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This essay will consider the issues in the practice of conserving and preserving built heritage sites, and will draw upon Hagia Sophia, a UNESCO World Heritage Site in Istanbul, Turkey, as a case study (Figure 1). Azizi, et al., (2016) identifies five problematic areas in building conservation: environmental, human, organisational, technical and financial. This essay takes these findings as a foundation and although it will touch upon each theme, the primary focus will be on environmental issues. This essay will provide a biography of Hagia Sophia and a discussion of conservation and preservation issues associated with the site.

Construction on Hagia Sophia finished in 537 (Cakmak, et al., 2009, p.693). This contested space was a key site of worship for two different religions and civilizations – Christianity until 1453 and Islam until 1934 – and since 1935 has functioned as a museum attracting over two million people each year (Kucukkaya & Sazak, 2018, pp.1-11). This essay will therefore refer to Hagia Sophia using the neutral term ‘building’ or ‘site’ (rather than a church, mosque or museum). The transformation from mosque to museum occurred during the secularisation of Turkey in the earlier years of the 20th Century, and since that point Hagia Sophia

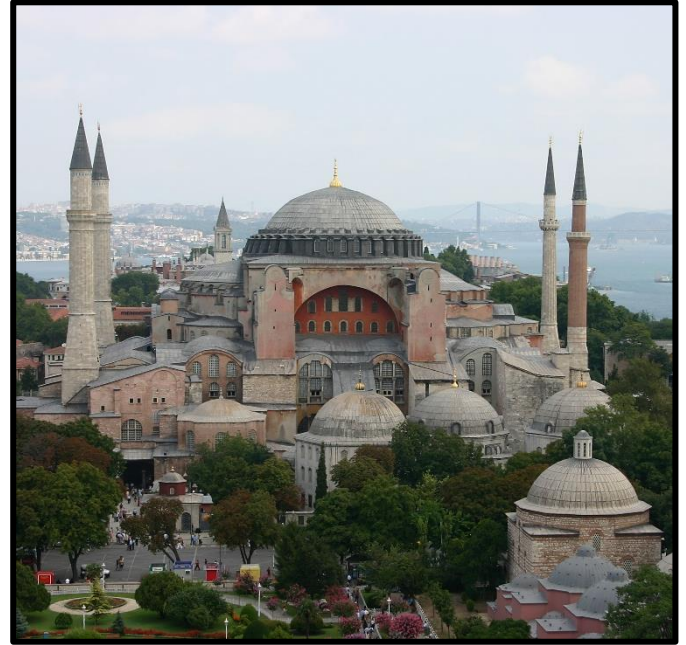


Figure 1 = Hagia Sophia. Hagia Sophia Museum, 2019

has become a symbol of the secularisation and ‘plurality of Istanbul’ (Avdoulos, 2016, pp.180-185). The process of musealisation, which is widely debated, criticised and could be considered as a political strategy, has preserved, conserved and developed the historical buildings of Istanbul. Despite the introduction of the *Istanbul Museum-City Project* in 2004, the primary aim of which was to transform Istanbul into an open-air museum focusing on the Ottoman past, there is increasing pressure from the state and Islamic community to re-sanctify the museum as a mosque, and this is connected to the Turkish state’s more recent pursuit of Islamification (Aykac, 2019, pp.161-173; Telegraph, 2019). Hagia Sophia has become the iconographic image associated with Istanbul, playing a major role in the city’s, and religious communities’, sense of identity (Avdoulos, 2016, pp.187-188). The site has immense religious, historical and political resonance. Prior to the construction of Hagia Sophia, the site housed temples of ancient religions. Many of its present structural and architectural features were sourced from holy Middle Eastern sites and Byzantine administrative buildings were constructed around it (Nur & Ozer, 2017, pp.61-69).

The secularisation of Turkey resulted in Hagia Sophia coming under the control of different government departments and taking on new identities and operations. After 1924, Hagia Sophia was taken into the jurisdiction of the Turkish Ministry of National Education, later it was transferred to the Undersecretariat for

Cultural Affairs, and from 2003 to the present day became the responsibility of the Ministry of Culture who are the main Turkish body for conservation affairs (Avdoulos, 2016, p.185; Aykac, 2019, p.164). It remains a site of socio-political, religious, archaeological and cultural significance in the region and in the world.



Figure 2 = Hagia Sophia Domes. Hagia Sophia Museum, 2019

earthquake, fire and war have resulted in the damage and destruction of aspects of Hagia Sophia (Nur & Ozer, 2017, p.60). Consequent restorations and additions such as structural supports, mausoleums and the straightening of columns have not affected Hagia Sophia's structural integrity (Ozkul & Kuribayashi, 2007a, p.2100; Kucukkaya & Sazak, 2018, pp.4-5).

