APPLICATION PROBLEMS OF THE REPAIR AND SEISMIC RETROFIT PROCUREMENTS AND SOLUTION PROPOSALS

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To my wife

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ABSTRACT

APPLICATION PROBLEMS OF THE REPAIR AND SEISMIC RETROFIT PROCUREMENTS AND SOLUTION PROPOSALS

This thesis presents an analysis and findings of the problems of retrofitting procurement by means of literature survey and publications provided by the Public Procurement Authority (PPA) of Turkey that covers all demand for review of complaints, procurement statistics, procurement notices of the government procurement auctions for the years 2012 and 2013. To analyze the problems in the procurement process, calculating of the estimated costs, qualification rules, evaluation of tenders considering the abnormally low tenders, technical specifications and legislations, reviewing the complaints mechanism, and the type of procurements are identified. For the purpose of revealing the deficiencies of existing technical guidelines used for retrofitting procurements, Eurocode and ASCI 41 were analyzed. Thus, Public Procurement Board decisions were surveyed considering the research topics of thesis. Aforementioned decisions help to determine problems. Moreover, the conclusion part of this thesis has several determinations and recommendations to enhance the public procurement legislation.

ÖZET

ONARIM VE SİSMİK GÜÇLENDİRME İHALELERİ UYGULAMALARINDA KARŞILAŞILAN SORUNLAR VE ÇÖZÜM ÖNERİLERİ

Bu tez çalışması, güçlendirme ihalelerinde karşılaşılan sorunlara ilişkin tespitlerde bulunmakta ve karşılaşılan sorunları analiz etmektedir. Bu analizi yaparken Kamu İhale Kurumu tarafından 2012 ve 2013 yıllarına ilişkin yayımlanan ihale ilanları, ihale istatistikleri ve itirazen şikâyet bilgilerinden yararlanılmıştır. İhale sürecinde karşılaşılan sorunları incelemek için yaklaşık maliyet hesabı, yeterlik kuralları, yaklaşık maliyet kavramı çerçevesinde tekliflerin değerlendirilmesi, teknik şartnameler ve yönetmelikler, itirazen şikayet mekanizması ve ihale türleri üzerinde durulmuştur. Mevcut onarım ve güçlendirme teknik kılavuzlarının eksik yanlarının tespiti amacıyla Eurocode ve ASCI 41 incelenmiştir. Ayrıca, tez konu başlıkları da göz önünde bulundurularak Kamu İhale Kurulu kararlarına yer verilmiştir. Bahse konu kararlar, sorunların ortaya koyulmasına yardımcı olmaktadır. Tezin sonuç kısmında Kamu İhale Mevzuatının geliştirilmesi için bazı saptalamalar ve öneriler yer almaktadır.

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LIST OF SYMBOLS

C	Ratio for limiting value
K	Constant as a function of C
T	Average value of tenders
σ	Standard deviation of tenders

LIST OF ACRONYMS/ABBREVIATIONS

PPL	Public Procurement Law
PPA	Public Procurement Authority
PPC	Public Procurement Court
TEC	Specification for Buildings to be Built in Seismic Regions
EU	European Union
EFTA	The European Free Trade Association
ALT	Abnormally Low Tender
BCA	Benefit - Cost Analysis
BCR	Benefit/Cost Ratio
ASCI	American Standard Code for Information Interchange
ISMEP	İstanbul Seismic Risk Mitigation and Emergency Preparedness
IPCU	Istanbul Project Coordination Unit
ISPA	İstanbul Special Provincial Administration
EAB	The Earthquake Advisory Board
AFAD	Disaster and Emergency Management Presidency of Turkey
IKN	Procurement Registration Number
NESAP	National Earthquake Strategy and Action Plan
CC	Cooperation and Coordination
LA	Legislation Arrangement
CE	Capacity Enhancement

1. INTRODUCTION

1.1. General

The retrofit of building is important to increase the buildings useful life to more than 50 additional years while achieving the safety levels of a newly constructed building. In the last 15 years, there has been an evolution of the seismic criteria in Turkey, so for example, the buildings existing paraseismic cross-bracking did not meet current requirements [1]. In parallel to this evolution, “Turkish Specification for Structures To Be Built in Disaster Areas”, issued on 1997. With a few amendments, this law was in effect until 2007. In 2007 a new specification, namely “Specification for Buildings to be Built in Seismic Zones” was issued on 6.3.2007 and amended on 3.5.2007.

Not only the technical specifications but also Procurement Law of Turkey have changed. Retrofitting projects of public buildings are required to obey Public Procurement Law (PPL) numbered 4734 which has become effective instead of state tender law. Aforementioned law establishes the principles and procedures to be applied in any procurement held by public authorities. In the light of procurement notices which are published on the website of Public Procurement Authority (PPA), it can be said that retrofitting projects are divided into two parts which are the preparing retrofitting projects and applying retrofitting projects. Seismic evaluation of buildings, preparation of retrofitting projects and metric lists, calculation of estimated cost, and preparation of tender documents are within the scope of Regulation on the Implementation of Services Procurement. Retrofitting contructions which is the second phase of retrofitting procedure, are obliged to comply with Regulation on the Implementation of Works Procurement.

1.2. Objective and Scope of Thesis

Seismic retrofitting is the strengthening of the undamaged elements of a structure to make them more resistant to seismic activity. The strength of a building may be reduced because of an improper retrofitting. In addition to this, an unconscious retrofitting may cause public loss. Not only the engineering aspects but also the procurement method of retrofitting is important to eliminate aforementioned results in a retrofitting project. A poorly designed retrofitting procurements may cause significant problems such as fulfilment of needs with delay and inappropriately, inefficient use of sources, waste of public fundings and time, insufficient retrofitting of public buildings, and to face with criminal sanctions.

As a result of a comprehensive literature survey, it was concluded that there is no study which analyzes the procurement process of seismic retrofitting of public buildings despite of the fact that there are many studies about the technical aspects of retrofitting of buildings.

Showing the characteristic aspects of retrofitting projects and common problems of procurement of services and works will give ideas to improve the procurement legislation considering the retrofitting procurements.

For this purpose, this thesis concentrates on the basic problems of retrofitting procurements within the scope of public procurement law and secondary legislations. Moreover, it states some recommendations to contribute current procurement legislation.

2. CURRENT SITUATION OF PUBLIC BUILDINGS

Turkey is one of the most seismically active regions in the world. Almost two thirds of the country is located on active fault zones where 70% of the population live. Average annual number of earthquakes equal or greater than a magnitude of 5.5 on the Richter scale is 0.76. With this frequency, Turkey rates 6th in the World [2].

Considering the earthquake reality of Turkey, it is required to determine the seismic risk of public buildings to prevent destructive effects of earthquakes. İlki and Alper (2009) think that there should be an inventory data bank of buildings for each village, town and city. According to them, the data bank should contain information about the owner(s), size, construction materials, structural system, occupancy type, design drawings, city planning alternations, zoning, seismic history, etc. Such information should be available to researchers and/or administrators upon request. It is a serious problem for Turkey that more than fity percent of buildings do possess neither a contruction permit nor an occupancy certificate. The design drawings are either not registered at the municipal authorities or do not reflect the real contruction conditions [3].

Following the two major earthquakes that struck the northwestern part of Turkey in 1999, several attempts have been taken at hospitals, schools or administrative buildings [4]. Despite of the great earthquake risk, there are no comprehensive studies on building inventory.

The most extensive study on public buildings inventory was performed in 2005 by the General Directorate of Construction, Ministry of Development and Housing. Results are tabulated below [46]:

Table 2.1. Inventory of public buildings in 1st and 2nd degree earthquake zone.

	Type of Building	**Total Number of Building (item)**		**Total Building Area (m^2)**	
		Reinforced Concrete	**Masonry Buildings**	**Reinforced Concrete**	**Masonry Buildings**
First and Second Degree Earthquake Zone	School	16315	6422	25907977	3121907
	Hospital	3931	2709	6272842	1334290
	Others	16038	8725	21409780	3671940

	Total	36264	17856	53590599	7924009

Table 2.2. Inventory of public buildings in 3rd and 4th degree earthquake zone.

	Type of Building	Total Number of Building (item)		Total Building Area (m^2)	
		Reinforced Concrete	Masonry Buildings	Reinforced Concrete	Masonry Buildings
Third and Fourth Degree Earthquake Zone	School	6339	3356	10313467	1486531
	Hospital	1623	1240	2599960	651670
	Others	6683	4141	8606526	1441077
	Total	14645	8737	21620013	3783406

As it can be seen above and below tables, there are 36264 reinforced concrete public buildings and 7856 masonry buildings which are located in the first or second degree earthquake zone. On the other hand, 14645reinforced concrete public buildings and 8737 masonry buildings are located in the first or second degree earthquake zone.

Table 2.3. Total inventory of public buildings.

	Type of Building	Total Number Of Building (item)		Total Building Area (m^2)	
		Reinforced Concrete	Masonry Buildings	Reinforced Concrete	Masonry Buildings
Total	School	22654	9778	36221444	4608438
	Hospital	5554	3949	8872802	1985960
	Others	22721	12866	30016366	5113017
	Total	50929	26583	75210612	11707415

Table 2.4. Current activities in 1st and 2nd degree earthquake zone.

First and Second	Type of Building	Inspection and Safety Assessment Performed	Retrofit Project Completed	Retrofit Completed and Continues

Degree Earthquake Zone		Number of Buildings (item)	Total Area (m^2)	Number of Buildings (item)	Total Area (m^2)	Number of Buildings (item)	Total Area (m^2)
	School	4911	5670146	508	1270882	262	502445
	Hospital	1340	1730462	54	180010	55	177482
	Others	3804	5872757	501	1213552	431	1014830
	Total	10055	13273365	1,063	2664444	748	1694757

Table 2.5. Current activities in 3rd and 4th degree earthquake zone.

Third and Fourth Degree Earthquake Zone	Type of Building	Inspection and Safety Assessment Performed		Retrofit Project Completed		Retrofit Completed and Continues	
		Number of Buildings (item)	Total Area (m^2)	Number of Buildings (item)	Total Area (m^2)	Number of Buildings (item)	Total Area (m^2)
	School	2028	2140113	14	22041	14	22041
	Hospital	863	1038076	2	3548	0	0
	Others	4338	3911175	3	8118	2	11500
	Total	7249	7069364	19	33707	16	33541

Table 2.6. Current activities in total.

Total	Type of Building	Inspection and Safety Assessment Performed		Retrofit Project Completed		Retrofit Completed and Continues	
		Number of Buildings (item)	Total Area (m^2)	Number of Buildings (item)	Total Area (m^2)	Number of Buildings (item)	Total Area (m^2)
	School	6939	7810529	522	1292923	276	524486
	Hospital	2223	2768538	56	183558	55	177482
	Others	8142	9783932	504	1221670	433	1026330
	Total	17304	20362729	1,082	2696151	764	1728296

Table 2.6. shows that the inspection and safety assessment of 17304 buildings which have 20362729 m^2 area was performed. Moreover, the retrofit projects of 1082 buildings were prepared and retrofitting of 764 buildings were completed and it continues.

Another important precaution against earthquakes is the project called as ISMEP. According to the given information on the website of project, in order to prepare Istanbul for a probable earthquake the Republic of Turkey and the International Bank for Reconstruction and Development signed the İstanbul Seismic Risk Mitigation and Emergency Preparedness (ISMEP) Loan Agreement with an amount of 310 Million Euro on October 18, 2005. Aforementioned agreement became effective as of February 3, 2006. Istanbul Project Coordination Unit (IPCU) was established within the İstanbul Special Provincial Administration (ISPA) for the implementation and supervision of the overall Project [5].

The overall objective of ISMEP project was explained in the "Environmental Management Plan" prepared by Erer and Salihoğlu (2010). They clarified the objective of project which is to assist the Government of Turkey in mitigating the seismic risk in Istanbul and to further strengthen the capacity for emergency preparedness in order to save lives and reduce social, economic and financial impacts in the event of future earthquakes. The project basically has three components:

- Strengthening the institutional and technical capacity for disaster management and emergency response,
- Seismic retrofitting of critical public facilities for higher earthquake resistance,
- Developing a program aimed to reduce vulnerabilities of residential buildings [6].

The second component of project is named as Component B Seismic Risk Mitigation for Priority Public Facilities. Component B supports:

- Retrofitting or reconstruction of priority public facilities, for example hospitals, clinics, schools, administrative buildings, student dormitories, social service facilities,
- National Disaster Activities,
- Preparing an inventory of cultural heritage buildings under the jurisdiction of Ministry of Culture and Tourism and seismic risk assessment of these cultural heritage buildings,
- Analyzing the current land management policies and instruments for identification of the different models and methods required for mitigating earthquake risks on public buildings with improved management and generation of new financial resources. [6]

Table 2.7. Current situation of ISMEP.

Buildings	School	Hospital	Public Service Building	Dormitory
Retrofitting-Completed	503	3	1	15
Retrofitting-Continues	38	2	4	0
Reconstruction-Completed	130	53	18	2

Reconstruction-Continues	46	18	2	1

Table 2.7. shows the current situation of ISMEP project within the scope of component B. According to the above table, retrofitting of 522 public buildings was performed [5].

