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AN APPROACH TO THE IMPLEMENTATION OF THE LAW NO 6306 OF RISKY STRUCTURES AND IZMIR SAMPLE

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ABSTRACT

The main theme of Implementation Regulation of the Law of Transformation of Areas under the Disaster Risks (Law no: 6306) is risky structures that find widespread application in all settlements of the country, especially in Istanbul, Ankara and İzmir. Therefore, the basic argument of the law is understood to be the removal of the earthquake risk primarily from unsecured buildings. However, it is thought that this approach basically creates a number of problematic points. The risky building transformation can lead to the continuation of the current plan conditions, the missed opportunity to approach international urban planning standards, and the delay in reorganizing social facilities areas.

In this article, an inventory of the risky construction works carried out throughout Turkey is tried to be put forward and the risky structure analysis in İzmir province is taken into consideration. Since the risky building process is continuing, the study area of this article has been privatized for a period of 3 years based on the interval between May 2012 and May 2015, when the first risky building requests started. In this context, it has been tried to put forth the arguments about the classification of the 4.708 structures whether risky or not in order to create a picture with complete frame.

Keywords: *Risky structure; law 6306; urban transformation; Izmir*

I. INTRODUCTION

Transformation includes the change in areas of physical, functional, social, economic, ecological or worn-out areas, including land use in geographical area, in order to relate areas to the city [1]. The fact that the urban transformation process takes place in the area and along large settlements means that the architectural thinking, the engineering parameters and the environmental influences are brought together to create a healthier city vision. On the contrary, it is known that a single structure-based transformation approach is acted upon by the fact that it forms the body of Law No. 6306, and a method is built on the relation of strength. Urban transformation in Turkey; the structures in existing built environments are destroyed and new structures are made in accordance with the 2007 Earthquake Regulation due to the fact that natural disasters play a dominant role [2]. Naturally, it is inevitable that the majority of structures built according to the provisions of the previous regulation before the provisions of the 2007 Earthquake Regulations are risky structures in a possible analysis.

II. METHOD & MATERIAL

Risky structure according to the implementation directive of Law No. 6306; refers to the buildings which are located within or outside the risk zone and which are determined on the basis of scientific and technological evidence that they have completed their economic life or are at risk of collapse or serious damage [3]. The buildings that complete their economic life are taken under the scope of this law, even if they are in or outside disaster areas [4].

For the determination of risky structures, compression and tensile tests are carried out by the institutions licensed by the Ministry of Environment and Urbanization, and subjected to analysis with the aid of various engineering programs.

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As a result of these analyzes, the owners or deputies apply to the relevant public institution with the documents of the results of the tests. The "building identification number" is assigned to each building that is subject to the application for risk determination. The 'Risky Building Detection Report Review Form' prepared by the Ministry of Environment and Urbanization and having the building identification number at the beginning, constitutes the record of the subjected building (Figure 1).

T.C. ÇEVRE VE ŞEHİRCİLİK BAKANLIĞI	**RİSKLİ YAPILARIN TESPİT EDİLMESİNE İLİŞKİN ESASLARA GÖRE RİSKLİ BİNA TESPİT RAPORU İNCELEME FORMU (BETONARME BİNALAR)**	**Yapı Kimlik Numarası**

FORMU KONTROL EDEN İDARE	**CSB İSTANBUL İL MÜDÜRLÜĞÜ**

1. GENEL BİLGİLER

Tespiti Yaptıran Malikin Adı, Soyadı	Malik TC Kimlik Numarası:	Toplam Konut Birim Adedi:	12	Binanın Yapım Yılı:	1976
Binanın/Sitenin Adı - Adresi (İlçe - İl / Belediyesi): KADIKÖY - İSTANBUL / KADIKÖY BELEDİYESİ		Toplam İşyeri Birim Adedi:	0	Parsel No:	148
		Toplam Birim Adedi:	12	Ada No:	864
Binanın Coğrafi Bilgileri (DD Dakika-ondalık): Enlem: 0 Boylam: 0		Blok Adı:	-	Pafta No:	112
İncelemeyi Yapan Lisanslı Kuruluş, Lisans Belge Numarası ve İnceleme Tarihi			Ulusal Adres Veri Tabanı Bina Kodu:		