Byzantine Iconoclasm removed Hagia Sophia's religious iconography in 726 but new mosaics were installed in 823 (Met Museum, 2019). In 1453 the Ottomans converted Hagia Sophia into a mosque removing the bells and altar. The more decorative elements of the building were radically altered. Iconographic images and mosaics were plastered over. These and further alterations of the decorative fabric of the building are highly problematic in terms of conservation. The Islamic religious art is subject to destruction in order to reveal the hidden Christian iconography, just as the Christian iconography was subjected to potential damage as a result of being deliberately hidden from sight (Kucukkaya & Sazak, 2018, pp.4-10).

Hagia Sophia and the Old City of Istanbul gained World Heritage Status in 1985 and the conservation and preservation of this site was prioritised accordingly (Avdoulos, 2016, p.180). However, it was not until 2004 that Turkey amended their conservation legislation, and the notion of heritage management was introduced (Aykac, 2019, p.164). Avdoulos (2016, pp.180-189) considers that the secularised conservation management approach used at Hagia Sophia disregards religious values. The building is therefore problematic for heritage managers. Both Christian and Muslim religious communities believe that the site's religious integrity is jeopardised through its secular use as a museum and are demanding that the building is returned to a site

of worship (Avdoulos, 2016, pp.180-189). This poses a fundamental question. Which religion would be given priority? Could both religions share the site for this purpose? In 2010, 200 Greek Orthodox Christians were barred by the Turkish government from holding a Holy Liturgy Service in Hagia Sophia (Avdoulos, 2016, p.190; Reuters, 2010). In 2014, 40,000 Muslims prayed outside Hagia Sophia to protest its function as a museum. Salih Turan, organiser of the protest, stated that Hagia Sophia's secularisation was an insult to the Muslim population (Boston University, 2014; Reuters, 2012). This dispute between faith, politics and function also exists within the academic space of heritage studies, where a debate is conducted over whether Hagia Sophia is a symbol of equality between the two religions, as both the Byzantine and Ottoman histories are displayed side by side (Figure 3), or whether Hagia Sophia is 'a symbol of Islam's victory over Christianity and the West' (Shaw, 2011, p.932; Bora, 1999, p.50).



Figure 3 = Hagia Sophia Ottoman & Byzantine Iconography. Hagia Sophia Museum, 2019

Built heritage conservation is the retention and preservation of a building without change or damage to original features, but it can involve repair as the primary aim is to 'prolong the life of the building' (Azizi, et al., 2016, p.588). Azizi, et al., (2016, pp.588-594) identify 46 issues with building conservation and arranges them into five themes (Figure 4), ranking from the most problematic to the least problematic in a conservation context: technical, environmental, organisational, financial and human. If these themes are applied to Hagia Sophia, it appears that it is the environmental aspect which presents the most problematic conservation issues. However distinct these themes appear to be, the central area 'common issues' is where the boundaries between the themes become blurred. This is particularly evident in Hagia Sophia's preservation and conservation issues, notably in the crossover between the 'human', 'technical', 'financial' and 'environmental' themes. Some of these non-exclusive examples include: funding (financial) used to either employ specialists or train people to become conservators due to the lack of knowledge (human); but because of the poor financial support (financial and technical), this becomes difficult and may therefore affect the building's condition (environmental).



Figure 4 = Common Issues in Conservation. Azizi, et al., 2016, p.588

However, Hagia Sophia faces a number of problems in terms of its future conservation. A multidisciplinary approach, including aspects from all the above themes, and professionals with several different skill sets, is required. Ongoing research into Hagia Sophia reflects this breadth of approach. The building's structure has been well documented with 3D laser scanning and ongoing long-term monitoring for humidity, moisture, cracking and damp (Built Heritage Monitoring Conservation Management, 2013, pp.1084-1085). This data will help to counter the technical and human deficits in knowledge and skills that may otherwise become issues in future restoration and preventative conservation.

Between 1992 and 2007, four investigations produced reports into the effects that future earthquakes could have on Hagia Sophia (Nur & Ozer, 2017, p.73). Additionally, non-destructive techniques have been used to determine the preservation of the Byzantine mosaics behind the Ottoman plaster. This set of data has influenced the development plan to conserve and protect the mosaics (Moropoulou, et al., 2013, p.133). A multidisciplinary approach has ensured that experts in many different fields have assisted in what is, to date, the successful conservation and restoration of Hagia Sophia (Built Heritage Monitoring Conservation Management, 2013, pp.1084-1085; Nur & Ozer, 2017, p.72), notwithstanding the wider political and religious considerations of the site.

