earthquake disaster that took place last February, it caused many buildings to collapse and suffer heavy damage. In this context, it is thought that it will be beneficial to carry out similar studies for all buildings before creating zoning plans, to design new buildings by paying attention to all parameters and to make them in accordance with earthquake guidelines.

•The study carried out in accordance with the Principles Regarding the Detection of Risky Structures of the Ministry of Environment and Urbanization (2019) 1. It has been considered narrowly as a step study

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APPENDIX A

A.1 : Buildings with Building Stock Evaluated in Dulkadiroğlu District

1. YAPI

kat sayısı	5			YSP(BAÇP)	BDP
deprem sınıfı puanı	2.bölge	80		0	45
yumuşak kat	yok	0	30		
bina kalitesi	iyi	0	25		
ağır çıkma	var	1	30		
yapı nizamı	ayrı	0	1		
düşeyde düz.	yok	0	15		
plada düz.	yok	0	10		
zemin eğimi	yok	0	3		
kısa kolon	var	1	5		

2. YAPI

kat sayısı	5			YSP(BAÇP)	BDP
deprem sınıfı puanı	2. bölge	80		65	70
yumuşak kat	var	1	30		
bina kalitesi	orta	1	25		
ağır çıkma	var	1	10		
yapı nizamı	bitişik	1	5		
düşeyde düz.	yok	0	15		
plada düz.	yok	0	10		
zemin eğimi	yok	0	3		
kısa kolon	var	1	5		

3. YAPI

kat sayısı	2			YSP(BAÇP)	BDP
deprem sınıfı puanı	2. bölge		120		95
yumuşak kat	yok	0	10		
bina kalitesi	orta	1	10		
ağır çıkma	yok	0	10		
yapı nizamı	bitişik	1	10		
düşeyde düz.	yok	0	5		
plada düz.	yok	0	5		
zemin eğimi	yok	0	3		
kısa kolon	var	1	5		

4. YAPI

kat sayısı	2			YSP(BAÇP)	BDP
deprem sınıfı puanı	2. bölge		120		75
yumuşak kat	var	1	10		
bina kalitesi	kötü	2	10		
ağır çıkma	yok	0	10		
yapı nizamı	bitişik	1	10		
düşeyde düz.	yok	0	5		
plada düz.	yok	0	5		
zemin eğimi	yok	0	3		
kısa kolon	var	1	5		

5. YAPI

kat sayısı	5			YSP(BAÇP)	BDP
deprem sınıfı puanı	2. bölge		80	55	57
yumuşak kat	var	1	30		
bina kalitesi	orta	1	10		
ağır çıkma	var	1	30		
yapı nizamı	ayrı	0	1		
düşeyde düz.	yok	0	15		
plada düz.	yok	0	10		
zemin eğimi	var	1	3		
kısa kolon	var	1	5		

6. YAPI

kat sayısı	7			YSP(BAÇP)	BDP
deprem sınıfı puanı	2. bölge		65	55	52
yumuşak kat	var	1	30		
bina kalitesi	iyi	0	30		
ağır çıkma	var	1	30		
yapı nizamı	ayrı	0	1		
düşeyde düz.	yok	0	15		
plada düz.	yok	0	10		
zemin eğimi	var	1	3		
kısa kolon	var	1	5		

7. YAPI

kat sayısı	7			YSP(BAÇP)	BDP
deprem sınıfı puanı	2. bölge		65	55	55
yumuşak kat	var	1	30		
bina kalitesi	iyi	0	30		
ağır çıkma	var	1	30		
yapı nizamı	ayrı	0	1		
düşeyde düz.	yok	0	15		
plada düz.	yok	0	10		
zemin eğimi	yok	0	3		
kısa kolon	var	1	5		

8. YAPI

kat sayısı	6			YSP(BAÇP)	BDP
deprem sınıfı puanı	2. bölge		65	55	27
yumuşak kat	var	1	30		
bina kalitesi	iyi	0	30		
ağır çıkma	var	1	30		
yapı nizamı	ayrı	0	1		
düşeyde düz.	var	1	15		
plada düz.	var	1	10		
zemin eğimi	var	1	3		
kısa kolon	var	1	5		

9. YAPI

kat sayısı	4			YSP(BAÇP)	BDP
deprem sınıfı puanı	2.bölge		90		30
yumuşak kat	yok	0	30		
bina kalitesi	kötü	2	15		
ağır çıkma	yok	0	30		
yapı nizamı	bitişik	1	0		
düşeyde düz.	var	1	15		
plada düz.	var	1	10		
zemin eğimi	yok	0	3		
kısa kolon	var	1	5		

10. YAPI

kat sayısı	5			YSP(BAÇP)	BDP
deprem sınıfı puanı	2. bölge		80	65	97
yumuşak kat	yok	0	30		
bina kalitesi	iyi	0	25		
ağır çıkma	var	1	30		
yapı nizamı	ayrı	0	1		
düşeyde düz.	yok	0	15		
plada düz.	var	1	10		
zemin eğimi	var	1	3		
kısa kolon	var	1	5		