A further action about the retrofitting of public buildings was conducted by The Earthquake Advisory Board (EAB), part of the Disaster and Emergency Management Presidency of Turkey (AFAD).

EAB resolved in 2010 to launch an "Earthquake Strategy Development Exercise" with the scope of identifying activities that must be undertaken to create the policies and establish priorities for protection from earthquakes and reduce their detrimental effects, suggest policies to be followed in the post-earthquake phase and earthquake-related research. After this procedure, "National Earthquake Strategy and Action Plan" has been prepared as the first step so as to empower a society that is well prepared and resilient for reduction of the seismic risk and capable of coping well in the face of earthquakes. The main purpose of the Plan is to constitute new earthquake-resistant, safe, well prepared and sustainable settlements so that physical, economic, social, environmental and political harms and losses that may be engendered by earthquakes are prevented, or their effects reduced [7].

Earthquake safe settlement and construction is one of the thematic groups of National Earthquake Strategy and Action Plan. According to this plan, there are some assignments to public corporations and universities. Additionally, the types of action have been considered under four main headings as Cooperation and Coordination (CC), Legislation Arrangement (LA), Institutional Structuring (IS) and Capacity Enhancement (CE). Their abbreviations have been introduced into the strategy and action plan tables [7]. In preparation of NESAP-2023 the fundamental principle has been agreed that these actions are permanent tasks for the designated agencies. Distributions of roles and assignments of corporations are shown below:

"Action B.1.1.1. Development Agencies shall take into account earthquake hazards and risks within their domains, and conduct their activities such that these risks will not be increased, or actually reduced."

Table 2.8. Action B.1.1.1.

Responsible Organisation	**Associated Organisation**	**Realization Period**	**Action Type**
Ministry of Development	Ministry of Environment and Urbanization, Development Agencies, AFAD, Municipalities, Governorates, Provincial Special	2012-2017	CE CC

	Administrations		

Table 2.9. Action B.1.1.2.

Responsible Organisation	Associated Organisation	Realization Period	Action Type
Ministry of Interior	Ministry of Environment and Urbanization, Development Agencies, AFAD, Ministry of Development, Municipalities, Provincial Special Administrations	2012-2017	CE CC

"Action B.1.1.2. Prior to preparation of provincial development and environmental arrangement plans Provincial Special Administrations shall determine the hazards and risks in the province, developing strategy plans for their reduction ensuring that they are compatible with environmental and development plans."

"Action B.1.2.1. The building inventory in Turkey led by schools and hospitals shall be extracted and all existing buildings shall be grouped on the basis of their damageability and risk."

Table 2.10. Action B.1.2.1.

Responsible Organisation	Associated Organisation	Realization Period	Action Type
Ministry of Environment and Urbanization	TUİK, Development Agencies, AFAD, Governorates, Ministry of Development, TBB, General Directorate of Civil Registration and Nationality	2012-2017	CE CC

Table 2.11. Action B.1.2.2.

Responsible	Associated	Realization Period	Action Type

Organisation	Organisation		
AFAD	Governorates, Universities, Relevant Governmental Institutions, Professional Chambers, Municipalities	2012-2017	CC

"Action B.1.2.2. With precedence placed on schools and hospitals the vulnerability of existing buildings shall be determined and the relevant technology put on a stable basis."

Table 2.12. Action B.1.2.3.

Responsible Organisation	Associated Organisation	Realization Period	Action Type
AFAD	Relevant Ministries, Governorates, Universities, Relevant Governmental Institutions, Municipalities, Professional Chambers	2012-2017	CC CE

"Action B.1.2.3. With priority placed on schools and hospitals seismic risk grouping for existing buildings shall be completed."

Table 2.13. Action B.1.2.4.

Responsible Organisation	Associated Organisation	Realization Period	Action Type
Ministry of National Education	YÖK, Relevant Governmental Institutions, Governorates, Universities, Private Sector, Municipalities	2012-2017	CC CE

"Action B.1.2.4. Priority shall be placed on retrofitting educational facilities and ongoing work shall be accelerated."

Table 2.14. Action B.1.5.1.

Responsible Organisation	Associated Organisation	Realization Period	Action Type
AFAD	Ministry of Environment and Urbanization,	2012-2023	CC, CE, LA

	Universities, All Related Institutions, Professional Chambers		

"Action B.1.5.1. The current seismic design code shall be updated and revised in keeping with Eurocode 8."

"Strategy B.1.6. Methods shall be developed, standardized and implemented for seismic safety assessment and building retrofit based on Turkish construction technology practices for bridges, viaducts and transportation networks as well as buried or surficial lifeline distribution systems (pipelines, natural gas lines, electric power networks and communication systems, etc.)."

Table 2.15. Action B.1.6.1.

Responsible Organisation	**Associated Organisation**	**Realization Period**	**Action Type**
Ministry of Transport, Maritime and Communication	Universities, TUBİTAK, Ministry of Development, Ministry of Environment and Urbanization, Ministry of Energy and Natural Sources, AFAD, All Relevant Institutions	2012-2013	CC, CE, LA

3. LEGISLATIVE FRAMEWORK

3.1. General

Similar to other developing countries, the public sector in Turkey is the biggest employer in the country, and public expenditures constitute a crucial part of the country's economic activities. The public procurement system therefore must be effective in creating impartial rivalry conditions to provide better quality goods and services and to eliminate waste [8]. In Turkey, public contruction works and also seismic retrofitting of public buildings are conducted within the scope of Public Procurement Law (PPL) numbered 4734.

3.2. Public Procurement Law in Turkey

The public procurement has an important role for the economies. The statictics show that the government spends around 12-15% of GDP to buy goods, services and construction works [9].

According to the PPL, "*Procurement means the proceedings which involve the award of a goods, services or works contract to the tenderer selected in accordance with the procedures and conditions laid down in this Law, and which is completed by signing of the contract following the approval of the contracting officer."* [10].

Arrowsmith, Linarelli and Wallace (2000) said that procurement refers to the situation where a public body obtains the goods and services that it needs by making a contract with another entity. Usually this will be a firm from the private sector (although public bodies sometimes enter into contractual arrangements to purchase from other public bodies or from state-owned companies). For example, a government department needing stationery will often choose to buy this from one of the many firms in the private sector that sell stationery- that is, to enter into a procurement contract [11].

The purpose of Public Procurement Law is defined in Article 1 as to establish the principles and procedures to be applied in any procurement held by public authorities and institutions governed by public law or under public control or using public funds [10].

Due to diversity of living situations, legislation cannot establish norms for each legal situation; hence knowledge of public procurement basic principles is very important. It is necessary to understand legal regulations through certain principles guiding the contracting authority in its decision-making, and the tenderer in the assessment of its rights in public procurement procedures. In the area of public procurement as well, it is considered that, in addition to public procurement specific principles, principles having become common value

criteria of our civilization and covering the whole legal system are to be taken into consideration [12].

The basic principles are specified in Article 5 of PPA 4734, as follows:

- Transparency,
- Competition,
- Equal treatment,
- Reliability,
- Confidentiality,
- Public supervision,
- Fulfilment of needs appropriately and promptly,
- Efficient use of resources,
- Unless there is an acceptable natural connection between them purchase of goods, services and works cannot be consolidated in the same procurement.
- Procurement of goods, services or works cannot be divided into lots with the intention of avoiding threshold values.
- For the procurements to be held in accordance with this Law, the principal procurement methods are open and restricted procedures. The other methods may be used under the special conditions set out in the Law.
- The procurement proceedings shall not be initiated unless there is a sufficient budget allocation [10].

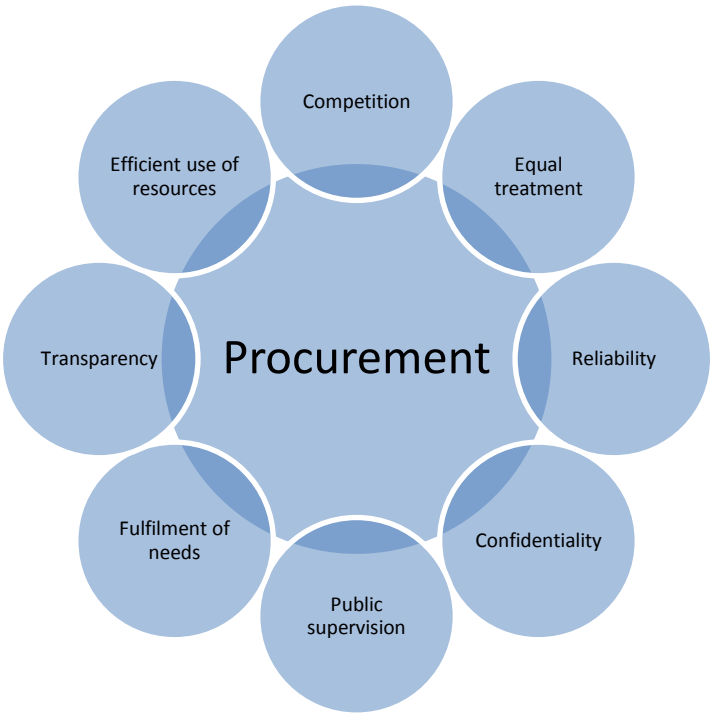

Figure 3.1. Basic principles of public procurement law 4734.

3.3. Public Procurement Authority

Along with public procurement reform in the legal framework, the regulatory structure of the public procurement sector has been significantly changed. Before the reform, there was no central public agency responsible for public procurement regulation. Public Procurement Authority (PPA), a financially and administratively autonomous regulatory body, was established by that law to regulate and monitor the national public procurement sector [13].

Public Procurement Law numbered 4734 and Public Procurement Contracts Law numbered 4735 present the main responsibilities of the PPA, which is the only authority for implementing the procurement procedures and regulations and gathering formation on all government procurement auctions in Turkey [14].

Some of the responsibilities and duties of Public Procurement Authority are as follows:

- To evaluate and conclude any complaints claiming that the proceedings carried out by contracting authority within the period from the commencement of the tender proceedings until the signing of the contract are in violation of this Law and the related legislative provisions,
- To prepare, develop and guide the implementation of all the legislation,
- To provide training on procurement legislation, to provide national and international coordination,

- To gather information as specified by the Authority relating to the contracts and tender proceedings carried out, to compile and publish statistics relating to quantity, price and other issues,
- To keep the records of those who are prohibited from participating in tenders,
- To carry out research and development activities,
- To regulate the principles and procedures with regard to tender notices, to publish Public Procurement Bulletin in printed or electronic media,
- In cases where it is established that domestic tenderers are prevented due to unfair reasons from participating in tender proceedings taking place in foreign countries, to take relevant measures in order to ensure that the tenderers of those countries are prevented from participating in the tenders held under the scope of this Law, and to furnish proposals to the Council of Ministers in order to ensure that the necessary arrangements are made,
- To prepare the annual budget, the final account and the annual activity reports of the Authority, to ensure the implementation of the Authority's budget, the collection of the revenues and the incurrence of the expenses [10].

In addition to the PPL, several pieces of secondary and tertiary legislation have been issued by the Public Procurement Authority – PPA (most recently in March 2009, after the adoption of the amendments to the PPL by Law 5812). These regulations contain detailed instructions for the conduct of procedures, together with standard tender and contract documents (the use of standard tender and contract documents is mandatory). The PPA also issues circulars and interpretative decisions. However, the standard contracts provide for the possible application of a price advantage in favour of domestic candidates, while the standard administration specifications for goods procurement leave it to the contracting authority to decide whether or not to open up competition to foreign tenderers under the thresholds [15].

3.4. Comparison of Law 2886 and Public Procurement Law 4734

Public Procurement Law was formed by considering the tender system in EU. The 2886 Law did not meet the improving conditions about tenders and also was not sufficient for deficiencies in practice. Karacan (2008) has compared on several main issues in order to have a general opinion about them and see their advantages and deficiencies [16].

- Contents of 4734 Law are not only content of 2886 Law but also public economic enterprises, social security institutions, funds, corporations constructed with special Laws and given public tasks and independent budgetinstitutions.

- In 4734 Law, so that contractors specified cost, they have to see the place and read thespecifications so bids could be more realistic than 2886 Law.
- The winner bid was the most appropriate bid which was specified according to notification announced every year. However due to 4734Law, the winner is the economically most advantageous bid whichprovides economic, financial, occupational and technical sufficiency
- According to 2886 Law, if unexpected conditions increased the contract price up to %30, contractor should finish the job with same conditions except for time. If contractor could prove that the increase was not due to his fault, amount of increase would be paid to him up to %30.
- In 4734 Law, due to the force major conditions, if there is a rise on contract price up to %10, the amount will be paid to the contractor in lump-sum tenders and up to %20 will be paid in unit price tenders.
- Minimum amount of work experience document was the %30 of conceptual cost of the bidder whereas in 4734 Law the minimum amount should not less than %50 but not more than %100 of conceptual cost of the bidder.
- There was no article about abnormally low tenders in 2886 Law. But in 4734 Law abnormally low tenders were arranged by a special phrase *"Before rejecting abnormally low tenders…"* [16].