A values-based approach is preferred for the conservation of built heritage where the sites' significance or value is determined by stewardships, their criteria and the stakeholders. The value itself then determines choices of whether the site is or is not to be conserved (Poulios, 2010, p.172; Mason., et al. 2003, p.5). This

values-based approach is unsuitable for Hagia Sophia, due to the intensity of stakeholders protecting their individual 'ownerships' in the building's differing secular and religious functions (Avdoulos, 2016, p.194). A living heritage approach, a community-based substitute for a values-based approach which focuses on conserving the flow of a core-community's relationship with their living heritage (ICCROM, 2018, p.9), may appear to provide a solution for the site. However, Hagia Sophia has had a sequence of different functions and has not one core-community, but three – church and members of the Christian community, mosque and members of the Muslim community, museum and members of that community, which includes heritage managers, stakeholders and staff (Avdoulos, 2016, p.193). As with the 'common issues' in Figure 4, there are further crossovers within the core-communities of Hagia Sophia. Members of the Christian and Muslim communities may be employed by the museum, and local communities of either religion may be reliant on tourism generated by the site.

The multiple interests at 'the junction of sacred and secular' mean that current conservation and management frameworks do not easily fit Hagia Sophia, which could be classed as a living heritage site. There needs to be a re-evaluation of the focus and definitions of a living heritage approach, and only then will a suitable conservation approach for Hagia Sophia emerge (Avdoulos, 2016, pp.195-198).

In terms of conservation practice, Azizi (2016, p.589) points out that human error, misinterpretation, lack of knowledge and poor communication can lead to incorrect assumptions and decision-making on conservation issues. If, for example, a conservator was not aware of Hagia Sophia's two structural systems and the necessity of the stone, brick and mortar's role in providing 'the stiffness of the primary structural elements' and applied the wrong conservation method, the building's integrity could be affected (Ozkul & Kuribayashi, 2007b, pp.1213-1216).

Another issue that may affect conservation practice is shortage of funding, material and skilled labour. This is problematic as 'there is no unifying document that defines the purpose of conserving the built cultural heritage', despite stricter guidelines determining that restorations and repairs must use the original and authentic materials and techniques, which can prove to be costly (Azizi, 2016, p.590; UNESCO, 2019).

Environmental pressures such as weather and atmospheric conditions, building condition and location, and economic and redevelopment issues can play a major role in the conservation and survival of a building. Heritage sites in cities experience greater pressure for redevelopment, whereas sites in rural areas with transport limitations are problematic to access and inhibits the profit/conservation exchange (Azizi, et al., 2016, pp.589-593). This, however, does not apply to Hagia Sophia which has an abundance of tourists (Kucukkaya & Sazak, 2018, p.10), which in turn may have increased tensions with the faith communities connected with the site who wish to return Hagia Sophia to its original purpose(s).

The main conservation issues for Hagia Sophia are its location and its condition. Situated on the conjunction of the Eurasian, Anatolian, African and Arabian Plates (Figure 5), Istanbul is subject to significant earthquake activity (BBC, 2019; Cakmak, et al., 2009, pp.695-697). Due to this, several of the arches and the main dome of Hagia Sophia have collapsed resulting in in many