11. YAPI

kat sayısı	3			YSP(BAÇP)	BDP
deprem sınıfı puanı	2. bölge		100	0	50
yumuşak kat	yok	0	20		
bina kalitesi	kötü	2	10		
ağır çıkma	yok	0	20		
yapı nizamı	bitişik	1	5		
düşeyde düz.	var	1	10		
plada düz.	var	1	10		
zemin eğimi	yok	0	3		
kısa kolon	var	1	5		

12. YAPI

kat sayısı	2			YSP(BAÇP)	BDP
deprem sınıfı puanı	2 bölge		120	0	87
yumuşak kat	yok	0	10		
bina kalitesi	kötü	2	10		
ağır çıkma	yok	0	10		
yapı nizamı	bitişik	1	5		
düşeyde düz.	yok	0	5		
plada düz.	yok	0	5		
zemin eğimi	var	1	3		
kısa kolon	var	1	5		

13. YAPI

kat sayısı	3			YSP(BAÇP)	BDP
deprem sınıfı puanı	2. bölge		100	0	52
yumuşak kat	yok	0	20		
bina kalitesi	orta	1	10		
ağır çıkma	yok	0	20		
yapı nizamı	bitişik	1	10		
düşeyde düz.	var	1	10		
plada düz.	var	1	10		
zemin eğimi	var	1	3		
kısa kolon	var	1	5		

14. YAPI

kat sayısı	3			YSP(BAÇP)	BDP
deprem sınıfı puanı	2. bölge		100	0	12
yumuşak kat	var	1	20		
bina kalitesi	kötü	2	10		
ağır çıkma	var	1	20		
yapı nizamı	ayrı	0	1		
düşeyde düz.	var	1	10		
plada düz.	var	1	10		
zemin eğimi	var	1	3		
kısa kolon	var	1	5		

15. YAPI

kat sayısı	3			YSP(BAÇP)	BDP
deprem sınıfı puanı	2. bölge		100	0	30
yumuşak kat	var	1	20		
bina kalitesi	orta	1	10		
ağır çıkma	yok	0	20		
yapı nizamı	bitişik	1	15		
düşeyde düz.	var	1	10		
plada düz.	var	1	10		
zemin eğimi	yok	0	3		
kısa kolon	var	1	5		

16. YAPI

kat sayısı	5			YSP(BAÇP)	BDP
deprem sınıfı puanı	2. bölge		80	65	80
yumuşak kat	var	1	30		
bina kalitesi	iyi	0	25		
ağır çıkma	var	1	30		
yapı nizamı	ayrı	0	1		
düşeyde düz.	yok	0	15		
plada düz.	yok	0	10		
zemin eğimi	yok	0	3		
kısa kolon	var	1	5		

17. YAPI					
kat sayısı	4			YSP(BAÇP)	BDP
deprem sınıfı puanı	2. bölge		90		37
yumuşak kat	yok	0	30		
bina kalitesi	kötü	2	15		
ağır çıkma	yok	0	30		
yapı nizamı	bitişik	1	15		
düşeyde düz.	yok	0	15		
plada düz.	yok	0	10		
zemin eğimi	var	1	3		
kısa kolon	var	1	5		

18. YAPI					
kat sayısı	3			YSP(BAÇP)	BDP
deprem sınıfı puanı	2. bölge		100		47
yumuşak kat	yok	0	20		
bina kalitesi	orta	1	10		
ağır çıkma	yok	0	20		
yapı nizamı	bitişik	1	15		
düşeyde düz.	var	1	10		
plada düz.	var	1	10		
zemin eğimi	var	1	3		
kısa kolon	var	1	5		

19. YAPI					
kat sayısı	2			YSP(BAÇP)	BDP
deprem sınıfı puanı	2. bölge		120		77
yumuşak kat	yok	0	10		
bina kalitesi	orta	1	10		
ağır çıkma	var	1	10		
yapı nizamı	bitişik	1	15		
düşeyde düz.	yok	0	5		
plada düz.	yok	0	5		
zemin eğimi	var	1	3		
kısa kolon	var	1	5		

20. YAPI					
kat sayısı	5			YSP(BAÇP)	BDP
deprem sınıfı puanı	2. bölge		80	65	77
yumuşak kat	var	1	30		
bina kalitesi	iyi	0	25		
ağır çıkma	var	1	30		
yapı nizamı	ayrı	0	1		
düşeyde düz.	yok	0	15		
plada düz.	yok	0	10		
zemin eğimi	var	1	3		
kısa kolon	var	1	5		