3.5. Classification of Procurements

3.5.1. Procurement Types

In Article 4, the types of procurements defined as:

Goods means any kind of purchased necessaries, and movables and immovables, together with the rights thereof.

Services means such services as maintenance and repair, transportation, communication, insurance, research and development, accounting, market surveys and polls, consultancy, promoting, broadcasting and publication, cleaning, catering, meeting, organisation, exhibition, guarding and security, vocational training, photography, film, intellectual and fine arts, computer systems and software services, lease of movable and immovable properties and the rights thereof and other similar services.

Works means construction of buildings, roads, railways, highways, airports, docks, harbours, shipyards, bridges, tunnels, subways, viaducts, sports facilities, infrastructure, pipelines, communication and energy transmission lines, dams, power plants, refineries, irrigation facilities, soil reclamation, flood-prevention and pickling; and installation, manufacture, preparation of site materials, transportation, completion, large scale-repair, restoration, landscaping, drilling, demolition, reinforcing and assembly related with the works stated above and similar construction works [10].

3.5.2. Procurement Procedures

According to public procurement law, in procurement of works by contracting authorities, one of the following procedures shall be applied:

(i) Open procedure: This is a procurement procedure where all tenderers may submit their tenders**.**

(ii) Restricted procedure: Procurement of works may be conducted by restricted procedure where open procedure is not applicable as the nature of the subject necessitates speciality and/or high technology and in procurement of works where estimated costs exceed the half of threshold value.

(iii) Negotiated procedure: Negotiated procedure may be applied, where;

- No tender is submitted in open or restricted procedures,
- It is inevitable to conduct the tender procedures immediately, due to unexpected and unforeseen events such as natural disasters, epidemics, risk of losing lives or properties or events that could not be predicted by the contracting authority,
- It is inevitable to conduct the tender procedures immediately, due to occurrence of specific events relating to defence and security,
- The procurement is of a character requiring a research and development process, and not subject to mass production,
- Due to specific and complex characteristics of the works, goods or services to be procured, it is impossible to define the technical and financial aspects clearly [10].

3.5.3. Contract Types

There are 5 different contract types which are defined in Article 6 of Public Procurement Contracts Law numbered 4735. According to the Article 6, contracts shall be made in 5 main categories as stated below:

- In procurement of works; turn key lump-sum contracts shall be made over the total tender price for the entire work proposed by the tenderer on the basis of application projects and site lists thereof.

Contracts the lump sum contract is the most basic form of an agreement between an owner and contractor and is fairly easy to manage. For this kind of contract to be effective, the owner must have sufficiently detailed and complete drawings and specifications. The construction documents must be well defined at the time of the bid to allow the bidders to properly estimate the cost of labor and materials.

- In procurement of goods or services; lump-sum contracts shall be made over the total tender price proposed by the tenderer for the entire work, the detailed specifications and quantities of which are pre-determined by the contracting entity.
- Unit price contracts shall be made over the total price calculated by multiplying the quantity for each work of item specified in the schedule prepared by the contracting entity, with unit prices proposed by the tenderer for each corresponding work of item,on the basis of, preliminary or final projects and site lists thereof along with unit price definitions in procurement of works whereas on the basis of detailed specifications of the work involved in procurement of goods or services.

In addition to mentioned above contract types, there are two more contract types rarely used stated below:

- Mixed contract is applied if there is a requirement to apply lump sum turnkey and unit price together.
- Seperate contracts are signed withind the scope of framework agreement [47].

3.6. Procurement Steps

The auction procedure was summarized in 11 steps as explained in the PPA Handbook of Public Procurement:

- The contracting entity determines its needs.
- The detailed properties of the need are described by the contracting entity. The technical requirements of the goods, services, or construction work are determined.
- Detailed market examination is conducted by the contracting entity, and estimated procurement cost is determined.
- The public institution that is associated with the contracting entity determines the procurement method. The procurement methods are first-price auction, negotiation, direct purchase, and constrained participation first-price auction.

- Auction documents are prepared.
- The contracting entity applies to the PPA for the permit to conduct the procurement process.
- The tender commission is constructed by the contracting entity.
- The auction details are announced to the public.
- The tender and pre-qualification documents are observed and bought by potential bidders at the place of contracting entity.
- The tenders are prepared and submitted to the contracting entity according to the conditions that were previously announced to the public. The tender commission evaluates the proposed bids, and the tenderer with the economically most advantageous tender is awarded with the contract.
- All tenderers are notified of the finalized tender [14].

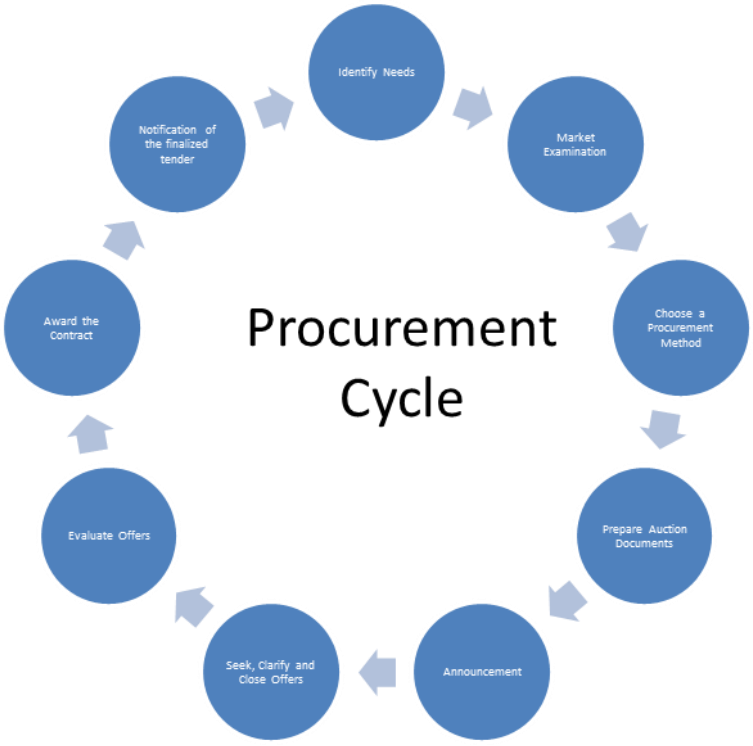

Figure 3.2. Procurement cycle.

3.7. E-Procurement

In Turkey, the participation in public tenders and the preparation of tender proposal dossiers are costly. In public tenders over 70 qualification and participation documents (gross number for all kinds of tenders) are taken from and/or approved by various public and private institutions. In the average, there are 20-25 qualification and participation documents presented in a tender dossier. The preparation of a high number of documents and tendering bring about a high amount of procedural cost. Moreover, in many eases, same documents are presented for tenders of different contracting authorities. It means that, the system doesn't have a memory.

This situation leads to reluctance among many potential economic operators to participate in public tenders, distorts competition and increases the costs [18].

Because of aforementioned procedural cost and stationery expenses, an electronic platform operated by PPA where contracting authorities and economic operators involved with public procurement procedures can conduct these procedures on the internet. Electronic public procurement platform (EKAP) has been in service since 01.09.2010 instead of public procurement platform (KSP).

One useful component of this platform is procurement search web page which is shown below. This search engine which contains all information about public procurements in Turkey, was used in thesis several times.

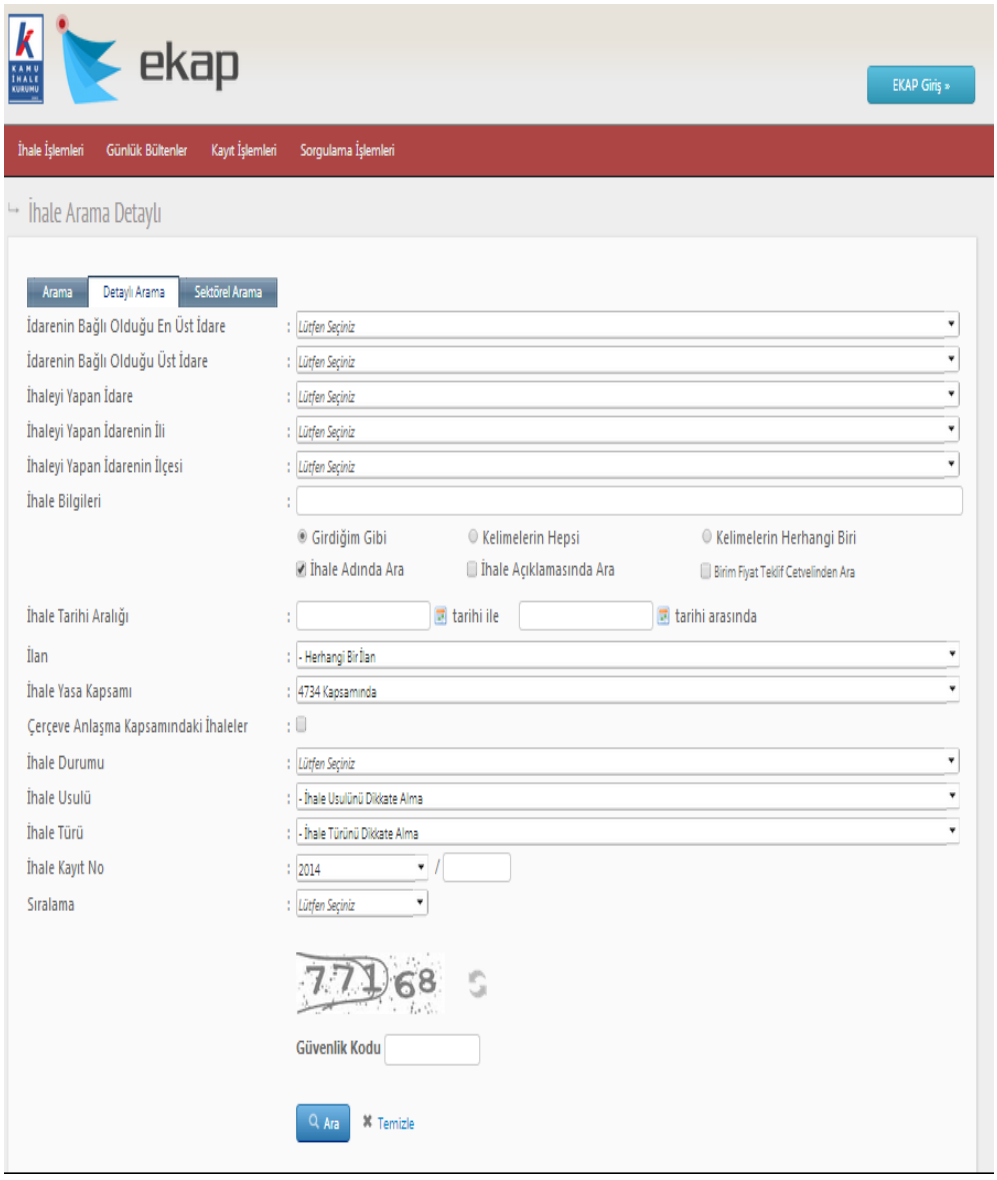

Figure 3.3. Inquiry website of PPA.

3.8. Statistics

3.8.1. Number of Procurements

Year in 2012, the public spent about 76.634.709.000 Turkish Liras for procurement of works, services, goods and consulting service. The 57.16 percent of this spending was for the procurement of works [17].

Table 3.1. Procurements within the scope of law in 2012.

Type of Procurement	Quantity of Public Procurement	
	Year 2012	%
Procurement of Goods	40709	43.23
Procurement of Services	32798	34.83
Procurement of Works	20666	21.94
Total	94173	100

Table 3.2. Amount of procurements within the scope of law 4734.

Type of Procurement	Amount of Public Procurement (1000 TL)	
	Year 2012	%
Procurement of Goods	15829853	20.66
Procurement of Services	17000347	22.18
Procurement of Works	43804509	57.16
Total	76634709	100

According to the Table 3.2., 94173 contracts awarded an amount of 76634709.000 TL were concluded in 2012. With the 21.94 share of total number of procurement and 57.16 percent of total amount of public procurement is related to procurement of works.

Table 3.3. Number of Bids.

Term	Procurement Type	Number of Procurement	Number of Tender	Average of Tenders
01.01.2012-31.12.2012	Good	40709	157912	3.88
	Service	32798	104934	3.2
	Work	20666	132437	6.41
	Total	94173	395283	4.2

Table 3.4. Procurement Types.

Scope	Procurement Type	Number of IKN	%
Within the Scope of Law 4734	Good	48578	30.55
	Service	45887	28.85
	Work	23488	14.77
	Total	117953	74.17
Exceptions	Good	33905	21.32
	Service	6092	3.83
	Work	792	0.5
	Total	40789	25.65
Out of Scope Law 4734	Good	117	0.07
	Service	138	0.09
	Work	37	0.02
	Total	292	0.18
Total	Good	82600	51.94
	Service	52117	32.77
	Work	24317	15.29
	Total	159034	100

Table 3.5. Procurements according to contract types.

Type of Contract	Good		Service		Work		Total	
	Item	%	Item	%	Item	%	Item	%
Unit Price	39387	96.75	27773	84.68	8432	40.8	75592	80.27
Turn-key Lump Sum	-	-	-	-	12131	58.7	12131	12.88
Lump Sum	1322	3.25	5025	15.32	-	-	6347	6.74
Mixed Contract	-	-	-	-	103	0.5	103	0.11
Total	40709	100	32798	100	20666	100	94173	100

Table 3.6. Total Amount of Contracts.