2. MEVCUT TAŞIYICI SİSTEM BİLGİLERİ

Bina Boyutları (Yaklaşık)(m)	23,19x12,94	Kat Adedi	5	Ortalama Kat Yüksekliği (m)	2,66
Binanın Yüksekliği	13,3	Taşıyıcı Sistem Tipi	ÇERÇEVE	Döşeme Sistem Tipi	KİRİŞLİ
Kritik Katın Yeri (Mimari Katı)	ZEMİN	Kritik Kat Alanı (m²)	269,99	Toplam Yapı Alanı (m²)	1370,91

3. BİNADAN BİLGİ TOPLAMA

Deprem Bölgesi	1	Seçilen Bilgi Düzeyi	ASGARİ	Binanın Projesi	YOK
Mevcut Beton Dayanımı (MPa)	5,82	Mevcut Donatı Tipi	S220	Donatı Korozyonu Var mı?	VAR
Alınan Toplam Karot Sayısı Kaçtır?	5	Düşey Eleman Düzensizliği Var mı?	YOK	Binada Çıkma Var mı?	VAR
Dolgu Duvar Etkisi Deprem Kuvveti Hesabında Dikkate Alındı mı? (RBTE Madde3.5.2.)	HAYIR	Kolonlarda Sargı Koşulu (RBTE Tablo2-Tablo3) Sağlıyor mu?	HAYIR	Zemin Sınıfı Nedir?	Z2

4. MEVCUT DURUM PERFORMANS ANALİZ SONUÇLARI

Kritik Kattaki Perde ve Kolon Eksenel Gerilme Ortalaması Nedir? (MPa)	4,2411	Kritik Katta Riskli Elemanların Kesme Kuvvetlerinin Kat Kesme Kuvvetine Oranı Nedir?	1	
Perdelerin Tabanında Elde Edilen Kesme Kuvveti Toplamının, Binanın Tümü İçin Elde Edilen Taban Kesme Kuvvetine Oranı	0	Kritik Kattaki En Büyük "(m)" Değeri En Büyük Öteleme Oranı "(8/h)"	(m) 441,928	(8/h) 0,0432
Binanın Periyodu (sn) Nedir?	1,95	Katlar İçerisinde Hesaplanan En Büyük Kat Öteleme Oranı "(8/h)"	0,0432	
Hesaplamada Kullanılan Programın Adı ve Sürüm Numarası	STA4CAD V13.1	En Büyük Kat Öteleme Oranı Hangi Katta Oluşmuştur? (Mimari Katı)	ZEMİN	

5.SONUÇ **BİNA RİSKLİ** (*** RBTY'ye göre **riskli bulunmayan** binalarda DBYBHY 7.7.3'te belirtilen **can güvenliği** performans düzeyinin sağlandığı sonucu çıkarılamaz.)

Açıklamalar :
BİNA RBTE'YE GÖRE RİSKLİDİR.

Değerlendirme Formunu Oluşturan Yetkili Kuruluş MÜH.İNŞ.SAN.VE TİC.LTD.ŞTİ. **Yetkili Mühendis (isim, imza, tarih)**	**Değerlendirme Formunu inceleyen** İSTANBUL İL MÜDÜRLÜĞÜ

Figure 1: Risky building detection report review form

The form contains general structure information, current load bearing system information, information collected from the building, performance analysis of the current situation and results section. Details of these headings include:

- According to the carcass structure of the building; Reinforced concrete, masonry, steel, etc.
- Code information in the data base of the national address where the building owner's name, building address, block, plot, layout, latitude and longitude (geographical coordinates), residential independent units, workplace independent units, total independent units
- The year of construction, the number and function of independent sections,
- Dimensions of the building (approximate), average floor height, building height, load bearing system type, floor system type, critical floor location, critical floor area, total building area information,

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- Load-bearing system type and floor system,
- Earthquake zone, existing concrete strength, existing reinforcement type, reinforcement corrosion, total number of core samples, vertical element irregularity, reflection of the infill wall effect to earthquake force calculations and soil class data

Analyzes are included:

- Shear wall and column axial tensile averages at the critical floor (MPa),
- The ratio of the shear forces of the risky constructional components to the floor,
- The ratio of the sum of the shear forces found at the bottom of the shear-walls to base shear force
- The largest value and the largest displacement rate in the critical floor (8/h),
- The period of the building (sec),
- The maximum rate of floor displacement calculated in the floors (8/h),
- The name and version number of the program used in the calculation, Floor analysis results of the largest floor displacement ratio.