21. YAPI

kat sayısı	7			YSP(BAÇP)	BDP
deprem sınıfı puanı	2. bölge		65	55	52
yumuşak kat	var	1	30		
bina kalitesi	iyi	0	30		
ağır çıkma	var	1	30		
yapı nizamı	ayrı	0	1		
düşeyde düz.	yok	0	15		
plada düz.	yok	0	10		
zemin eğimi	var	1	3		
kısa kolon	var	1	5		

22. YAPI

kat sayısı	7			YSP(BAÇP)	BDP
deprem sınıfı puanı	2. bölge		65	55	55
yumuşak kat	var	1	30		
bina kalitesi	iyi	0	30		
ağır çıkma	var	1	30		
yapı nizamı	ayrık	0	1		
düşeyde düz.	yok	0	15		
plada düz.	yok	0	10		
zemin eğimi	yok	0	3		
kısa kolon	var	1	5		

23. YAPI

kat sayısı	3			YSP(BAÇP)	BDP
deprem sınıfı puanı	2. bölge		100		27
yumuşak kat	var	1	20		
bina kalitesi	orta	1	10		
ağır çıkma	yok	0	20		
yapı nizamı	bitişik	1	15		
düşeyde düz.	var	1	10		
plada düz.	var	1	10		
zemin eğimi	var	1	3		
kısa kolon	var	1	5		

24. YAPI

kat sayısı	2			YSP(BAÇP)	BDP
deprem sınıfı puanı	2. bölge		120		85
yumuşak kat	var	1	10		
bina kalitesi	orta	1	10		
ağır çıkma	yok	0	10		
yapı nizamı	bitişik	1	10		
düşeyde düz.	yok	0	5		
plada düz.	yok	0	5		
zemin eğimi	yok	0	3		
kısa kolon	var	1	5		

25. YAPI

kat sayısı	3			YSP(BAÇP)	BDP
deprem sınıfı puanı	2. bölge		100		80
yumuşak kat	yok	0	20		
bina kalitesi	orta	1	10		
ağır çıkma	yok	0	20		
yapı nizamı	bitişik	1	5		
düşeyde düz.	yok	0	10		
plada düz.	yok	0	10		
zemin eğimi	yok	0	3		
kısa kolon	var	1	5		

26. YAPI

kat sayısı	7			YSP(BAÇP)	BDP
deprem sınıfı puanı	2. bölge		65	55	25
yumuşak kat	var	1	30		
bina kalitesi	orta	1	30		
ağır çıkma	yok	0	30		
yapı nizamı	bitişik	1	5		
düşeyde düz.	var	1	15		
plada düz.	var	1	10		
zemin eğimi	yok	0	3		
kısa kolon	var	1	5		

27. YAPI

				YSP(BAÇP)	BDP
kat sayısı	6			YSP(BAÇP)	BDP
deprem sınıfı puanı	2. bölge		65	55	112
yumuşak kat	yok	0	30		
bina kalitesi	iyi	0	30		
ağır çıkma	yok	0	30		
yapı nizamı	ayrı	0	1		
düşeyde düz.	yok	0	15		
plada düz.	yok	0	10		
zemin eğimi	var	1	3		
kısa kolon	var	1	5		

28. YAPI

kat sayısı	6			YSP(BAÇP)	BDP
deprem sınıfı puanı	2. bölge		65	55	30
yumuşak kat	var	1	30		
bina kalitesi	iyi	0	30		
ağır çıkma	var	1	30		
yapı nizamı	ayrı	0	1		
düşeyde düz.	var	1	15		
plada düz.	var	1	10		
zemin eğimi	yok	0	3		
kısa kolon	var	1	5		

29. YAPI

kat sayısı	3			YSP(BAÇP)	BDP
deprem sınıfı puanı	2. bölge		100	0	22
yumuşak kat	var	1	20		
bina kalitesi	kötü	2	10		
ağır çıkma	var	1	20		
yapı nizamı	bitişik	1	10		
düşeyde düz.	yok	0	10		
plada düz.	yok	0	10		
zemin eğimi	var	1	3		
kısa kolon	var	1	5		

30. YAPI

kat sayısı	3			YSP(BAÇP)	BDP
deprem sınıfı puanı	2. bölge		100	0	32
yumuşak kat	var	1	20		
bina kalitesi	kötü	2	10		
ağır çıkma	var	1	20		
yapı nizamı	bitişik	1	0		
düşeyde düz.	yok	0	10		
plada düz.	yok	0	10		
zemin eğimi	var	1	3		
kısa kolon	var	1	5		

35. YAPI

kat sayısı	4			YSP(BAÇP)	BDP
deprem sınıfı puanı	2. bölge		90		42
yumuşak kat	yok	0	30		
bina kalitesi	iyi	0	15		
ağır çıkma	var	1	30		
yapı nizamı	bitişik	1	10		
düşeyde düz.	yok	0	15		
plada düz.	yok	0	10		
zemin eğimi	var	1	3		
kısa kolon	var	1	5		