Type of Contract	Good		Service		Work		Total	
	Item	%	Item	%	Item	%	Item	%
Unit Price	15508133	97.97	15582434	91.66	25186984	57.50	56277552	73.44
Turn-key Lump	-	-	-	-	17750826	40.52	17750826	23.16

Sum								
Lump Sum	321720	2.03	1417913	8.34	-	-	1739633	2.27
Mixed Contract	-	-	-	-	866,699	1.98	866699	1.13
Total	15829853	100	17000347	100.00	43804509	100.00	76634709	100.00

3.8.2. Number of Retrofitting Procurements

The information about retrofit and strengthening procurements in 2012 is shown in the table, by means of Electronic public procurement platform (EKAP).

Table 3.7. Number of Retrofitting Procurements in 2012.

Type of Procurement	Number of Procurement	Number of cancellation
Works	291	57
Service	270	40
Total	561	97

According to Table 3.7., total of 561 procurements of retrofit and strengthening were registered to the EKAP. 270 of total were about the evaluation of buildings, preparation of retrofit projects and estimated values. On the other hand, 291 of 561 were public works that are the application of retrofit projects.

97 of total procurements were cancelled because of different reasons. Table 3.8. shows only the cancellation of public works related with retrofit and strengthening. Two main reasons are defectiveness of tender documents and having no bid. Another important reason to failure for procurement is receiving abnormally low tender which cannot be explained by tenderer.

Table 3.8. Number of Cancellation in Retrofitting Procurements.

Reason of Cancellation	Number of Cancellation
No tender	11
Tenders are higher than estimated value	7
No competition	6
Faulty in tender document	11

Faulty in estimated value	2
Abnormally low tender	9
Others	11
Total	57

4. TECHNICAL GUIDELINES

4.1. General

A Specification is a statement of requirement. It is also sometimes referred to as a Scope of Work. Getting the Specifications right is a key element in any successful Procurement [19].

The technical specifications are provisions to which the contract must conform. The totality of the technical requirements contained in particular in the contract documents, defining the characteristics required of a work, material, product or supply or service, which permits a work, a material, a product or a supply or a service to be described in a manner such that it fulfils the purpose of the contract [20].

A good specification contains the following elements:

- It identifies a minimum requirement.
- It allows for maximum competition (competitive bids).
- It identifies the test methods to be used to verify compliance with the requirement.
- It contributes to obtaining best value at the lowest possible cost using a fair, equitable, and transparent (easy for the public see and understand) contract award process [37].

In Article 12, the rules of specifications defined as:

Preparation of administrative and technical specifications specifying all characteristics of the goods, services and works that constitute the subject matter of the procurement by the contracting authorities is obligatory. However, in cases where contracting officer approves that preparation of technical specifications by contracting authority is impossible due to the characteristics of the goods, services or works, it may be outsourced, in accordance with the provisions of this Law.

The technical criteria for the goods, services and works to be procured shall be specified in the technical specifications, which constitute an integral part of the tender documents. The specified technical criteria shall aim efficiency and functionality, shall not consist of elements impeding competition and shall ensure equal opportunity for all tenderers.

Technical specifications may, where possible, include arrangements to ensure conformity with national and/or international technical standards. Technical characteristics and definitions shall be set forth in these specifications. No specific brand, model, patent, origin, source or

product can be specified, and no feature or definition indicating any brand or model, can be included.

However, in case where no national and/or international standards exist or where it is not possible to establish technical characteristics; brand or model can be specified provided that “or equivalent” phrase is stated [10].

Competition is one of the most important criteria for the Public Procurement Law. Anti-competitive regulations cannot be placed in the technical specification. Another important criteria is the fulfilment of needs appropriately. According to the basic principle, specifications must be clear and comprehensive to exhibit needs promptly, and efficient use of resources.

According to the Regulation on the Implementation of Works Procurement which is the complementary part of Public Procurement Law, the preparation of projects and the establishment of application projects shall be completed for the works. However, for construction works, when there is not sufficient time to establish an application project due to the natural disasters, the tenders may be conducted with preliminary or final projects. For construction works for which the application project cannot be established before the tender since land and soil surveys are required in certain stages, except for the building works, the tender may be conducted with the final project [21].

4.2. Standard Technical Specifications

There are several significant steps in the process of reducing seismic risk in buildings that this document does not encompass. The first step, deciding whether or not to undertake a rehabilitation project for a particular building, is beyond the scope of the guidelines. Once the decision to rehabilitate a building has been made, the guidelines’ detailed engineering guidance on how to conduct seismic rehabilitation analysis can be applied [22].

Selection of minimum standards for seismic performance in existing buildings, either when buildings are being evaluated or retrofit, is controversial. The results of evaluation of most buildings fall on a continuous scale of increased risk of losses, except when a collapse mechanism is apparent. Selection of acceptable risk by policymakers is difficult and commonly falls to the engineering community by default in the form of codes and standards. Issues most often considered when setting public policy are the risk to life safety, the historic significance of buildings, and some measure of the benefit/cost relationship of retrofit. It is hoped that the availability of better engineering tools for evaluation and retrofit, particularly in the framework of performance based engineering, may enable planners and politicians to refine targets for mitigation of seismic risk to efficiently reflect the best interests of the community or region. Such clarified public policies could provide valuable input into development of local codes and standards [3].

4.2.1. Guidelines in Turkey

First Earthquake Code in Turkey has been published following the Major Erzincan Earthquake in 1940. The Code is named as Provisional Building Guidelines in Earthquake Zones. This code was subjected to revisions in 1942 and 1947. The Code dated as 1953 in the name of Regulations on Buildings to be Built in Earthquake Zones accepted as first significant publication. A revision was published to this in 1961. The first complementary Earthquake Code, Regulations on Buildings to be Built in Disaster Regions was published in 1968. The Code re-published in 1975 with the same name has been admitted as the first code prepared in consideration of similar applications in developed countries. This Code has been almost re-written in 1998. Latest Earthquake Code in Turkey has been published in March 2007, Specification for Buildings to be Built in Seismic Regions (TEC2007) by the Ministry of Public Works and Settlement, Government of the Republic of Turkey [48].

Table 4.1. The Seismic Events In The Evolution of Seismic Design Codes In Turkey [23].

Year	**Place of Occurrence**	**Magnitude**	**Loss of Life**
1939	Erzincan	7.9	32962
1940	First seismic code published		
1944	Bolu-Gerede	7.2	3959
1944-1949	Seismic code revised		
1953	Yenice, Gönen	7.4	265
1953	Seismic code revised		
1957	Fethiye	7.1	67
1962	Seismic code revised		
1966	Varto	6.9	2364
1968	Seismic code revised		
1970	Gediz	7.2	1086
1975	Lice	6.9	2385
1975	Seismic code revised		
1976	Çaldıran, Muradiye	7.2	3840
1992	Erzincan	6.8	653
1995	Dinar	6.3	94
1997	Seismic code revised		
1998	Ceyhan, Adana	5.9	-
1998	Seismic code revised		
1999	Kocaeli	7.4	17408
1999	Düzce, Kaynaşlı, İzmit	7.2	845
2002	Sultandağı, Çay	6.3	42
2003	Bingöl	6.1	184
2005	Seferihisar	5.9	-
2005	Hakkari	5.4	3
2007	Seismic code revised		
2010	Başyurt-Elazığ	6.0	42
2011	Van	7.2	604

Table shows that the seismic events in the evolution of seismic codes in Turkey [23]. This table demonstrates that the destructive earthquakes have usually resulted in revisions to the codes [24].

According to the Specification for Buildings to be Built in Seismic Regions (TEC2007), Methods to be used for the seismic analysis of buildings and building-like structures are, Equivalent Seismic Load Method, Mode – Superposition Method and Analysis Methods in the Time Domain [27].

Linear elastic calculation methods to be used for the determination of seismic performances of buildings are the calculations methods which are “Equivalent seismic load method” and “Mode superposition method”. Linear elastic procedure is an assessment in which the building is analyzed elastically under vertical (gravity and live loads) and earthquake loads separately. Linear elastic procedure can be applied to the buildings which;

- are at most 25 m in height from ground level,
- have at most 8 stories,
- have torsional irregularity constant smaller than 1.4 [24].

The inelastic linear analysis methods included in the scope of TEC 2007 are Incremental Equivalence Seismic Load Method, Incremental Mode Combination Method and Measurement within the Scope of Time Definition Method [27]. In this procedure, a deformation capacity of each member is calculated, nonlinear analysis is performed and plastic deformations are analyzed. Each member is assessed according to its deformation compared with limits and finally global performance of a structure is obtained. This procedure is closer to the real situation, because this analysis considers redistribution of forces after the yielding of members. Both assessment procedures provide the performance levels of each member of a building. However, main aim of these assessments is to estimate the performance of the whole building [24].

Some of the most important advances introduced through the latest version of the earthquake code are:

- Inclusion of a new extensive chapter on seismic safety assessment and retrofitting of existing buildings,
- Inclusion of a linear elastic method for seismic safety assessment considering the inelastic behavior interms of approximate allowable demand/capacity ratios given depending on the damage level,
- Inclusion of the performance-based assessment principles for existing structures in seismic safety evaluation and retrofitting,

- Inclusion of different levels of design earthquakes (such as service, design and maximum earthquakes) and performance levels (such as immediate occupancy, life safety and collapse prevention) to be considered for various types of buildings,
- Inclusion of single-mode and multi-mode push-over analysis for seismic safety assessment and retrofitting,
- Inclusion of nonlinear time history analysis,
- Inclusion of principles and details relatedwith conventional retrofitting techniques (such as concrete jacketing,strengthening with steel members, and shear wall additions) and retrofitting using innovative materials(such as fiber reinforced polymers) [25].

On the other hand, there are some shortcomings of earthquake code of Turkey. A research has been conducted by Sucuoğlu and Şengöz (2009) in order to evaluate the differences between the two types of seismic assessment procedures in the 2007 Turkish Earthquake Code. For this purpose, they comparatively assessed by employing both procedures two residential buildings in their existing and retrofitted states, according to the principles in the 2007 Turkish Earthquake Code. The assessment results were also evaluated in view of the actual performance observations from one of the investigated building which suffered damage during the 1999 Düzce earthquake. They reached the weaknesses of the 2007 Turkish Earthquake Code. These are:

- As a result of comparative analysis of the outputs, both methods estimates damages which are higher than the actual damages.
- The bounds of relative storey drift are not realistic and not decisive.
- Retrofitting does not increase the ductility capacity of building.
- Determining the seismic performance of the building is very consservative and not economic [26].

In Turkey, there is not a standart guideline for all seismic rehabilitation procurement of works. There are some different technical specifications prepared by contracting authorities. These specifications were prepared in the light of Specification For Structures To Be Built In Disaster Areas which is the earthquake code of Turkey where the rehabilitation and retrofit procedure is regulated in the chapter 7, Evaluation and Invigorate of The Existing Buildings.

A common used guideline was prepared by the The Urban Planning Chief of Kocaeli Metropolitan Municipality. This guideline is the simplified form of the relevant chapter of Turkish Earthquake Code.

The first step of retrofitting is the observation and tests from buildings. The scope of this step is the data regarding the details and sizes of the elements to be used in determining the capacities of the elements of the supporting systems of the existing buildings and information

regarding the geometry and material characteristics of the supporting systems will be achieved from the projects and reports of such buildings, from observations and measurements to be carried out on the building, and from trials performed on the material samples taken from the building [27].

Determining the seismic safety and retrofitting of buildings is the second step of guideline. This step contains the preparation of rehabilitation project, estimated cost and metric lists.

According to the specification for structures to be built in disaster areas, determination of geometry of the building is one of the most important steps of data collection procedure from buildings. In case the architectural projects are present, these can be used as aids to the works for preparation of measured drawings. Information obtained must include the locations, axis openings, heights and dimensions of all the reinforced concrete elements and nonbearing walls, and must be sufficient for the creation of a calculation model for the building. If there is not present architectural projects, the measured drawings of the supporting system shall be prepared with field work [27].

According to the clause of Article 62, inconstruction works, it is not allowed to initiate the procurement proceedings without obtaining building site, without completing ownership, expropriation and if required development transactions and without establishing application projects. Where the technical and financial characteristics can not be precisely determined due to the originality and complexity of the works, the procurement may be carried out through preliminary or final project. In construction works where application projects exist, it is obligatory the procurement be carried out through receiving turnkey lump-sum price proposal. However, for works, which have no sufficient time to establish an application project due to natural disasters, the procurements may be conducted with preliminary or final projects; and for all types of repair works and works which the application project can not be established before the procurement since land and soil surveys are required in some certain stages during construction, or a development or route change is probable, except for the building works, the procurement may be conducted with final project. In those works, the procurement may be carried out on turn-key lump-sum basis for the parts of works where the application project can be implemented, and on unit price basis for each item of work for the parts where the application project can not be implemented. The conditions regarding to availability of building site and completion of ownership and expropriation transactions shall not be required in projects relating to dams and large-scale irrigations, drinking water conduit lines, energy transmission lines, substations, transformer stations, switchyards, captures, water tanks, highways, harbours and airports, railways, oil and natural gas pipelines [10].

