

'Green is the New Black': Sustainability in Contemporary UK Crematorium Design.

Cremation was revived in Britain in the late nineteenth century as an alternative to burial. The movement was historically secular, informed by concerns over hygiene, overcrowded burial grounds and cemeteries, and supported by advances in late Victorian technology and scientific thinking. Given that for two thousand years Christianity had fostered burial as the traditional form of funeral, it is somewhat remarkable that cremation attained cultural normality, indeed ritual dominance, by the late twentieth century: today 76% of deaths result in cremation in the UK.

However, by the late twentieth century, cremation was to face its own challenges. There were great pressures on crematoria to operate as cost effective businesses, both across the public and private sector. The financial downturn in the UK prompted the fuel crisis in 1973 which caused the Conservative Government Audit commission 'to make suggestions for economies and revenue production which would have made both burial and cremation expensive'.

But there were further pressures to come. Given that hygiene had been one of the premises upon which cremation had been promoted some hundred years previously, it was somewhat ironic that the contemporary issues would be environmental ones. Even before the passing of the Clean Air Act in 1956, concerns were expressed in the UK about the hazards of industrial emissions and nuclear power, giving rise to a public consciousness about man-made threats to the earth and its atmosphere. Membership of the European Union in 1972 introduced further external environmental pressures and in 1990, the Thatcher government passed its Environmental Protection Act. Cremation came under particular scrutiny when Government research and publications began to draw attention to the increase in atmospheric dioxins attributed to emissions from the combustion of 'glue, paint, embalming fluid, PVC, rubber soled shoes and other man-made fibres'. By 2001 commentators were arguing that *'the environmental issues involved in the debate about burial and cremation replicate those involved in the problem of household waste and in the comparative benefits of landfill versus incineration'*.

From 1991, crematoria could only operate with prior authorization from Environmental Health Officers. All emissions were now to be monitored. The policy was given the acronym BATNEEC (Best Available Techniques Not Entailing Excessive Costs). Local authorities, who owned the majority of crematoria, had to comply. This required revising budgets and fitting new filtration equipment by April 1997, involving the adaptation of existing crematoria. Costs were estimated at £70 million for the, then, 255 crematoria. Mercury remained the most hazardous emission and as industrial mercury emissions declined, crematoria became exposed as the major polluter on account of dental amalgam fillings. The UK was a signatory of the OSPAR (Oslo-Paris) Convention for the Protection of the Marine Environment of the North-East Atlantic. Its recommendation in 2003-4 called for an application of BATNEEC to prevent the dispersal into the atmosphere of mercury emissions.

In 2005 Defra, The Department for Environment Food & Rural Affairs, introduced a further requirement for the cremation industry to remove mercury from 50% of cremations. This gave rise to the need for costly filtration equipment in crematoria, adding further to the burdens of those planning to build new crematoria; and rendering crematoria too expensive for local authorities to finance. This accounts for the dominance of the private sector in crematorium design where only 4 of the 40 crematoria opened between 1993 and 2011 in England and Wales and 2 out of 8 in were local authority owned.

The cremation industry responded imaginatively to the national target of 50% by creating the Crematoria Abatement of Mercury Emissions Organisation, CAMEO in 2014. This non-profit making organization provides and manages a national burden sharing scheme, whereby emissions are negotiated between crematoria. Those crematoria unable to abate, 'buy' abated cremations from those crematoria able to do so – effectively an internal trading agreement.

So how has contemporary crematorium design changed to accommodate sustainability? My first example is the new crematorium at Crownhill, Milton Keynes. In 2005, Milton Keynes Council Environmental Health established that a new crematorium would be required in what was then the UK's fastest expanding city. *Architecture MK* (the local authority architects' department) was commissioned to design a building with a calm and tranquil character suitable for its purpose, without

appearing to be associated with any particular culture or religion. The agreed design, which incorporates a combination of curved cycloid shaped in-situ concrete roofs and flat roofs, was inspired by the Kimbell Art Museum designed in 1966 in Fort Worth, Texas by American architect Louis Kahn. This design, with its concept of 'served' and 'servant' spaces, became the concept and inspiration of the Milton Keynes project, where the combination comprises wide span 'served spaces' in austenitic stainless steel clad cycloid form concrete roof vaults, located over concrete columns, in conjunction with flat roofed 'servant space' elements. The 'served' spaces comprise the chapel, which lies at the heart of the design, seating 145 people, the waiting area, cremator plant room, administrative spaces, the portecochere, and the covered departures area and wreath court. The cremator room includes the mercury abatement equipment and Milton Keynes participates in the CAMEO 'burden-sharing scheme'.

The 'servant spaces' are located under the flat roofs between the cycloids and comprise the stores, the officiant's room, WCs, kitchens, stores and cremulator room.

The project was delayed to some degree over issues of funding and by the time work resumed in 2007, a new imperative had emerged in the form of the Council's new sustainability policy - D4, requiring amongst other things, that 10% of all the building's energy be generated from renewable sources, such as wind turbines, photovoltaics, ground source heat pumps etc.; that insulation U-value standards were to be 20% better than Part 1.2 of the current Building Regulations, and that lighting must be of a very low energy usage. Sustainability therefore became a key driver for the project. It was agreed with the planners that heat recovery from the cremators would be an acceptable alternative to renewable energy – thus avoiding wind turbines which were deemed by the architects to be inappropriate for a crematorium.