36. YAPI

kat sayısı	3			YSP(BAÇP)	BDP
deprem sınıfı puanı	2 bölge		100		30
yumuşak kat	var	1	20		
bina kalitesi	kötü	2	10		
ağır çıkma	var	1	20		
yapı nizamı	bitişik	1	5		
düşeyde düz.	yok	0	10		
plada düz.	yok	0	10		
zemin eğimi	yok	0	3		
kısa kolon	var	1	5		

33. YAPI

kat sayısı	3			YSP(BAÇP)	BDP
deprem sınıfı puanı	2. bölge		100		42
yumuşak kat	var	1	20		
bina kalitesi	iyi	0	10		
ağır çıkma	var	1	20		
yapı nizamı	bitişik	1	10		
düşeyde düz.	yok	0	10		
plada düz.	yok	0	10		
zemin eğimi	var	1	3		
kısa kolon	var	1	5		

34. YAPI

kat sayısı	4			YSP(BAÇP)	BDP
deprem sınıfı puanı	2. bölge		90		15
yumuşak kat	yok	0	30		
bina kalitesi	iyi	0	15		
ağır çıkma	var	1	30		
yapı nizamı	bitişik	1	15		
düşeyde düz.	var	1	15		
plada düz.	var	1	10		
zemin eğimi	yok	0	3		
kısa kolon	var	1	5		

35. YAPI

kat sayısı	4			YSP(BAÇP)	BDP
deprem sınıfı puanı	2. bölge		90		42
yumuşak kat	yok	0	30		
bina kalitesi	iyi	0	15		
ağır çıkma	var	1	30		
yapı nizamı	bitişik	1	10		
düşeyde düz.	yok	0	15		
plada düz.	yok	0	10		
zemin eğimi	var	1	3		
kısa kolon	var	1	5		

36. YAPI

kat sayısı	3			YSP(BAÇP)	BDP
deprem sınıfı puanı	2 bölge		100		30
yumuşak kat	var	1	20		
bina kalitesi	kötü	2	10		
ağır çıkma	var	1	20		
yapı nizamı	bitişik	1	5		
düşeyde düz.	yok	0	10		
plada düz.	yok	0	10		
zemin eğimi	yok	0	3		
kısa kolon	var	1	5		

37. YAPI

kat sayısı	4			YSP(BAÇP)	BDP
deprem sınıfı puanı	2. bölge		90		30
yumuşak kat	yok	0	30		
bina kalitesi	orta	1	15		
ağır çıkma	yok	0	30		
yapı nizamı	bitişik	1	15		
düşeyde düz.	var	1	15		
plada düz.	var	1	10		
zemin eğimi	yok	0	3		
kısa kolon	var	1	5		

38. YAPI

kat sayısı	3			YSP(BAÇP)	BDP
deprem sınıfı puanı	2. bölge		100		27
yumuşak kat	yok	0	20		
bina kalitesi	orta	1	10		
ağır çıkma	var	1	20		
yapı nizamı	bitişik	1	15		
düşeyde düz.	var	1	10		
plada düz.	var	1	10		
zemin eğimi	var	1	3		
kısa kolon	var	1	5		

39. YAPI	kat sayısı	5			YSP(BAÇP)	BDP
	deprem sınıfı puanı	2. bölge		80	65	55
	yumuşak kat	var	1	30		
	bina kalitesi	orta	1	25		
	ağır çıkma	var	1	30		
	yapı nizamı	ayrı	0	1		
	düşeyde düz.	yok	0	15		
	plada düz.	yok	0	10		
	zemin eğimi	yok	0	3		
	kısa kolon	var	1	5		

40. YAPI	kat sayısı	4			YSP(BAÇP)	BDP
	deprem sınıfı puanı	2. bölge		90		22
	yumuşak kat	var	1	30		
	bina kalitesi	iyi	0	15		
	ağır çıkma	var	1	30		
	yapı nizamı	ayrık	0	15		
	düşeyde düz.	yok	0	15		
	plada düz.	yok	0	10		
	zemin eğimi	var	1	3		
	kısa kolon	var	1	5		

A.2 : Buildings with Building Stock Evaluated in Elbistan District

41. YAPI	kat sayısı	5			YSP(BAÇP)	BDP
	deprem sınıfı puanı	2. bölge		80	65	85
	yumuşak kat	var	1	30		
	bina kalitesi	orta	1	25		
	ağır çıkma	yok	0	30		
	yapı nizamı	bitişik	0	10		
	düşeyde düz.	yok	0	15		
	plada düz.	yok	0	10		
	zemin eğimi	yok	0	3		
	kısa kolon	var	1	5		

42. YAPI	kat sayısı	3			YSP(BAÇP)	BDP
	deprem sınıfı puanı	2. bölge		100		30
	yumuşak kat	var	1	20		
	bina kalitesi	kötü	2	10		
	ağır çıkma	var	1	20		
	yapı nizamı	bitişik	1	5		
	düşeyde düz.	yok	0	10		
	plada düz.	yok	0	10		
	zemin eğimi	yok	0	3		
	kısa kolon	var	1	5		