One of the critical points of Article 62 is that the procurement may be conducted with final project except for the building works. This means that procurement works of retrofitting of building must go out the tender with the type of Turn-key lump sum contract.

Obviously, the most difficult situation is when no construction drawings are available. In this case, neither the overall configuration of the building nor the material properties may be

known, although a layout of most buildings is available due to the ongoing need to document uses, rentals, or remodels of the spaces. The overall dimensional accuracy of such layouts should be verified. The exact configuration of elements that have significant strength or stiffness must be determined, whether traditionally classified structural or nonstructural. Field investigation, including limited removal of finishes, will be necessary. Constant engineering judgement as to the progression of destructive investigation must be exercised, rather that a pre-decided program that will invariably be overly aggressive. Massive masonry elements may require small diameter coring to determine the presence and nature of core materials [3].

A major problem arises because of the contract type. The architectural and engineering projects of the old buildings are generally not available. This reality makes the obligation of lump-sum price proposal meaningless. Akçay and Manisalı suggest that Strengthening and retrofitting of buildings should be able to be tendered in Unit Price [35].

4.2.2. Asce 41

Despite of the limited regulations of Turkey, there is a comprehensive documents named as ASCE 41 Seismic Rehabilitation of Existing Buildings, in USA to improve building performance in future earthquakes .

ASCE 41 is intended to serve as a nationally applicable tool for design professionals, code officials, and building owners under taking the seismic rehabilitation of existing buildings. Injurisdictionally mandated seismic rehabilitation programs, the code official serves as the authority having jurisdiction. Involuntary seismic rehabilitation programs, the building owner, or the owner's designated agent, serves as the authority having jurisdiction [28].

According to the ASCE 41, seismic rehabilitation of the building shall be performed to achieve the selected Rehabilitation Objective in accordance with the requirements of the Simplified Rehabilitation Method or the Systematic Rehabilitation Method.

Simplified Rehabilitation may be applied to certain buildings of regular configuration that do not require advanced analytical procedures. The primary intent of Simplified Rehabilitation is to reduce seismic risk efficiently, where possible and appropriate, by seeking Limited Objectives. Partial Rehabilitation measures, wltich target high-risk building deficiencies such as parapets and other exterior falling hazards, are included as Simplified Rehabilitation techniques, but their use should not be limited to buildings that conform to the limitations. On the other hand, Systematic Rehabilitation maybe applied to anybuilding and involves thorough checking of each existing structural component, the design of new ones, andverification of acceptable overall performance representedby expected displacements and internal forces.The Systematic Rehabilitation Method focuses on thenonlinear behavior of structural response and employsprocedures not previously emphasized in seismic codes [28].

ASCE is very comprehensive standard which guides for foundations and geologic site hazards Steel, Concrete, Masonry, wood and light metal frames. Additionally, standard gives information about seismic isolation and energy dissipation simplified rehabilitation, architectural, mechanical, and electrical components.

4.2.3. Eurocode 8

On February 11th, 2005, Part 3 of Eurocode 8 has been unanimously positively voted by the representatives of the 23 countries adhering to CEN (Committé Européen de Normalisation), which include both EU and EFTA member countries. The document is entirely new with respect to a previous draft, which was issued in the '90s, and it took only about three years to be completed and to meet with general acceptance. This is quite a remarkable fact, if one considers that for documents of much less controversial nature, as for example Part 1 of EC8, which deals with the design of new structures, it took about ten years to reach the consensus for passing from the 1994 Pre-Standard version to the present status of a European Standard. The reason for this apparent success may not be sought so much in the quality of the document, documents of truly high quality take often years of minute discussions to get approved, but rather in the ever increasing awareness of the urgent need of doing something in the direction of alleviating the problem of existing structures [29].

5. ABNORMALLY LOW TENDERS

5.1. General

There is not a definition for the abnormally low tenders in Public Procurement Law of Turkey. Article 38 of the Public Procurement Law 2002 says that:

The tender commission shall evaluate the tenders in accordance with Article 37 and shall determine those that are abnormally low compared to the other tenders or the estimated cost determined by the contracting authority. Before rejecting these tenders, the commission shall request from the related tenderers, the details relating to components of the tender that are determined to be significant, in writing and within a specified period.

The tender commission shall evaluate the abnormally low tenders taking into consideration the written explanations documented on the following aspects:

(i) economic nature of the manufacturing process, the services provided and the method of works,

(ii) selected technical solutions and advantageous conditions to be utilized by the tenderer in supply of the goods and services or fulfilment of the works,

(iii) the originality of the goods, services or works proposed.

As a result of this evaluation, the tenders of the tenderers whose written explanations are found insufficient or who fail to make a written explanation shall be rejected.

Tender Commission shall use the criteria set by the Authority to determine and evaluate the abnormally low tenders. In implementation of this article the Authority is entitled to set limit values or inquiring criteria or average values in order to identify and evaluate abnormally low tenders and to determine the economically most advantageous tender. [10].

In reality, abnormally low tender has not been a problem specific only for today's procedures. It had also been one of the main problems faced in Europe since the Romans, until the nineteenth century, where a reverse auction procedure so-called licitatio had been practiced. In licitatio, the bids were collected verbally from the presently attending bidders and bidders were impulsively offering very low prices through a fierce competition without conducting a cost estimation procedure. Then the bidder, who undertook the contract by offering the lowest price in this way, was reducing the quality in order to recover or limit prospective losses [31].

5.2. Causes of Abnormally Low Tenders

According to the conclusions of study of DG III Working Group on Abnormally Low Tenders, the causes of ALT's are structural, cyclical and most prevalent in times of decreasing demand. In the construction market the phenomenon of ALT's affects principal contractors and sub-contractors in equal measure. The reasons why enterprises submit ALT's are summarised below:

- Imprecise and ambiguous project and tender documentation
- Inadequate time to prepare tenders
- Errors in evaluating tender documents
- Abuse of post-tender negotiations and the negotiated procedure
- Public entities participating in public works tenders
- Contracts are awarded to the lowest price, not the economically most advantageous Tender Contractors who intentionally submit ALT's [32].

In 2009, Gunduz and Karacan performed a comprehensive ALT evaluation with the help of a questionnaire to which 430 construction companies responded which consisted of 18 questions, two of which required private information about the respondent and the company.

According to large companies, the main reasons of the ALT's were as follows:

- Obtaining work experience document; most public authorities require a significant level of past project experience from the tenderers,
- Miscalculation of tender price of a company,
- Inaccuracy of conceptual cost.
- Staying in the business

Table 5.1. Reasons of Abnormally Low Tenders [33].

Reasons of ALT's	**Small Companies (%)**	**Medium Companies (%)**	**Large Companies (%)**
Miscalculation of bid price	42.11	50.00	51.28
Inaccuracy of conceptual cost	31.98	37.68	51.28
Staying in business	60.32	50.72	53.85
Advantageous conditions	17.81	28.26	41.03
Work experience document	30.36	37.68	64.10
Ambiguity in tender document	26.72	28.26	38.46
Shortage of tender preparation	06.07	12.32	10.26

Staying in the business and miscalculation of tender price were the most important reasons for small and medium companies and shortage of tender preparation period was agreed by all sizes of companies [33].

Karacan summarizes speech of Ünüvar (2004) on the 1'st international public procurement symposium, mentioned that why bureaucrat-politicians, who had spent government budget inappropriately, had awarded the contract to the cheapest bid. Reasons of awarding to lowest bid were:

- Insufficiency of risk analyses.
- Lack of confidence of contracting authorities to their own conceptual cost.
- Anxiety of protecting the benefit of government treasury [16].

5.3. Evaluation of Abnormally Low Tenders

According to the Article 38, Public Procurement Authority determines criteria that a tender is assumed to be abnormally low. According to the General Communique for Public Procurements which is the complementary part of Public Procurement Law, a tender is abnormally low if it is lower than the limiting value.

Tenders which are above the 120 percent of estimated value and below the 40 percent of estimated value, are ignored to calculate limit value. First of all, it must be calculated the average value and standard deviation.

$$T_{ave1}=\frac{\Sigma Tn}{n} \quad (5.1)$$

$$\sigma = \sqrt{\frac{\sum(Tn-Tave1)^2}{(n-1)}} \quad (5.2)$$

$$\{ T_i: (T_{ave1}- \sigma \leq T_i \leq T_{ave1}+ \sigma)\} \quad (5.3)$$

$$T_{ave2}=\frac{\Sigma Ti}{n} \quad (5.4)$$

$$C=\frac{Tave2}{EC} \quad (5.5)$$

where T_{ave1} is the average value of tenders, σ is standard deviation of tenders, Ti is the tender between standard deviation, T_{ave2} is the average value of tenders between standard deviation, C is a constant, EC is the estimated cost.

Then, it must be reached to the K value by following procedure:

- If C < 0.60, K value is equal to constant C.

- If 0.60 ≤ C ≤ 1.00, solution of Equation 5.6 will give K value.

$$K=\frac{(3.2C-C^2-0.6)}{(C+1)} \quad (5.6)$$

- If C > 1.00, solution of Equation 5.7 will give K value.

$$K=\frac{(C^2-0.8C+1.4)}{(C+1)} \quad (5.7)$$

Finally, limit value can be calculated by Equation 5.8.

$$\text{Limit Value}=\frac{K\times Tave2}{C\times N} \quad (5.8)$$

Table 5.2. Coefficients to find ALT Limit [16].

C	K	C	K	C	K	C	K
1.20-1.00	0.800	0.85	0.746	0.70	0.671	0.55	0.575
0.99	0.797	0.84	0.741	0.69	0.666	0.54	0.568
0.98	0.794	0.83	0.737	0.68	0.660	0.53	0.560
0.97	0.791	0.82	0.732	0.67	0.654	0.52	0.553
0.96	0.787	0.81	0.728	0.66	0.648	0.51	0.545
0.95	0.784	0.80	0.723	0.65	0.642	0.50	0.538
0.94	0.781	0.79	0.718	0.64	0.635	0.49	0.530
0.93	0.777	0.78	0.714	0.63	0.629	0.48	0.522
0.92	0.773	0.77	0.709	0.62	0.623	0.47	0.514
0.91	0.770	0.76	0.704	0.61	0.616	0.46	0.506
0.90	0.766	0.75	0.698	0.60	0.610	0.45	0.497
0.89	0.762	0.74	0.693	0.59	0.603	0.44	0.489
0.88	0.758	0.73	0.688	0.58	0.596	0.43	0.481
0.87	0.754	0.72	0.682	0.57	0.589	0.42	0.472
0.86	0.750	0.71	0.677	0.56	0.582	0.41	0.463

Karacan (2008) has tabulated K and C values which are shown above in Table 5.2. [16].

According to the General Communique for Public Procurements contracting entities were obliged to request the price analysis from a tenderer if that tenderer turned out to fall below the threshold value, and ALT were obliged to submit an estimation schedule, which is to contain the quantity and corresponding price of every work item pertaining to the work, and detailed price analyses, however, any other type of documentation to be requested by the entities from ALT were not explicitly stated in the legislation. Therefore, whether to request any other type of

documentation, if considered relevant, was left to the contracting entity. Also, though it was stated in the wording of the Article 38 that the details relating to components of the tender commission were to be requested from ALT, contracting entities were (and are, according to the current regulations) free to request details relating to all components of the tender as a whole [34].

5.4. Recommendations to Prevent Abnormally Low Tenders

The most comprehensive recommendations mentioned by DG III Working Group on Abnormally Low Tenders to prevent ALTs which are below:

- In open procurement procedures contracting authorities should properly apply the qualitative legal, economic and technical selection criteria set out in Articles 24-35 of Public Procurement Law.
- Contracting entities should use procurement systems that ensure that enterprises bear some responsibility for quality and performance by encouraging the production of the optimum solution integrating construction, maintenance and costs in use (whole life costs).
- Early appointment of technical contractors is important. Irrespective of the form of contract used, in the interests of ensuring contract award on the basis of best value for money, it is essential that technical contractors be appointed on appropriate terms at the earliest opportunity to work with the design team.
- Partnering is another important tool to prevent ALT. Partnering is not about lowest price, but ultimately about best overall value for money. It implies selection of partners on the basis of attitude to team working, ability to innovate and to offer efficient solutions.
- With the traditional procedure under which the enterprise is invited to tender on the basis of the execution drawings, either a detailed or a preliminary design, it is important that the design is as precise and as unambiguous as possible. The tender documentation must also be complete and unambiguous.
- The client must allow adequate time limits for the preparation of a tender, taking into consideration the complexity of the work. Similarly, the principal contractor must allow sub-contractors adequate time limits for the preparation of their tenders.
- Surety bonds covering bid, performance and payment is useful. The performance bond guarantees contract performance in accordance with the terms and conditions, accepted price and time allowed. The payment bond protects certain service providers, material suppliers and sub-contractors against non-payment by the prime or main contractor.