As a result of the evaluation of the institution concerned with the application made based on all these data and analyzes, "building risky" or "building risk free" is determined. The applicant and Directorate of Land Registry are provided with the obtained information [5].

III. RISKY STRUCTURE ANALYSES IN TURKEY

The peculiar conditions of the cities of Turkey require the development of collective renewal methods for a long time. However, neither the reduction of the disaster risks nor the right method and path for successful collective renewal applications are followed with the new regulations introduced [6]. The risky building applications that started in the middle of 2012 accelerated with the approach that the transformation is reduced to the destruction of single structure in particular and as of 2017 more than one hundred thousand buildings are evaluated as risky structure and demolition process is realized. Figure 2 shows the distribution of the number of risky structures in all the provinces in Turkey. Istanbul represents almost half of the whole country with 49%. In İzmir this ratio is 9% and 8% in Ankara.

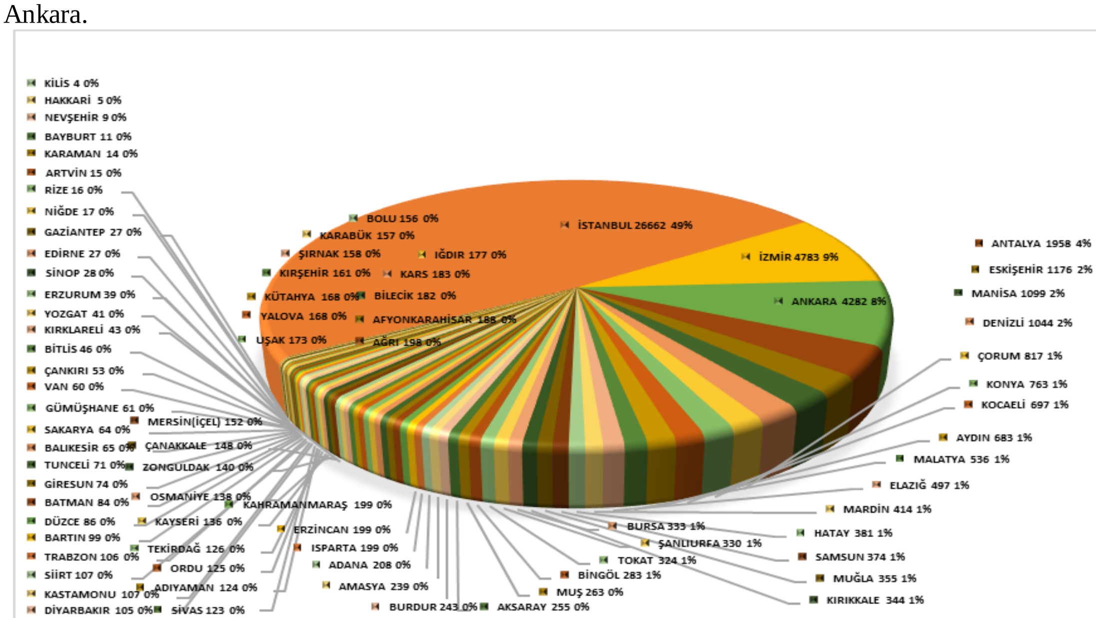

Figure 2: Number of risky buildings and percentage distribution in Turkey

In Table 1, Istanbul is the city with the highest risk structure analysis in Turkey with 26,793 buildings. As a result of the analysis of the buildings submitted to the applicant in the context of the current earthquake regulations, 99.51% of the "risky" results came out [7].