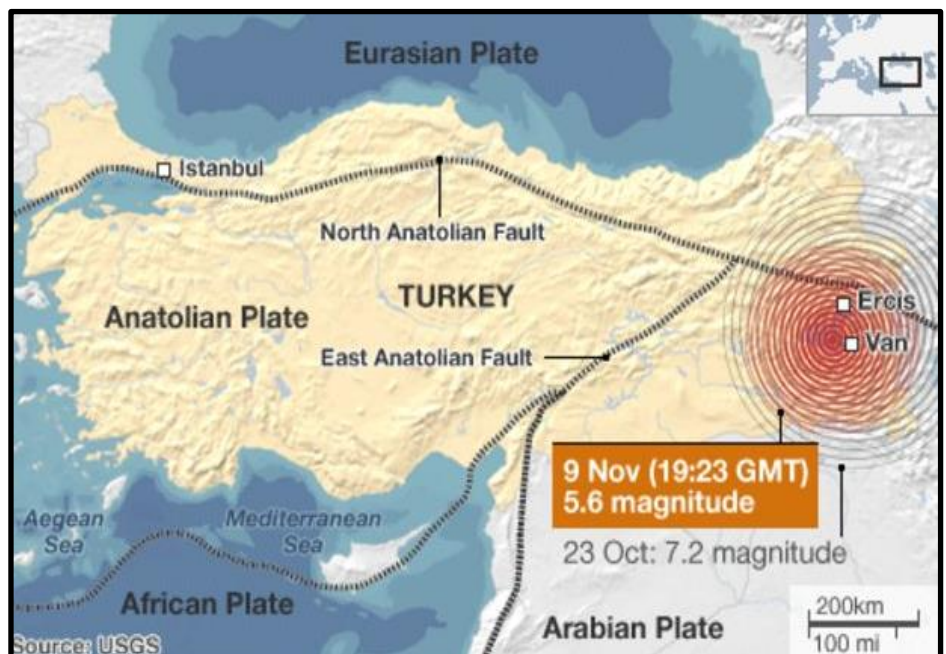


Figure 5 = Plates Surrounding Istanbul. BBC, 2012

reconstructions and repairs over the centuries. These destructions and reconstructions, along with the materials and pace of reconstruction, have resulted in large deformations in the building's structure with arches bowing outwards, gaps allowing water to penetrate the walls, and the structural material to become frail and decay (Ozkul & Kuribayashi, 2007b, p.1212; Built Heritage Monitoring Conservation Management, 2013, p.1087). Due to the inevitability of the occurrence of future geological earthquake activity, Hagia Sophia has been the subject to research and analysis, such as vibration surveys, to determine the effects that an earthquake might have on the building today. This data has shown that whereas low-level magnitude geological activity will have little effect on Hagia Sophia, high-level activity will be detrimental and may even cause the building's destruction (Ozkul & Kuribayashi, 2007a, pp.2101-2105).

Changing humidity levels and external temperatures also play a major role in determining the internal conditions of Hagia Sophia. In summer months, the highest temperature in the building is in the dome, however in the winter the highest temperature is in the second cornice. High temperatures and groundwater infiltration lead to high humidity levels in the building, which then causes condensation to occur on the walls. The humidity and water penetration of the walls allows for salt crystallization weakening the fabric of the walls and causing flaking and discolouration of the decoration. In 2008, the removal of plaster from a western exterior wall in order to reveal the Byzantine layer caused significant quantities of water to penetrate the wall (Built Heritage Monitoring Conservation Management, 2013, pp.1085-1088). This was a result of a lack of adequate knowledge of both the geological and environmental aspects of the building, and how the building materials themselves respond to those aspects.

Later research by Mizutani, et al (2015, p.1354-1358) found that measurements of the humidity level of Hagia Sophia show relative ongoing stability in the integral moisture levels within the building. Thermal imaging has shown, however, that raised moisture content, when present, is due to runoff rainwater penetrating the walls at points where plants and roots are growing. Therefore, preservation of Hagia Sophia can be improved through measures to limit the quantity of runoff rainwater (Mizutani, et al., 2015, p.1354-1358), possibly through appropriate guttering systems. This however, would affect the appearance and authenticity of the site. In addition to this, the lead roof began to leak in the 1990s, allowing in further rainwater. From 1996 to 1998, Hagia Sophia was monitored by the World Monuments Fund (WMF) and from 1997 to 2002, WMF received several grants from American Express to restore the dome and repair the roof (Kucukkaya & Sazak, 2018, p.9). As can be seen in the continuous provision of grants throughout recent years, Hagia Sophia's acknowledged significance has ensured that considerably funds and efforts have restored and repaired the damaged from wars, strifes and natural disasters (UNESCO, 2019; Nur & Ozer, 2017, p.60). However, there is ongoing damage to the structure and fabric of the building through environmental factors such as issues with the presence of runoff rainwater, vegetation, and humidity level. Conservation can be improved through attention to these environmental issues, thus ensuring preservation rather than more costly and inauthentic repair (Mizutani, et al., 2015, p.1354-1358).

This essay has shown that there are many aspects of a building, and its location, that must be considered in the conservation and preservation of buildings of historical complexity and contestation. Although conservation practice undertaken at Hagia Sophia in recent years has, thus far, been successful, the current conservation approach is not entirely suitable, and a possibly more appropriate Living Heritage approach needs amendments to its remit. However, if it were not for conservation and preservation practice, Hagia Sophia would not be in the immaculate state it is in today. Heritage buildings attract millions of visitors each year. This brings in money for the museum who can then employ and pay staff, as well as bringing in money for the country. Heritage buildings become part of a country's identity and political prowess, despite the problematic contestation of faith ownership as can be seen with Hagia Sophia. Without conservation practice, heritage buildings would fall into disrepair, there would be no financial gain for the country, there would be no educational value, and the history would die along with it.

Words: 2668

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