- Under bid depository system, all tenders are submitted as sealed tenders to a depository which is administered by an independent authority
- For the purpose of fair and transparent competition, contracting entities should comply with the prohibition of post-tender negotiations in the open and restricted procedures. Once tenders have been submitted, negotiations on these tenders or their constituent elements, especially their prices, must not be allowed.
- Award criteria that are not related to price must be carefully chosen and well suited to the work. These criteria have to be objective, verifiable and quantifiable.
- In order to discourage speculation by tenderers, it is essential that additional provisions will be added to the contract only in the event of unforeseen technical constraints and that specifications are strictly enforced.
- Legislation should be amended in order that sub-contractors may benefit from the principles of transparency and non-discrimination in the same way as principal contractors.
- In order to ensure fair competition any preferential treatment of public entities, which do not operate on the basis of private risk capital, must be ruled out.
- ALTs are principally due to imbalance between supply and demand in the construction market. It is desirable, therefore, to smooth out variations in demand as far as possible by planning ahead for several years. Given that a “stop-and-go” economy is the worst kind of policy, long-term and steady investment by public authorities would be helpful.
- It must be promoted the awareness of the adverse effects of ALT’s to public authorities [32].

There are also some recommendations to reduce ALT’s in the light of questionaire performed By Gunduz and Karacan:

- Contracting authorities should be able to see real completionprice of completed project to use it as a reference for conceptualcost. This way, the bidders may calculate the bid pricemore efficiently.
- Proper quality control should be applied in construction and postconstruction periods.
- The conceptual cost and actual cost values of a project shouldbe checked by a supervisor. If conceptual cost is different fromreal cost, a punishment system for the responsible agency thatcalculated the conceptual estimate might be developed.
- After the awarding process, design changes should be kept to a minimum.
- Surety bond system was not practically applicable.

- An averaging system should be applied but some modifications must be made to adapt it to today's conditions [33].

5.5. Case Study 1

Decision no 2013/UY.II-888 (PPA, 2013):

Tender subject to application was "Vali Hükümet Konağı Güçlendirme, Çevre Düzenlemesi ve Genel Onarım İşi". Tenderer's application for complaint was on the 07.01.2013 and application was rejected by the contracting authority on the 10.01.2013.

Within 10 days after the rejection notice, tenderer applied to the PPA as complaint objection. PPA decided that the application of complaint as objection was not appropriate on 11.02.2013. That shows the complaint was concluded after 40 days.

Applicant tenderer claims that the written explanation of tenderer who has been awarded the contract is contrary to the Article 45 of General Communique for Public Procurements where the explanation rules of abnormally low tenders are detailed.

Decision of Public Procurement Authority was briefly: "there are 4 abnormally low tenders which are lower than the limiting value that is 1.838.454,67 TL. There are 15 work items which are needed to be explained.

According to the explanation documents of tenderer who has been awarded the contract, 14 of 15 work items are higher than the unit prices of public administrations. The last work item was authenticated with a proforma invoice. There is a difference between the metric list of contracting authority and tenderer , which is allowable.

Because of reasons mentioned above, the complaint's application was rejected due to the correct operation of contracting authority which is Van Provincial Special Administration.

5.6. Case Study 2

Decision no 2013/UY.II-3054 (PPA, 2013):

Tender subject to application was "Van Gürpınar Yibo Güçlendirme Ve Onarım İşi". Tenderer's application for complaint was on the 19.06.2013 and application was rejected by the contracting authority on the 24.06.2013.

Within 10 days after the rejection notice, tenderer applied to the PPA as complaint objection. PPA decided that the application of complaint as objection was appropriate on 24.07.2013. That shows the complaint was concluded after 35 days.

Applicant tenderer claims that the written explanation of tenderer who has been awarded the contract is not legal because of the fact that difference between the amounts of work of contracting authority and tenderer who has been awarded the contract shown in metric lists is inadmissibly too much.

Decision of Public Procurement Authority was briefly:

There are 8 abnormally low tenders which are lower than the limiting value that is 1227879.46 TL. There are 27 work items which are needed to be explained.

There must be a allowable difference between the amounts of work of contracting authority and tenderer. According to the ruling cases of Board of Public Procurement, the allowable difference is at most 10 percent. There is a difference between the metric list of contracting authority and tenderer shown in Table 5.3., which is allowable.

On the other hand, it is a legal obligation according to the Article 45 of Communique for Public Procurements the explanation of the minimum wage of workers which was not provided by the tenderer.

Because of information mentioned above, the complaint's application about the tenderer who has been awarded the contract was approved due to the incorrect operation of contracting authority which is Van Provincial Special Administration.

Table 5.3. Comparison of metric lists.

Item No	**Code of Work Item**	**Unit**	**Metric List of Contracting Authority**	**Metric List of Tenderer**	**Advantage of Tenderer**	**In %**
1	27.525/2	m^2	9483.582	9250.000	233.58	2.46
2	P-74/A	Item	8066.000	7845.000	221.00	2.74
3	Y.23.015	Tone	74.030	72.500	1.53	2.07
4	Y.19.055/003	m^2	3580.423	3500.000	80.42	2.25
5	26.008/117C	m^2	2419.847	2400.000	19.85	0.82

6	18.241	m^2	2635.215	2550.000	85.22	3.23
7	21.220	m^2	2632.215	2552.000	80.22	3.05
8	Y.16.050/06	m^3	532.070	525.000	7.07	1.33
9	21.013	m^2	2700.540	2620.000	80.54	2.98
10	25.048/3	m^2	8306.920	8100.000	206.92	2.49
11	Y.23.241	Kg	7828.404	7801.000	27.40	0.35
12	Y.23.014	Tone	30.830	30.500	0.33	1.07
13	25.043/1A	m^2	7134.252	6970.000	164.25	2.30
14	26.006/087A	m^2	2074.440	2050.000	24.44	1.18
15	25.034/2	m^2	3619.623	3550.000	69.62	1.92
16	26.008/113A	m^2	995.321	990.000	5.32	0.53
17	27.507/MK	m^2	3142.304	3100.000	42.30	1.35
18	Y.21.051/C03	m^3	9550.271	9337.000	213.27	2.23
19	21.300/1anl	m^2	1083.545	1041.000	42.55	3.93
20	18.194	m^2	2632.215	2550.000	82.22	3.12
21	Y.19.061/003	m^2	2632.215	2610.000	22.22	0.84
22	Y.18.245/001	m^2	2632.215	2610.000	22.22	0.84
23	Y.18.461/057B	m^2	717.131	713.000	4.13	0.58
24	17.155/MK	m^2	850.000	840.000	10.00	1.18
25	14.012/1	m^3	891.590	880.000	11.59	1.30
26	25.003/1	m^2	1448.325	1425.000	23.33	1.61
27	105.612	Item	1.000	1.000	0.00	0.00

6. COMPLAINT MECHANISM

Contracting entities and tender commissions are obliged to carry out the tender proceedings in accordance with the principles and procedures stated in PPL. This obligation is a duty owed also to the contractor, supplier or service provider. Any contractor, supplier or service provider who claims that he has suffered a loss of rights or damage or he is likely to suffer a loss or damage resulting from an alleged breach of such duty can request review in accordance with Articles 55 and 56 and the regulation regard to administrative applications for review of procurement procedures, with a written complaint [21].

The complaint shall be made to the contracting authority within the application period which is five days regarding the procurements held according to subparagraphs (b) and (c) of the article 21 and ten days for other cases from the date which the proceeding or action, which is subject matter of the complaint, have been realized or should be realized, and before contract signing. The period for complaint applications concerning the issues covered in the procurement notice shall start from the date on which the notice is first published, while the period for applications regarding the other provisions of prequalification or tender documents which are not reflected in the procurement notice shall start from the purchasing date of the related document.

The complaints regarding the procurement notice, prequalification or tender documents shall be submitted at the latest until three working days before the tender or application deadline provided that time limits do not exceed the time limits stated in the first pragraph. It is compulsory for the contracting authorities to conclude such complaint applications before the procurement date or deadline for the application. In case material defect or technical defect or deficiencies which could effect tender preparation or fulfilment of the work during the review following the complaint are detected and the contracting authority considers a correction on the tender documentation, application deadline or tender date can be postponed for once, according to procedure in article 29 after the necessary correction. However, if the detected material or technical defect or deficiencies have also taken place in tender notice it shall be proceeded according to Article 26.

The contracting authority makes the necessary review on the complaint application and takes a reasoned decision within ten days following the complaint application. The decision shall be notified to the complainant and the other candidates, tenderers or potential tenderers within three days after the date of the decision. Potential tenderers are not notified about the decisions other than those against the tender notice, tender or pre-qualification documents.

In case a decision is not taken in the specified period the complainant may submit an appeal application within ten days following the expiring of decision period; and in case the decision is not deemed appropriate, the candidates, tenderers or potential tenderers including the complainant may submit an appeal application to the Authority within ten days following the notification of the decision by the contracting authority.

The contract may not be signed unless ten days have passed either from the final notification date of the decision upon application where an application to the contracting authority exists, or from the expiration date for taking a decision where no decision is taken and unless it has been enquired whether there has been no appeal application or, unless the Authority has given a final decision where there has been an appeal application [10].

According to Article 55, a complaint application to the contracting entity should be made to the latter within 10 days in general and five days in urgent cases, from the date which the proceeding or action that is the subject matter of the complaint has been realised or should be realised, and before the contract is signed. An appeal application to the PPA should be made within 10 days following the expiration of the decision period if no decision is taken by the contracting entity, or following the decision by the contracting entity if the concerned decision is not deemed appropriate. The PPA will take the final decision within 20 days in general, and 10 working days in urgent cases [13].

Inappeals for review procedures the Board makes three types of decisions specifying the following reasons and grounds:

- Determining the corrective operation(s) (e.g. re-evaluation of tenders) in caseswherethecancellation of the procurement is not necessary and remedies by the contracting entity would be sufficient,
- Ordering the cancellation of the procurement in cases of noncompliances with PPL and there lated legislation that constitute an obstacle for the continuation of the tender proceedings and can not be removed by taking corrective measures, and
- Deciding that the appeal for review procedures is irrelevant [21].

The PPL therefore does not provide for compensation for damages. The lodging of an appeal does not automatically result in the suspension of the procurement procedure; the Public Procurement Board must decide separately on such suspension. The procedure is suspended only in specific circumstances, i.e. where the complaint is well-founded or where the damage or loss could be irreparable. Suspension is extremely rare in practice [36].

Table 6.1. Complaints according to the procurement types.

Sort of Procurement	**Number of Complaint**	**Total Procurements**	**Ratio of Complaints to Total (%)**
Goods	913	50331	1.81
Services	2906	45917	6.33
Works	1463	23500	6.23
Total	5282	119748	4.41

Table 6.2. Decision By Public Procurement Authority in 2012.

Sort of Decision	**Number**	**In %**
Decision of Conflicts	5508	94.44
Regulatory Board's Decision	279	4.78
Administrative Decision	30	0.51
Correction Decision	15	0.27
Total	5832	100

Table 6.2. shows that Public Procurement Authority has adjudicated 5832 complaints. 5508 of total complaints are related with decision of conflicts. According to the Table 6.1., 1.81 percent of procurement of goods, 6.33 percent of procurement of services and 6.23 percent of procurement of works in scope of law 4734, were complained by tenderers in 2012.

Table 6.3. Complaint applications were rejected in 2013.

Contracting Authority	**Number of Decision**	**Type of Building**	**Reason of Complaint**
Van -Secretary General of Special Provincial Administration	*2013/UY.I-2475*	School	Abnormally Low Tender
	2013/UY.I-4267	Student Dormitory	
Adana –S.G.S.P.A.	*2013/UY.IV-1796*	Student Dormitory	Bid Security
Türkiye Şeker Fabrikaları A.Ş.	*2013/UY.I-2849*	Factory	Abnormally Low Tender
Bursa -S.G.S.P.A.	*2013/UY.III-3021*	Hospital	Authentication
	2013/UH.IV-3220	Lodging Building	
Adana -S.G.S.P.A.	*2013/UY.IV-3221*	Student Dormitory	Bid Security
Aksaray- Secretariat General of Hospitals	*2013/UY.IV-4036*	Hospital	Authentication
Turkish Electricity Transmission Company	*2013/UH.IV-999*	Lodging Building	Abnormally
Social Security Institution (Ssi)	*2013/UY.III-243*	Service Building	Authentication
Ministry of Health	*2013/UH.IV-3691*	Hospital	Cancellation of procurement

Social Security Institution (Ssi)	*2013/UY.III-2439*	Service Building	Authentication

Table 6.4. Corrective operations for complaint applications in 2013.

Contracting Authority	**Number of Decision**	**Type of Building**	**Reason of Complaint**
Van -Secretary General of Special Provincial Administration	*2013/UY.III-2573*	School	Abnormally Low Tender
Kars-Provincial Directorate Of Environment And Urban Planning	*2013/UY.I-2619*	StudentDormitory	Authentication
Van -Secretary General of Special Provincial Administration	*2013/UY.I-2764*	School	Abnormally Low Tender
Van -Secretary General of Special Provincial Administration	*2013/UY.II-3054*	School	Abnormally Low Tender
General Directorate of Turkish Coal Enterprises	*2013/UH.III-3498*	Lodging Building	Authentication
Aksaray- Secretariat General of Hospitals	*2013/UY.III-4380*	Hospital	Authentication

Table 6.5. shows that the complaint period is too long which is reason of delay in retrofitting projects. To decrease long complaint period, tenderers who truly suffered a loss of right should be permitted to apply. The easiest way to accomplish this is to increase the application fee.