43. YAPI

				YSP(BAÇP)	BDP
kat sayısı	5				
deprem sınıfı puanı	2. bölge		120		65
yumuşak kat	var	1	10		
bina kalitesi	orta	1	10		
ağır çıkma	var	1	10		
yapı nizamı	bitişik	1	10		
düşeyde düz.	var	1	5		
plada düz.	var	1	5		
zemin eğimi	yok	0	3		
kısa kolon	var	1	5		

44. YAPI

				YSP(BAÇP)	BDP
kat sayısı	5				
deprem sınıfı puanı	2. bölge		80	55	35
yumuşak kat	var	1	30		
bina kalitesi	orta	1	25		
ağır çıkma	var	1	30		
yapı nizamı	bitişik	1	10		
düşeyde düz.	yok	0	15		
plada düz.	yok	0	10		
zemin eğimi	yok	0	3		
kısa kolon	var	1	5		

45. YAPI

				YSP(BAÇP)	BDP
kat sayısı	4				
deprem sınıfı puanı	2. bölge		90	75	75
yumuşak kat	var	1	30		
bina kalitesi	orta	1	15		
ağır çıkma	var	1	30		
yapı nizamı	bitişik	1	10		
düşeyde düz.	yok	0	15		
plada düz.	yok	0	10		
zemin eğimi	yok	0	3		
kısa kolon	var	1	5		

46. YAPI

				YSP(BAÇP)	BDP
kat sayısı	5				
deprem sınıfı puanı	2.bölge		80	65	20
yumuşak kat	var	1	30		
bina kalitesi	orta	1	25		
ağır çıkma	var	1	30		
yapı nizamı	bitişik	1	10		
düşeyde düz.	var	1	15		
plada düz.	var	1	10		
zemin eğimi	yok	0	3		
kısa kolon	var	1	5		

47. YAPI

				YSP(BAÇP)	BDP
kat sayısı	3				
deprem sınıfı puanı	2. bölge		100		15
yumuşak kat	var	1	20		
bina kalitesi	orta	1	10		
ağır çıkma	var	1	20		
yapı nizamı	bitişik	1	10		
düşeyde düz.	var	1	10		
plada düz.	var	1	10		
zemin eğimi	yok	0	3		
kısa kolon	var	1	5		

48. YAPI

				YSP(BAÇP)	BDP
kat sayısı	4				
deprem sınıfı puanı	2. bölge		90		25
yumuşak kat	var	1	30		
bina kalitesi	orta	1	15		
ağır çıkma	var	0	30		
yapı nizamı	bitişik	1	15		
düşeyde düz.	yok	0	15		
plada düz.	yok	0	10		
zemin eğimi	yok	0	3		
kısa kolon	var	1	5		

49. YAPI

				YSP(BAÇP)	BDP
kat sayısı	4				
deprem sınıfı puanı	2.bölge		90		25
yumuşak kat	var	1	30		
bina kalitesi	kötü	2	15		
ağır çıkma	yok	0	30		
yapı nizamı	bitişik	1	0		
düşeyde düz.	yok	0	15		
plada düz.	yok	0	10		
zemin eğimi	yok	0	3		
kısa kolon	var	1	5		

50. YAPI

				YSP(BAÇP)	BDP
kat sayısı	5				
deprem sınıfı puanı	2. bölge		80	65	105
yumuşak kat	var	1	30		
bina kalitesi	iyi	0	25		
ağır çıkma	yok	0	30		
yapı nizamı	bitişik	1	5		
düşeyde düz.	yok	0	15		
plada düz.	yok	0	10		
zemin eğimi	yok	0	3		
kısa kolon	var	1	5		

51. YAPI

				YSP(BAÇP)	BDP
kat sayısı	3				
deprem sınıfı puanı	2. bölge		100		15
yumuşak kat	var	1	20		
bina kalitesi	kötü	2	10		
ağır çıkma	var	1	20		
yapı nizamı	bitişik	1	10		
düşeyde düz.	yok	0	10		
plada düz.	var	1	10		
zemin eğimi	yok	0	3		
kısa kolon	var	1	5		

52. YAPI

				YSP(BAÇP)	BDP
kat sayısı	2				
deprem sınıfı puanı	2. bölge		120		60
yumuşak kat	var	1	10		
bina kalitesi	kötü	2	10		
ağır çıkma	var	1	10		
yapı nizamı	bitişik	1	10		
düşeyde düz.	yok	0	5		
plada düz.	var	1	5		
zemin eğimi	yok	0	3		
kısa kolon	var	1	5		