Table 1: Cities with the highest risky building analyses

City	Building	Not Risky	Risky	Percentage
Istanbul	26.793	131	26.662	%99,51
Izmir	4.809	26	4.783	%99,46
Ankara	4.312	30	4.282	%99,30
Antalya	1.971	13	1.958	%99,34
Eskisehir	1.182	6	1.176	%99,50
Manisa	1.100	1	1.099	%99,99
Denizli	1.048	4	1.044	%99,62
Corum	820	3	817	%99,63
Konya	764	1	763	%99,87
Kocaeli	697	0	697	%100,00
Total	55.002	268	54.734	%99,52

The highest risky building analyses are made in İzmir and Ankara after Istanbul. As a result of the application of risky buildings in these two large cities, a risk ratio of more than 99% is achieved. As of May 2015, only 268 of the 55,002 buildings on which risk analysis has been carried out throughout Turkey are in the risk-free group, which is even below 1%. These results of the structures which are passed from the risk analysis insufficient in terms of strength point to two important points. Firstly, almost all of the structures called risky are very weak in terms of strength. Secondly, the assessment of risky structure analysis in light of the provisions of the current regulation is a collective approach, and even the single storey structures contain question marks as to the necessity of immediate demolition because it is impossible to meet the provisions of the regulation. When viewed as a bureaucratic and legally compliant set of rules, the work actually done is suitable for all rules, but the result is far from desirable because it is not really adopted [8].

IV. RISKY STRUCTURE ANALYSES IN IZMIR

It is determined that only 26 of the 4,809 buildings that have undergone risk analysis in İzmir, which has made the most applications for risky building application after Istanbul, are included in risk-free building class.

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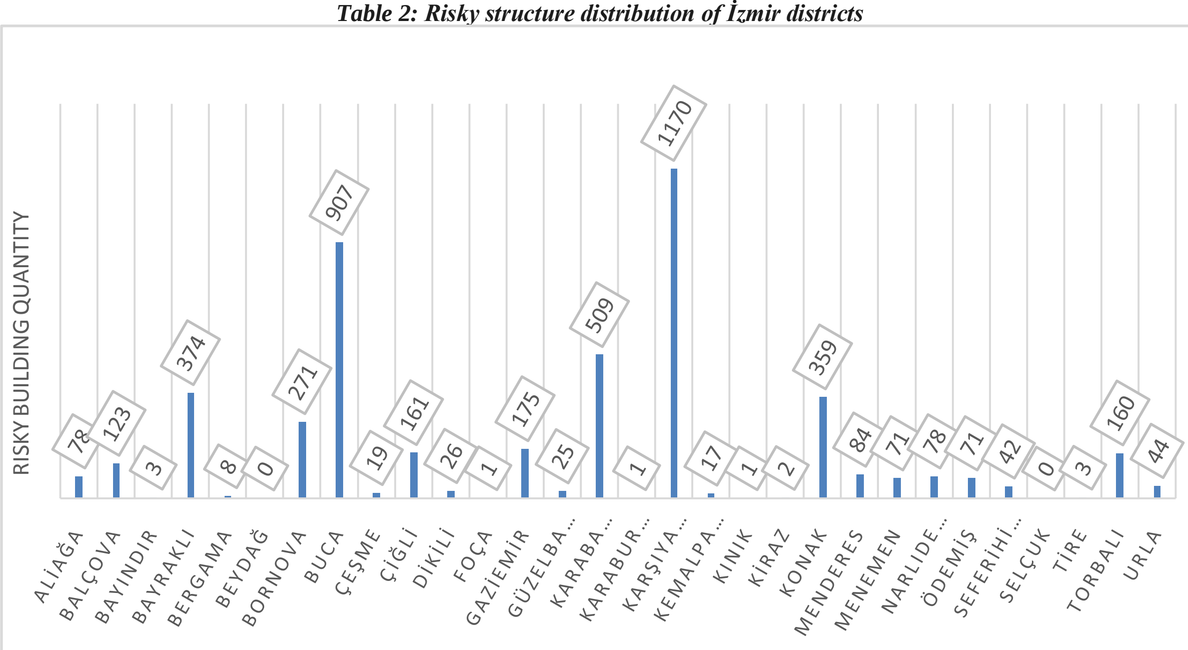
Table 2: Risky structure distribution of İzmir districts



The provinces with the highest risks identified in İzmir are Karsiyaka (1170), Buca (907), Bayrakli (374) and Karabaglar (359) (as of May 2015) (Table 2). Among the 4,809 structures, 24 of the buildings which are classified as risky are constructed after 2007. These constructions, which were built after the enforcement of the provisions of the current earthquake regulations in 2007, are reinforced concrete (5), masonry (14), and wooden + mudbrick (5). 24 of the structures built after 2007 did not meet the 2007 earthquake regulations standards, which are still up to date. However, this means that the projects of these risky buildings have not been made within the scope of the regulation provisions, or engineering services have been taken inadequately during construction.