Table 6.5. Total complaint periods.

Name of Procurement	**Decision No**	**Complaint Period**

Aksaray Devlet Hastanesi A2 Blok Güçlendirme, Tadilat, Ameliyathane Genel Bakım Onarım Yapımı İşi	*2013/UY.III-438*	63
Vali Hükümet Konağı Güçlendirme, Çevre Düzenlemesi ve Genel Onarım İşi	*2013/UY.II-888*	40
Bina ve Lojmanların Güçlendirme Projesi, Yaklaşık Maliyet, Özel İdari Teknik Şartname Hazırlanması	*2013/UH.III-3498*	50
Van Gürpınar Yibo Güçlendirme Ve Onarım İşi	2013/UY.II-3054	35
Bursa İli Dörtçelik Ruh Sağlığı Hastanesi Güçlendirme ve İkmal İnşaatı	2010/UY.II-2934	45
	2011/UY.II-583	42

Figure 6.1. Retrofitting of a hospital.

7. QUALIFICATION RULES

7.1. General

For various reasons a procuring entity may wish to exclude certain provider from a procurement. Most obviously, it will wish to ensure that any contracting partner has the ability to complete the contract. This will generally entail checks on the firm's technical ability to perform – for example, whether it has qualified personnel- and on its financial position. An entity might also seek to exclude a provider for reasons not directly related to its ability to deliver. This process of deciding which firms are eligible to participate can be referred as qualification [50].

Table 7.1. Qualification rules for procurement of works according to PPL.

<table>
<tr><th>EC-TV</th><th>Trade register</th><th>Documents proving the experience</th><th>Economic and financial capability</th><th>Quality and environment management system certificate</th><th>Facilities, machinery, devices and other equipment</th></tr>
<tr><td>EC<=TV/10</td><td rowspan="4">Required</td><td rowspan="4">Required</td><td>Cannot be Demanded</td><td rowspan="2">Cannot be Demanded</td><td rowspan="4">Own property cannot be required</td></tr>
<tr><td>TV/10≤EC≤TV/2</td><td>Unrestricted</td></tr>
<tr><td>TV/2≤EC≤TV</td><td rowspan="2">Required</td><td rowspan="2">Optional</td></tr>
<tr><td>EC≥TV</td></tr>
</table>

Above table shows the qualification criteries for procurement of works in Turkey according to estimated cost and threshold values [49]. In this table, estimated cost called as and threshold values called as TV.

7.2. Economic and Financial Capability

According to the Article 10 of PPL, the tenderers participating in the procurement proceedings may be required to submit the following information and documents for evaluation of their economic and financial qualifications:

- Bank statements relating to the financial standing of the tenderer,
- The balance sheet of the tenderer which is obligatory to be published in accordance with the related legislation, or required sections of the balance sheet, if those are not available, equivalent documents,
- A statement of the tenderer's overall turnover or documents indicating the volume of the work being carried out and completed by the tenderer relating to the subject matter of the procurement proceedings [10].

7.3. Professional and Technical Qualifications

The contracting authorities decide who can and who cannot be a contractor by looking into the personal circumstances of the candidate or the tenderer, their technical knowledge, and their experience, and even their reliability,by laying down the circumstances under which certain actors may be excluded from the award procedures [37].

One of the Qualification criterias is professional and technical criteria which are documents that demonstrates the experience, certificates to be obtained from quality control institutions, documents related to the organisational structure, thetechnical staff, the production capacity and samples and catalogues etc.) which are specified in Article 10 of PPL and described in detail in the application regulations. Based on the estimated cost, qualification criteriawhich shall be used are specified in each application regulation (goods,services, works and consultancy services). While determining qualification criteria, contracting entities should demand these inaccordance with the subject of procurement and shun documents whichcontradict each other and restrict competition [21].

According to PPL, the tenderers participating in the procurement proceedings may be required to submit professional and technical qualifications:

(i) Documents proving that the tenderer is operating as a registered member of the related chamber in accordance with the relevant legislation, and is legally eligible to submit tenders,

(ii) With regard to subject matter of the procurement or similar works undertaken by the tenderer under a contract having a value in the public or private sector;

- Documents proving the experience in works contracts whose preliminary acceptance proceedings have been completed and in services contracts linked to construction works whose acceptance proceedings have been completed within the last fifteen years,
- Documents proving the experience in works contracts whose preliminary acceptance proceedings have been completed and in services contracts linked to construction works whose acceptance proceedings have been completed, of which is supervised

or managed at least in the ratio of %80 of the contract value. within the last fifteen years,

- Documents proving the experience for the ongoing works contracts and services contracts linked to works contracts which have been completed flawlessly, supervised and managed at least in the ratio of %80 of the total contract value within the last fifteen years, provided that the initial contract value has been completed,
- Documents proving the experience in goods and services contracts completed within the last five years,
- For transferred contracts: the documents proving the experience in works contracts whose preliminary acceptance proceedings and in services contracts linked to construction works whose acceptance proceedings have been completed within the last fifteen years and in goods and services contracts whose acceptance proceedings have been completed within the last five years, provided that at least %80 of the contract value have been completed,

(iii) Documents relating to the production and/or manufacturing capacity, research-development activities and quality assurance practices of the tenderer,

(iv) Information and/or documents relating to the organisational structure of the tenderer, proving that he/she employs or will employ adequate number of staff in order to fulfil the subject matter of the procurement,

(v) In cases of procurement of services or works, the documents demonstrating the educational and professional qualities of the managerial team and the technical staff of the tenderer,

(vi) Documents relating to facilities, machinery, devices and other equipment required for fulfilment of the work that is the subject matter of the contract of the procurement,

(vii) Documents relating to the technical staff or technical institutions responsible for quality control, whether they are directly attached to the tenderer or not,

(viii) Certificates granted by quality control institutions accredited in accordance with the international rules, certifying the conformity of the work in question with the standards specified in the tender document,

(ix) In case requested by the contracting authority for the confirmation of their accuracy, samples, catalogues and/or photographs of the goods to be supplied [10].

7.4. Case Study 1

Decision no 2013/UH.III-3498 (PPA, 2013):

Tender subject to application was “Bina ve Lojmanların Güçlendirme Projesi, Yaklaşık Maliyet, Özel İdari Teknik Şartname Hazırlanması”. Tenderer’s application for complaint was on the 16.07.2013 and application was rejected by the contracting authority on the 24.07.2013.

Within 10 days after the rejection notice, tenderer applied to the PPA as complaint objection. PPA decided that the application of complaint as objection was appropriate on 04.09.2013. That shows the complaint was concluded after 50 days.

Applicant tenderer claims that their tender was rejected illegally for Turkish Trade Registry Gazette shows the distribution of capital was not submitted.

Decision of Public Procurement Authority was briefly: Regulation on the Implementation of Services Procurement does not necessitate to show the distribution of capital. It requires only to present Turkish Trade Registry Gazette which shows the shareholders who they are.

Tender dossier of applicant contains a Turkish Trade Registry Gazette and it shows the shareholders of tenderer firm in accordance with Article 38 of Regulation on the Implementation of Services Procurement.

Because of reasons mentioned above, the complaint’s application was approved due to the incorrect operation of contracting authority which is General Directorate Of Turkish Coal Enterprises.

According to the corrective operation, contracting authority must re-evaluate the tender of applicant as considering the Turkish Trade Registry Gazette is valid.

7.5. Case Study 2

Decision no 2013/UY.III-3021 (PPA, 2013):

Tender subject to application was “Bursa İli Dörtçelik Ruh Sağlığı Hastanesi Güçlendirme ve İkmal İnşaatı”. Auction date is 24.06.2010 and first decision of PPA was on 27.09.2010 with decision number 2010/UY.II-2934. Second decision of PPA was on 03.02.2011 with decision number . Ankara 7th Administrative Tribunal which is first supreme court of procurements decided to reject of application of tenderer. Council of State decided on 29.01.2013 to reconsideration of PPA. Finally, the last decision of PPA was on 24.07.2013 with decision number 2013/UY.III-3021

Tenderer’s application for first complaint was on the 13.08.2010 and application was rejected by the contracting authority on the 19.08.2010. Within 10 days after the rejection notice, tenderer applied to the PPA as complaint objection. PPA decided that the application of complaint as objection was appropriate on 27.09.2010. That shows the first complaint was concluded after 45 days.

Tenderer's application for second complaint was on the 19.12.2010 and application was rejected by the contracting authority on the 03.01.2011. Within 10 days after the rejection notice, tenderer applied to the PPA as complaint objection. PPA decided that the application of complaint as objection was appropriate on 03.02.2011. That shows the second complaint was concluded after 42 days.

Applicant tenderer claims that documents of other tendereres, which proves the experience in work, key technical personnel, financial turnover, financial rates are contrary to legislation.

Decision of Public Procurement Authority was briefly:
Contracting authority has decided to cancellation of procurement because of public loss about 740.000 TL . By reason of cancellation operation, procurement process was finished.

Because of reasons mentioned above, the complaint's application was not approved due to the cancellation operation of contracting authority which is General Directorate Of Turkish Coal Enterprises.

7.6. Case Study 3

Decision no 2013/UY.III-4380 (PPA, 2013):

Tender subject to application was "Aksaray Devlet Hastanesi A2 Blok Güçlendirme, Tadilat, Ameliyathane Genel Bakım Onarım Yapımı İşi". Tenderer's application for complaint was on the 18.09.2013 and application was rejected by the contracting authority on the 26.09.2013.

Within 10 days after the rejection notice, tenderer applied to the PPA as complaint objection. PPA decided that the application of complaint as objection was appropriate on 20.11.2013. That shows the complaint was concluded after 63 days.

Applicant tenderer claims that the documents proving the experience was not approved illegally despite of the fact that they submit engineering graduation certificate.

Decision of Public Procurement Authority was briefly: "Applicant tenderer has authenticated a civil engineer graduation certificate which shows 52 year work experience that is equal to 8521500.00 TL work experience. This value affords minimum amount of requirement 2193000.00 TL. Consequently, graduation certificate is legal in accordance with Article 43 of General Communique for Public Procurements

Because of reasons mentioned above, the complaint's application was approved due to the incorrect operation of contracting authority which is Secretariat General of the Public Hospitals Aksaray.

According to the corrective operation, contracting authority must re-evaluate the tender of applicant as considering the documents proving the experience is valid.

8. ESTIMATED COST

8.1. General

One of the most recent concepts brought about by PPL is the “estimated cost”. This term replaces the term “estimated value” which was formerly used. The contracting entities shall determine the estimated cost in accordance with market conditions via conducting a detailed price and quantity research. Before the determination, the contracting entity shall establish the type of offer and receive the price quotations accordingly. In the procurement of goods and services, the offers may be received as lump sum or unit price where the unit prices are multiplied by the quantities for each unit. In the procurement of works the offers may be received as turnkey lump sum or unit price [21].

According to Article 9 of PPL, prior to the procurement proceedings of goods, services or works, the contracting authority shall conduct all necessary price research and shall determine an estimated cost excluding the value added tax and shall be indicated on a priced bill of quantities with its justifications. Estimated cost shall not be stated in tender or pre-qualification advertisements, and shall not be explained to tenderers or to the others who do not have any formal relationship with the tender proceeding [10].

Confidentality of estimated value is one of the crucial principles of the Public Procurement Law. According to Doğanyiğit (2010), there are some reasons to conceal estimated value.

- Contracting authorities compares their estimated values with the average of other tenders whic allows allows the contracting authorities to check the reliability of calculated estimated value.
- Estimated value is an input to calculate limiting value for the evaluation of abnormally low tenders.
- The confidentality of estimated value indicates whether the tenders are realistic or not.

Additionally Doğanyiğit explained some of the problems about confidentality of estimated value. According to him,

- Disclosure of estimated value may occur maliciously which is illegal according to Turkish Criminal Law.
- Percentage documents of cunstruction gives tenderers a clue to calculate the estimated value.

- The cancellation of procurement means to begin re-tendering process with the disclosured estimated value [38].

8.2. Determination of the Need

Kural and Alsaç (2006) state that the first step of procurement in accordance with PPL is the determination of the need. In the context of their internal work flows, related departments of the contracting entities inform the department which is in charge of procurement about their goods, services and works needs. With the aim of completing investment projects in the planned time period and presenting them for the use of the economy, in order for a tender to be conducted for any work that covers a period exceeding one year, it is compulsory that a program be established to ensure that there is an appropriation in the budget on a yearly basis distributed according to the time period of the work. The appropriation contemplated for the first year shall not be less than 10% of the project cost and the appropriation portions which are initially put in the program for the coming years can not be decreased in the following years. In consideration of the timeperiod in which the planned appropriations can be used, it is essential that the tenders be conducted in due time. For works covering a period of more than one year and having the investment characteristic, excluding those that must be carried out due to natural disasters, it is essential that the tenders be concluded within the first nine months of the year. The procurement of goods and services to be realized in the following fiscal year and having continuous characteristic, however, may be carried out before the end of the previous fiscal year. In construction works, other than projects relating to dams, large-scale irrigations, oil and natural gas pipelines, public entities are not allowed to initiate the tender process without obtaining the building site, completing ownership, expropriation and, if required, development transactions [21].