53. YAPI

				YSP(BAÇP)	BDP
kat sayısı	4				
deprem sınıfı puanı	2. bölge		90		70
yumuşak kat	yok	0	30		
bina kalitesi	orta	1	15		
ağır çıkma	yok	0	30		
yapı nizamı	ayrı	0	1		
düşeyde düz.	yok	0	15		
plada düz.	yok	0	10		
zemin eğimi	yok	0	3		
kısa kolon	var	1	5		

54. YAPI

				YSP(BAÇP)	BDP
kat sayısı	4				
deprem sınıfı puanı	2. bölge		90	75	75
yumuşak kat	var	1	30		
bina kalitesi	orta	1	15		
ağır çıkma	var	1	30		
yapı nizamı	ayrık	0	10		
düşeyde düz.	yok	0	15		
plada düz.	var	1	10		
zemin eğimi	yok	0	3		
kısa kolon	var	1	5		

55. YAPI

kat sayısı	5			YSP(BAÇP)	BDP
deprem sınıfı puanı	2. bölge		80	65	55
yumuşak kat	var	1	30		
bina kalitesi	iyi	0	25		
ağır çıkma	var	1	30		
yapı nizamı	bitişik	1	0		
düşeyde düz.	var	1	15		
plada düz.	var	1	10		
zemin eğimi	yok	0	3		
kısa kolon	var	1	5		

56. YAPI

kat sayısı	3			YSP(BAÇP)	BDP
deprem sınıfı puanı	2. bölge		100		35
yumuşak kat	var	1	20		
bina kalitesi	kötü	2	10		
ağır çıkma	var	1	20		
yapı nizamı	bitişik	1	0		
düşeyde düz.	yok	0	10		
plada düz.	yok	0	10		
zemin eğimi	yok	0	3		
kısa kolon	var	1	5		

57. YAPI

kat sayısı	5			YSP(BAÇP)	BDP
deprem sınıfı puanı	2. bölge		80	65	30
yumuşak kat	var	1	30		
bina kalitesi	orta	1	25		
ağır çıkma	var	1	30		
yapı nizamı	bitişik	1	0		
düşeyde düz.	var	1	15		
plada düz.	var	1	10		
zemin eğimi	yok	0	3		
kısa kolon	var	1	5		

58. YAPI

kat sayısı	4			YSP(BAÇP)	BDP
deprem sınıfı puanı	2. bölge		90	75	75
yumuşak kat	var	1	30		
bina kalitesi	orta	1	15		
ağır çıkma	var	1	30		
yapı nizamı	bitişik	1	10		
düşeyde düz.	yok	0	15		
plada düz.	yok	0	10		
zemin eğimi	yok	0	3		
kısa kolon	var	1	5		

79. YAPI

kat sayısı	5			YSP(BAÇP)	BDP
deprem sınıfı puanı	2. bölge		80	65	85
yumuşak kat	yok	0	30		
bina kalitesi	iyi	0	25		
ağır çıkma	var	1	30		
yapı nizamı	ayrık	0	10		
düşeyde düz.	var	1	15		
plada düz.	var	1	10		
zemin eğimi	yok	0	3		
kısa kolon	var	1	5		

80. YAPI

kat sayısı	4			YSP(BAÇP)	BDP
deprem sınıfı puanı	2. bölge		90	0	0
yumuşak kat	var	1	30		
bina kalitesi	iyi	0	15		
ağır çıkma	var	1	30		
yapı nizamı	ayrı	0	1		
düşeyde düz.	var	1	15		
plada düz.	var	1	10		
zemin eğimi	yok	0	3		
kısa kolon	var	1	5		

A.3 : Buildings with Building Stock Evaluated in Pazarcık District

81. YAPI

kat sayısı	2			YSP(BAÇP)	BDP
deprem sınıfı puanı	1. bölge		90		42
yumuşak kat	var	1	10		
bina kalitesi	orta	1	10		
ağır çıkma	var	1	10		
yapı nizamı	bitişik	1	10		
düşeyde düz.	yok	0	5		
plada düz.	yok	0	5		
zemin eğimi	var	1	3		
kısa kolon	var	1	5		

82. YAPI

kat sayısı	3			YSP(BAÇP)	BDP
deprem sınıfı puanı	1. bölge		80		25
yumuşak kat	var	1	20		
bina kalitesi	orta	1	10		
ağır çıkma	var	1	20		
yapı nizamı	ayrı	0	1		
düşeyde düz.	yok	0	10		
plada düz.	yok	0	10		
zemin eğimi	yok	0	3		
kısa kolon	var	1	5		

83. YAPI

kat sayısı	5			YSP(BAÇP)	BDP
deprem sınıfı puanı	1. bölge		60	65	60
yumuşak kat	var	1	30		
bina kalitesi	iyi	0	25		
ağır çıkma	var	1	30		
yapı nizamı	ayrık	0	1		
düşeyde düz.	yok	0	15		
plada düz.	yok	0	10		
zemin eğimi	yok	0	3		
kısa kolon	var	1	5		