2866 of the 4783 risky structures (60%) are 1-storey and 2-storey buildings which are considered as low-rise buildings. In analysis based on horizontal loads such as earthquakes, the low level means that the lateral load of the earthquake is less effective on the building. In this context, 2,283 of these 2,866 buildings (80%) are composed of masonry and wooden + mud brick buildings. According to the 2007 earthquake regulations, with the approach of an analysis as a safe-only product, it can be pointed out that some qualified masonry and wooden structures may have been destroyed by being placed in the class of risky buildings in the direction of this understanding.

The districts in which 26 structures without risk are located, the years of construction, types of floor systems and the number of floors are shown in Table 3. It is seen that the constructions are in a wide range from 1940 to 1995. Among the 26-risk-free building, 7 are reinforced concrete, 16 are masonry and 3 are wood + mudbrick. A four-storey reinforced concrete structure in the Turabi district of Seferihisar, which was built in 1940, has been approved after the control by İzmir Provincial Directorate of Environment and Urbanism. Thus, the conclusion of an analytical approach in the context of the current earthquake regulations, which is the main idea of this study, can be regarded as a supporting precedent.

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Table 3. Risk-free structures according to analyzes

No	District	Year of built	Load-bearing system	Storey
1	Seferihisar	1995	Masonry	1
2	Dikili	1985	Masonry	1
3	Gaziemir	1981	Masonry	1
4	Bornova	1991	Masonry	1
5	Buca	1981	Masonry	1
6	Karşıyaka	1985	Masonry	2
7	Karşıyaka	1988	Masonry	5
8	Buca	1970	Masonry	4
9	Karabağlar	1980	Reinforced concrete	6
10	Bayraklı	1991	Masonry	1
11	Karşıyaka	1985	Wood + mudbrick	1
12	Karşıyaka	1975	Masonry	1
13	Balçova	1983	Masonry	2
14	Karşıyaka	1975	Wood + mudbrick	1
15	Karabağlar	1984	Masonry	2
16	Buca	1966	Reinforced concrete	2
17	Torbalı	1975	Masonry	1
18	Gaziemir	1965	Reinforced concrete	5
19	Seferihisar	1940	Reinforced concrete	4
20	Seferihisar	1965	Reinforced concrete	1
21	Menderes	1960	Masonry	1
22	Balçova	1966	Reinforced concrete	2
23	Buca	1977	Masonry	1
24	Buca	1985	Masonry	5
25	Ödemiş	1967	Reinforced concrete	1
26	Aliağa	1975	Wood + mudbrick	1

V. RESULTS

Since 2012 when the law numbered 6306 was applied, locomotive concept has become a risky structure studies. With risky building studies, it is aimed to demolish weak and insecure structures in terms of earthquake and to construct safe buildings within the framework of similar zoning criteria to guarantee safety of life and property. As a result of the analysis of 55,002 buildings in Turkey, only 268 (0.48%) are found to be in the risk-free structure class (as of May 2015). In this frame, according to the risky building criteria drawn by the Ministry of Environment and Urbanization, almost all of the buildings subjected to risk analysis have inadequate cross-sections under static and dynamic loads. It is thought that the study of a risky structure with the paradigm of safe-side-only in the light of current earthquake regulations is considered to be an incomplete approach although it is not wrong. It is necessary to study the risky structure approach considering the provisions of the regulations in the conditions of the period when the risky structure is built, especially the low-rise reinforced concrete and masonry structures of which analysis is carried out, instead of only recording the "risky" record in the title deed registry under the provisions of contemporary earthquake regulations.

VI. CONCLUSION

In this study in which the sample of İzmir is handled, only 26 of the 4.873 risk-tested buildings are identified as risk-free. It is seen that the majority of 2.866 buildings are composed of masonry and low-rise buildings (1-2 storey). Making an assessment, particularly in low-rise buildings subject to the risky building analysis on the basis of their construction years without ignoring the provisions of the regulations in force at that time, is thought to be more accurate from the point of earthquake engineering approach that captures the spirit of time.

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