8.3. Cost-Benefit Analysis

Social projects like Retrofitting of Existing Building need assessment because the government invests heavy amount for benefits of the people. There are various methods available to assess the viability of such projects. Those are Cost Benefit Analysis, Cost Effective Criteria and Acceptable Risk. The most commonly used method is Cost Benefit Analysis [39].

Cost-benefit (BCA) analysis is the fundamental necessity of all before initiating a rehabilitation strategy. Different strategies have widely varying costs. Rehabilitation programs include design costs, construction costs, transportation costs, tenant relocation costs, costs of engineering, and costs due to loss of floor space during and after construction etc. In most cases the value of life is the principal motivation. In addition to these criteria reduction of casualties, cost of repair, loss of building function and business interruption are the other motivating major criteria for the relevant authorities [40].

To conduct a BCA for a project, it is important to complete the following:

- Identify the problem easily,
- Explicitly define the set of objectives to be accomplished,
- Generate alternatives that satisfy the stated objectives,
- Identify clearly the constraints that are technological, political, legal, social, financial that exist with the project environment. This step will help to narrow alternatives generated,
- Determine and list the benefits and costs associated with each alternative. Specify each in monetary terms. If this cannot be done for all factors, this fact should be clearly stated in the final report,
- Calculate the Benefit/Cost Ratios (BCR) and other indicators (e.g. Present value, rate of return, initial investment required, and payback period) for each alternative,
- Prepare the final report, comparing the results of the evaluation of each alternative examined [41].

There is not a comprehensive strategy in Turkey to determine whether public buildings will be rehabilitated or not. After determining the estimated cost of retrofitting project, the contracting authority decides according to its budget ignoring the value of life.

A simple cost-benefit analysis was performed to evaluate seismic retrofitting measures of an apartment building in Istanbul, Turkey. The study combined probabilistic seismic hazard estimates, sophisticated structural analysis techniques and economic cost-benefit principles to select the best of three retrofitting options proposed by local contractors. Actual cost estimates for the retrofitting measures, in addition to the direct dollar losses due to a potential collapse, were considered. In addition, to translate all of the losses into one common metric, the dollar cost of human lives lost in the event of a structural collapse was also considered [42].

A research has been conducted by Yanmaz and Luş (2005) in order to to provide a rational basis for evaluating the benefits and costs of such retrofitting measures, and to implement the methodology on a real building located in İstanbul. For this purpose, they had taken into consideration the different cost types which are structural cost, loss of life, cost of urgent sheltering, cost of retrofitting.

They reached some results by means of fragility curves that shows the probability that for a given ground motion shaking level (peak ground acceleration), the structural response will exceed a given threshold level corresponding to a particular damage level [43].

The results are:

- The fragility curves that are developed for the original model and the proposed retrofitting alternatives provide easy to understand and statically meaningful informatiton on expected

damage. As the damage probabilities were seen to decrease with the additional rigidity provided by the retrofitting alternatives for drift sensitive components, the increases in the floor accelerations with the increased stiffness values led to undesired shifts in the ragility curves for acceleration sensitive components.

- During the Benefit-Cost analysis based on the fregility curves, the human losses were observed to dominate the costs for the un-retrofitted original structure, with structural losses, acceleration sensitive component losses, emergency housing costs, and drift sensitive non-structural component losses following in decreasing order.
- The methodology investigated in this study provides a solid framework for the analysis of retrofitting strategies, especially for developing countries such as Turkey. Additional studies, however, seem to be necessary to be able to utilize this approach to its full effect. Such studies would be expected to focus on detailing earthquake risks, including the effects of local construction practices in the analyses, developing more detailed statistical models for injuries and injury costs, and developing reliable mathematical models for simple retrofitting schemes such as wrapping and encasing.
- For more realistic results, models that more accurately reflect the structural properties of these building types should be used to develop the relevant fragility curves.
- Retrofitting the existing building stock would decrease costs to insurance companies, and insurance against earthquake damage would ease the burden of governments and the affected by the earthquakes [44].

8.4. Calculation of Estimated Value

The estimated cost forms the base for markup evaluation to arrive at the final bid. However, due to uncontrollable risk elements, the actual construction cost will never be exactly equal to the estimated construction costs. A contingency provision is usually included in the estimate for these elements. However, if it is inadequate, the cost overruns will cut into the markup and, in some cases, result in a pure loss at the end of the project for the contractor [45].

To determine the estimated cost of procurement, starting point is to estimate the amount of work. In order to do that, metric lists, site lists, application project, manufacturing descriptions, and site investigation must be prepared.

Additionally, there are some restrictions to use unit prices which are regulated in Article 10 of Regulation on the Implementation of Works Procurement. These are:

- Current market rate and unit prices which are published by public authorities,

- Cost is obtained from individuals or firms which operate as contractor or sub-contractor are experienced in construction,
- Market investigation,
- Current market rate and unit prices which are published by trade associations and universities,
- Estimated values of previous procurement of work [51].

8.5. Case Study

A random time period was chosen to analyze the deviation of amount of contract from estimated cost, by means of procurement search engine of PPA. This random period was the summer season which is very suitable for retrofitting. Table 8.2. which is obtained from Table 8.1., indicates that contracts were awarded approximately 30% below of the estimated cost. This shows that there are huge deviations because of inaccurate calculation of estimated costs and tenders, and competition.

Table 8.1. Estimated costs and amount of contract.

Contracting Authority and Procurement Numbers (Provincial Special Administration)	**Type of School**	**Estimated Cost**	**Best Bid**	**Highest Bid**	**Contract Date**
Samsun 2013/25979	Elementary School	625515.56	619000.00	619000.00	24.04.2013
Van 2013/27999	High School	3742973.00	2508000.00	2742000.00	26.04.2013
Van 2013/28946	Elementary School	1260206.00	850374.00	932400.00	17.04.2013
Bingöl 2013/33289	Elementary School	366978.83	330000.00	365000.00	08.05.2013
Erzurum 2013/34344	High School	1650736.22	1210000.00	1498000.00	05.06.2013
Kayseri 2013/36448	High School	860036.26	614400.00	765000.00	06.05.2013
Van 2013/37728	Elementary School	317428.92	214000.00	300000.00	07.05.2013
Elazığ 2013/40509	Elementary School	580065.01	399000.00	409000.00	16.05.2013
Van 2013/43766	Elementary School	1252012.00	773000.00	1149000.00	29.05.2013

Van 2013/43828	Elementary School	239994.00	170000.00	335000.00	27.05.2013
Bingöl 2013/45977	Elementary School	382144.25	345000.00	397000.00	04.06.2013
Afyonkarahisar 2013/46317	High School	37907.49	35750.00	47000.00	13.06.2013

Moreover, Table 8.3. shows that procurement procedure has a significant role to determine the amount of awarded contract [17]. More competitive procurements were concluded with lower amount of contracts. This result is accordant with the conclusions of Table 8.2.

Table 8.2. Percentage of deviation.

Registration Number	**Estimated Cost**	**Best Bid**	**Percentage**
2013/25979	625515.56	619000.00	1.04
2013/27999	3742973.00	2508000.00	32.99
2013/28946	1260206.00	850374.00	32.52
2013/33289	366978.83	330000.00	10.08
2013/34344	1650736.22	1210000.00	26.70
2013/36448	860036.26	614400.00	28.56
2013/37728	317428.92	214000.00	32.58
2013/40509	580065.01	399000.00	31.21
2013/43766	1252012.00	773000.00	38.26
2013/43828	239994.00	170000.00	29.16
2013/45977	382144.25	345000.00	9.72
2013/46317	37907.49	35750.00	5.69

Table 8.3. Percentage of deviation according to procurement procedures.

Type of Procurement	**Procurement Procedure**	**Amount of Contract (TL)**	**Estimated Cost (TL)**	**AC/EC*100**
Work	Open Procedure	33100022	49094012	67
	Restricted	7129773	10236153	70
	Negociated	3574715	4073248	88

	Total	43804509	63403413	69
Service	Open Procedure	13973457	16132202	87
	Restricted	617974	833913	74
	Negociated	2408916	2681796	90
	Total	17000347	19647911	87

9. CONCLUSION AND RECOMMENDATIONS

There is not a detailed research on the current situation of public buildings about whether retrofitting is needed or not. The most comprehensive research on inventory of public building is performed by Ministry of Development and Housing in 2005. According to this study, there are almost 77,500 public buildings which have 87,918,027 m^2 total area. Seismic evaluation of 17,304 of total buildings was completed. In other words, only the 22 percent of total buildings were seismically evaluated.

Aforementioned study is outdated because of rapidly ongoing construction projects and governmental investments. For the purpose of learning the economic and social risk of possible earthquakes, and taking precautions, the inventory of public buildings must be extracted immediately.

Technical specifications must be within the procurement documentation. According to the literature survey, a standard guideline for all retrofitting procurements is not prepared by any authorized organization in Turkey. A common used technical Specification is extracted from the Specification for Buildings to be Built in Seismic Regions (TEC2007), by the Kocaeli Metropolitan Municipality. To standardize the technical specifications, guideline must be obliged to use for all retrofitting procurements. According to Sucuoğlu and Şengöz (2009), maybe the most important drawback of both TEC 2007 and guideline prepared by Kocaeli Metropolitan Municipality is to estimate the damage that is higher than the damage observed [26]. Because of mentioned shortcomings, cost overrun in the estimated value of retrofitting project arises. Part 3 of Eurocode and ASCI 41 is very useful directive for amendment of guideline used for retrofitting procurements.

Another important problem of not only retrofitting procurements but also all procurement of services and works is abnormally low tenders. According to the DG III working group on ALT's, errors in evaluating tender document is one of the causes of ALT's. Considering Turkey, the most important reason of ALT's is to ensure the staying in business. The questionare performed about the causes of ALT's in Turkey by Gunduz and Karacan (2009) confirms this event [36].

Moreover, it is stated that current market rates and unit prices which are published by public authorities are some of the required inputs to calculated estimated value. Because of the fact that unrealistic unit prices cause higher estimated value, the limiting values are calculated more than usual. Determination and explanation procedure of ALT's is very complicated which causes waste of time, money and labor. Applying strictly the qualification rules in retrofitting procurements seems to be the most appropriate solution to prevent ALT's in Turkey. Another three recommendations to decrease ALT's are summarized as,

- Tender documents should be carefully prepared. It is closely related to the importance of qualification rules.
- Quality control must be carried strictly.
- Limiting value may be reduced. According to General Communique for Public Procurements, N value for retrofitting procurements is 1,00. There is an inverse proportion between N value and limiting value. Thus, the N value should be increased to reduce limiting value. In this case, it is very crucial to apply strict quality control for contract amounts which are close to limiting value.

According to Public Procurement Law, complaint mechanism is carried out by the contracting aouthorities and Public Procurement Board. Table 6.1. shows that the 6% of procurement of works and procurement of services was the subject of the complaint. In 2013, the main reasons of complaint about retrofitting procurements were abnormally low tenders and qualification criterias.

A complaint application to the contracting authority should be made to the latter within 10 days. On the other hand, the Public Procurement Board takes the final decision within 20 days in general, and 10 working days in urgent cases. Table 6.5. shows that the complaint period is too long which is reason of delay in retrofitting projects. To decrease long complaint period, tenderers who truly suffered a loss of right should be permitted to apply. The easiest way to accomplish this is to increase the application fee.

The rules of estimated value is regulated in Article 9 of PPL. According to PPL, estimated cost is confidential up to the auction date. The main reason for confidentality is to check the reliability of estimated cost by comparing with tenders. In practice, estimated cost can be already calculated before auction date by tenderers. This reality poses a question mark about the confidentality of estimated cost. It is thought that confidentality of estimated cost is not useful and essential.

It can be argued that the work experience is the most important qualification criteria. Rules for documents prove work experience is explained in the Communique on Similar Works for Procurement of Works. When aforementioned communique is analyzed, there is not a group or sub-group for repair and retrofit procurements which are generally assessed within Group B-II that includes building works. This situation causes that retrofitting works are implemented by ordinary and insufficient building contractors. To prevent mentioned drawback, a group for retrofitting projects should be established and be determined as similar work for all retrofitting works.

Moreover, inaccurate estimated costs may lead contracting authorities to mistaken retrofitting decisions. As stated above, unrealistic unit prices cause higher estimated value. The contracts are awarded to quite higher bids than market prices. Table 8.2. proves that the deviation of unrealistic estimated costs. According to Table 8.2., contracts were awarded

approximately 30% below of the estimated cost. To prevent this deviation, unit prices which are published by Ministry of Environment and Urban Planning are needed to be revised urgently.

In Turkey, the decision making process is very superficial whether public buildings will be retrofitted or not. Not only a legislative framework but also a comprehensive academic study about benefits and costs of retrofitting projects does not exist. It is very crucial to create a legal framework as taking into account not only the structural cost but also life cost.

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