SUMMARY

Earthquakes have affected buildings structures since the beginning of construction history. The buildings that appeared to be strong in the usual life (like masonry or stone buildings) could be potentially devastate to a catastrophic level. Various interpretations have been forwarded about the potentials of the collapse of the buildings, based on observation of the response of the buildings during the earthquakes. Scientists work on the effects of seismic activity on the buildings, and on the prevention of major damages and loss of human lives. The outcomes of all these research's come through with the direction of building techniques and materials.

Surprisingly the performances of historical buildings under the seismic activity can be very successful compared to contemporary buildings. The traditional techniques and earth materials performed successfully in past earthquakes. This issue took the scientist's attention to the historical building techniques. As well as the questions related to understanding these historical structures and their seismic behavior. For instance, many ancient structures in Turkey were still standing from centuries and passed many earthquakes without any consolidations. Therefore this issue have to be investigated for giving a new light to the ancient construction details.

There are so many questions that arise from the investigation on ancient structures. But one of the most interesting one is if the old masons were aware about the ancient anti - seismic constructions details or they used those techniques according to other criterions such as the patron's requests and the budget of the construction. This question is important in order to understand the development of the construction against the seismicity and the integrations of the construction details and architectural essences between different cultures, like appended in ancient Ottoman period.

Ottoman baths are ones of the still standing structures from centuries without or with minimum consolidation. The typology of those buildings, their historical locations and cultural environment are very interesting and appropriate for investigation of this research topic. The cultural era, between 13th and 16th century in Ottoman domination, is the time where integration of construction details from the west and the east was achieved. The new society of the Turkish people and their innovative character formed a new architecture which was the source of classical Ottoman architecture. While the development of the construction techniques and structural applications progressed in parallel to architectural styles. The essences of Byzantine, Seljuk's building techniques could be followed on the buildings of that era.

In this study for understanding the anti – seismic construction awareness of the mason's in 13th and 16th centuries; research mainly focused on historical construction techniques in varied cultures in different of times such as Turkish seigniory, early Ottoman and Byzantine periods. Analyzing those techniques gave an overview of the history of construction and their integration with local cultures. And also some answers to the questions such as "how it was firstly built and developed".

The secondly focused issue for finding an answer to the problem were analyzing the ancient masonries of the baths with techniques adopted for traditional buildings in seismic areas, such as masonry quality index evaluation, damage and collapse analysis. Those investigations were qualitative but also quantitative analyses which give an estimate of the strength of the masonries and possible collapsed scenarios. The outcomes from those investigations were the clues for understanding the usage of preventive techniques for seismic protection.

SUMMARY

From the outcomes of the methodological investigations and comparison of historical outlines, it appears that the masons were aware of seismic activity and they adopted some ancient precaution techniques against the earthquake effects. However these techniques were used randomly in building scale facing other constraints such as budget and patron tendency in architecture. As well those preventive techniques were not commonly used in city scale. Some architectural, construction tendencies and integrations were commonly used in settlements however they not became generalized.

The results and the research methods of the thesis are giving a perspective of thoughts of construction of ancient buildings that we can learn some ideals about their resistance to the seismic activities. The interpretation of these ideals were the decision process for the building design construction in the ancient times.

These ideals were collected together and divided in two groups. The construction details, which divided into the sectional layout of the wall, and perpendicular attachment details with masonries were collected in the first group. As well the cross sectional layout, horizontal and the vertical beams, which were constructed with a timber or brick materials were get into this group. In addition, supports of the structure such as outside perpendicular walls were another tendency for the ancient construction and precautions of the buildings for the seismicity.

In the second group, the precautions were analyzed and the ideals collected in the level on plan layout and the sectional dimensions of the structure. The square shape of the plan, continuity of the masonry walls with many perpendicular walls were affected the behavior of the building in the level of horizontal loads. However, the sectional layout of the building was another important aspect that the ancient builders give less attention on that. The different heights of the structure made the building weaker according to the higher parts. These parts always had a tendency to collapse on to the lower parts. Tambour and perpendicular supports were the only used structural elements to keep the dome and the whole structure in stable and not to collapse.

All these ideals were used in the ancient building in a very smart way by the ancient masons. These were the reason for remaining of these structures for centuries against the earthquakes and many destructive factors.

In this study, the reason for the survival of structures from the past to future were examined. For the future research, preservation of these structures should be the goal of the research because of their cultural value and their witnesses for the past.