84. YAPI

kat sayısı	3			YSP(BAÇP)	BDP
deprem sınıfı puanı	1. bölge		80		15
yumuşak kat	var	1	20		
bina kalitesi	orta	1	10		
ağır çıkma	var	1	20		
yapı nizamı	bitişik	1	10		
düşeyde düz.	yok	0	10		
plada düz.	yok	0	10		
zemin eğimi	yok	0	3		
kısa kolon	var	1	5		

85. YAPI

kat sayısı	4			YSP(BAÇP)	BDP
deprem sınıfı puanı	1. bölge		70	75	52
yumuşak kat	yok	0	30		
bina kalitesi	orta	1	15		
ağır çıkma	var	1	30		
yapı nizamı	bitişik	1	15		
düşeyde düz.	var	1	15		
plada düz.	var	1	10		
zemin eğimi	var	1	3		
kısa kolon	var	1	5		

86. YAPI

kat sayısı	2			YSP(BAÇP)	BDP
deprem sınıfı puanı	1. bölge		90		45
yumuşak kat	var	1	10		
bina kalitesi	kötü	2	10		
ağır çıkma	var	1	10		
yapı nizamı	ayrık	0	1		
düşeyde düz.	yok	0	5		
plada düz.	yok	0	5		
zemin eğimi	yok	0	3		
kısa kolon	var	1	5		

87. YAPI

kat sayısı	7			YSP(BAÇP)	BDP
deprem sınıfı puanı	1. bölge		50	55	70
yumuşak kat	yok	0	30		
bina kalitesi	iyi	0	30		
ağır çıkma	var	1	30		
yapı nizamı	ayrık	0	1		
düşeyde düz.	yok	0	15		
plada düz.	yok	0	10		
zemin eğimi	yok	0	3		
kısa kolon	var	1	5		

88. YAPI

kat sayısı	2			YSP(BAÇP)	BDP
deprem sınıfı puanı	1. bölge		90		45
yumuşak kat	var	1	10		
bina kalitesi	kötü	2	10		
ağır çıkma	yok	1	10		
yapı nizamı	ayrık	0	1		
düşeyde düz.	yok	0	5		
plada düz.	yok	0	5		
zemin eğimi	yok	0	3		
kısa kolon	var	1	5		

89. YAPI

kat sayısı	4			YSP(BAÇP)	BDP
deprem sınıfı puanı	1. bölge		70	75	55
yumuşak kat	var	1	30		
bina kalitesi	orta	1	15		
ağır çıkma	var	1	30		
yapı nizamı	bitişik	1	10		
düşeyde düz.	yok	0	15		
plada düz.	yok	0	10		
zemin eğimi	yok	0	3		
kısa kolon	var	1	5		

90. YAPI

kat sayısı	5			YSP(BAÇP)	BDP
deprem sınıfı puanı	2. bölge		60	65	22
yumuşak kat	var	1	30		
bina kalitesi	iyi	0	25		
ağır çıkma	var	1	30		
yapı nizamı	bitişik	1	10		
düşeyde düz.	var	1	15		
plada düz.	var	1	10		
zemin eğimi	var	1	3		
kısa kolon	var	1	5		

91. YAPI

kat sayısı	5			YSP(BAÇP)	BDP
deprem sınıfı puanı	1. bölge		60	65	5
yumuşak kat	var	1	30		
bina kalitesi	orta	1	25		
ağır çıkma	var	1	30		
yapı nizamı	bitişik	1	5		
düşeyde düz.	var	1	15		
plada düz.	var	1	10		
zemin eğimi	yok	0	3		
kısa kolon	var	1	5		

92. YAPI

kat sayısı	3			YSP(BAÇP)	BDP
deprem sınıfı puanı	1. bölge		80		15
yumuşak kat	var	1	20		
bina kalitesi	orta	1	10		
ağır çıkma	var	1	20		
yapı nizamı	bitişik	1	10		
düşeyde düz.	yok	0	10		
plada düz.	yok	0	10		
zemin eğimi	yok	0	3		
kısa kolon	var	1	5		

93. YAPI

kat sayısı	7			YSP(BAÇP)	BDP
deprem sınıfı puanı	1. bölge		50	55	30
yumuşak kat	var	1	30		
bina kalitesi	iyi	0	30		
ağır çıkma	var	1	30		
yapı nizamı	ayrık	0	1		
düşeyde düz.	yok	0	15		
plada düz.	var	1	10		
zemin eğimi	yok	0	3		
kısa kolon	var	1	5		

94. YAPI

kat sayısı	4			YSP(BAÇP)	BDP
deprem sınıfı puanı	1. bölge		70	75	45
yumuşak kat	var	1	30		
bina kalitesi	iyi	0	15		
ağır çıkma	var	1	30		
yapı nizamı	bitişik	1	10		
düşeyde düz.	var	1	15		
plada düz.	var	1	10		
zemin eğimi	yok	0	3		
kısa kolon	var	1	5		

95. YAPI

kat sayısı	6			YSP(BAÇP)	BDP
deprem sınıfı puanı	1. bölge		50	55	40
yumuşak kat	var	1	30		
bina kalitesi	iyi	0	30		
ağır çıkma	var	1	30		
yapı nizamı	ayrık	0	1		
düşeyde düz.	yok	0	15		
plada düz.	yok	0	10		
zemin eğimi	yok	0	3		
kısa kolon	var	1	5		

96. YAPI

kat sayısı	7			YSP(BAÇP)	BDP
deprem sınıfı puanı	1. bölge		50	55	0
yumuşak kat	var	1	30		
bina kalitesi	iyi	0	30		
ağır çıkma	var	1	30		
yapı nizamı	bitişik	1	15		
düşeyde düz.	var	1	15		
plada düz.	var	1	10		
zemin eğimi	yok	0	3		
kısa kolon	var	1	5		

97. YAPI

kat sayısı	5			YSP(BAÇP)	BDP
deprem sınıfı puanı	1.bölge		60	65	45
yumuşak kat	var	1	30		
bina kalitesi	iyi	0	25		
ağır çıkma	var	1	30		
yapı nizamı	bitişik	1	15		
düşeyde düz.	yok	0	15		
plada düz.	yok	0	10		
zemin eğimi	yok	0	3		
kısa kolon	var	1	5		

98. YAPI

kat sayısı	5			YSP(BAÇP)	BDP
deprem sınıfı puanı	1. bölge		60	65	35
yumuşak kat	var	1	30		
bina kalitesi	iyi	0	25		
ağır çıkma	var	1	30		
yapı nizamı	ayrı	0	10		
düşeyde düz.	var	1	15		
plada düz.	var	1	10		
zemin eğimi	yok	0	3		
kısa kolon	var	1	5		

99. YAPI	kat sayısı	1			YSP(BAÇP)	BDP
	deprem sınıfı puanı	1. bölge		90		55
	yumuşak kat	yok	0	10		
	bina kalitesi	kötü	2	10		
	ağır çıkma	yok	0	10		
	yapı nizamı	bitişik	1	10		
	düşeyde düz.	yok	0	5		
	plada düz.	yok	0	5		
	zemin eğimi	yok	0	3		
	kısa kolon	var	1	5		

100. YAPI	kat sayısı	3			YSP(BAÇP)	BDP
	deprem sınıfı puanı	1. bölge		80		25
	yumuşak kat	yok	0	20		
	bina kalitesi	iyi	0	10		
	ağır çıkma	var	1	20		
	yapı nizamı	bitiişik	1	10		
	düşeyde düz.	var	1	10		
	plada düz.	var	1	10		
	zemin eğimi	yok	0	3		
	kısa kolon	var	1	5		

101. YAPI	kat sayısı	3			YSP(BAÇP)	BDP
	deprem sınıfı puanı	1.bölge		80		20
	yumuşak kat	var	1	20		
	bina kalitesi	iyi	0	10		
	ağır çıkma	var	1	20		
	yapı nizamı	bitişik	1	15		
	düşeyde düz.	yok	0	10		
	plada düz.	yok	0	10		
	zemin eğimi	yok	0	3		
	kısa kolon	var	1	5		

102. YAPI	kat sayısı	5			YSP(BAÇP)	BDP
	deprem sınıfı puanı	1. bölge		60	65	17
	yumuşak kat	var	1	30		
	bina kalitesi	iyi	0	25		
	ağır çıkma	var	1	30		
	yapı nizamı	bitişik	1	15		
	düşeyde düz.	var	1	15		
	plada düz.	var	1	10		
	zemin eğimi	var	1	3		
	kısa kolon	var	1	5		

ÖZGEÇMİŞ

KİŞİSEL BİLGİLER

Adı Soyadı	**:**	Feride CEYLAN
Uyruğu	**:**	Türkiye Cumhuriyeti

EĞİTİM

Derece	**Adı**	**Bitirme Yılı**
Üniversite :	**Bitlis Eren Üniversitesi**	**2018**
Yüksek Lisans :	**Hasan Kalyoncu Üniversitesi**	**2023**
Doktora :	-	

İŞ DENEYİMLERİ

Yıl	**Kurum**	**Görevi**
2018	**Mirsa Gayrimenkul Değerleme A.Ş.**	**İnşaat Mühendisi**
2020	**Milli Eğitim Bakanlığı**	**Teknolojisi/Yapı Dekorasyon Öğretemenliği**
2023	**Plaza Peyzaj - Plaza Peyzaj Tem. İns. Kayn. Tesis Yönetimi San. Ve Tic. A.Ş.**	**Ziraat Bankası Dış Kaynak-Müşteri Temsilcisi**