Energy conservation and the minimizing of energy usage were a prime consideration in the development of the design. The excess heat produced by the cremators is used to heat water stored in buffer tanks. Heat pump technology pumps that water to heat the building throughout and to provide a hot water supply. Lighting is low energy LED and intelligently controlled ventilation systems were installed throughout the building, rather than air conditioning. Temperature regulation is also supported by the high thermal mass of the structural concrete vaults.

The location of the building was over existing planting. For this reason, new planting was incorporated as part of the works. The scheme was designed in conjunction with MKC Landscape Architecture and the SUDS (Sustainable Drainage System) Consultant RPS Design. The design provides contrasting elements of partly manicured formal garden and partly natural meadow and woodland. The building is contained by the SUDS system, which was designed to enhance the existing natural watercourse that runs through the site, thus improving the habitats of the existing wildlife. While the building did disrupt some ecology, the use of specific planting, wetland and other silviculture, has enhanced the overall ecological importance of the site. The final scheme was much admired, winning a Concrete Society Award in 2012. The chapel is thought widely to have 'an uplifting interior', used for blessings at weddings and the fine acoustics of the chapel have resulted in the local orchestra using it for practice and performance', providing powerful evidence of a new crematorium played an extended role in the community.

Unfortunately, on account of local authority strictures Architecture MK was closed and oversaw stages A-G. Robert Potter and Partners were engaged to oversee the final stages H-L. It is more than likely that the firm were engaged on the basis of their reputation for sustainable crematorium design in Scotland.

Established in 1964 with offices in Ayr, Dumfries, Glasgow and Stranraer, with wide-ranging experience, the firm designed the much admired Rouchan Loch crematorium, set in 10 acres of natural countryside outside Dumfries, bordered to the north by mature Scots pine woodland, and to the south by the Loch itself. Opened in 2005 after fifteen years of planning, this Scandinavian-style crematorium was the first in SW Scotland, preventing funerals having to be arranged in Glasgow or Ayrshire. Completely hidden from roads, the timber buildings are designed to blend in with its rural surroundings and wildlife is encouraged on the site. The principal building contains a small chapel, with seating for only 40 people, together with the cremation plant. The landscape setting was the key to the design of the building, emphasizing the peaceful atmosphere of the place and the crematorium was built using sustainable materials. Glazing on both sides of the service room frames the views to the woodland and the loch. The building is positioned as close to the loch as possible to allow natural light to reflect into the service room from the surface of the

water. It was specifically designed to host small-scale services (held in addition to a main service in the Church or Chapel of Rest). The use of materials is paramount. The building has a glulam timber structure and uses western red cedar externally and yellow pine internally. A waiting area was added in 2010, designed to look like a Viking longhouse. A separate memorial lodge, built in the style of a log cabin with a living roof, based on examples seen by the owners in Scandinavia, houses the Book of Remembrance. In addition to this book, memorials take the form of trees and bushes, together with the more unusual engraved boulders, woodcarvings and leaves on a memorial tree. There is a green burial site adjacent. Roucan Loch was commended for its use of sustainable materials by the Glasgow Institute of Architects in 2005.

The following year, 2006, the firm designed South Lanarkshire, Blantyre, one of only two local authority crematoria of this period. This was to be the first project in Scotland to incorporate mercury filtration and has been praised by the Scottish Environmental Agency. From a stylistic point of view, Blantyre begins to represent a somewhat homogenous style, in common with its contemporaries, south of the border. The clock tower has an undeniable likeness to a Tesco supermarket.

Livingstone was the first of two crematoria to be designed for The Westerleigh Group in partnership with West Lothian Council, by Stride Tregowlan, a leading English practice based in the southwest. Opened in 2010, it conforms to the modern vernacular style, which the owners contend 'has a light, natural look, in sympathy with its rural surroundings and is one of the most environmentally friendly in Europe.

One of Scotland's most recent crematoria opened in 2011 at Melrose, serving the Borders. Again by Stride Tregowlan for The Westerleigh Group, the project met with fierce opposition, *The Borders Telegraph* reporting one objector as saying it 'was the biggest disaster since the Romans arrived in Melrose'. Situated adjacent to Wairds Cemetery, which is within the Eildon and Leaderfoot National Scenic Area, on the slope of Eildon Hill North it enjoyed protected status. Objectors were taken to look at the recently opened Livingstone, which they concluded was 'relatively unobtrusive', 'simply designed', 'tastefully decorated' with 'an attractive use of wood and natural

stone'. The style, by now recognizable, was not the problem; the objectors conceding that it could be 'the right building in the wrong place'.

Interestingly, Robert Potter & Partners and Stride Treglown both have experience in the healthcare sector, suggesting a parallel with places of healing and comfort which also incorporate natural materials and place great emphasis on the crucial role of the natural landscape.

In conclusion, the 1990 EPA, as amended by the Pollution and Control Act, 1999, had three major effects on cremation and burial in the UK: a greater public awareness of environmental issues, not least because of the potential impact on funeral costs; the revival of 'green' burial: and the return of the private sector in cremation provision. Some local authority crematoria responded to the environmental challenge by selling crematoria (or outsourcing the management alone) to private firms; other local authorities, without existing crematoria now began to rely on private provision for many of the new-builds. As I hope I have shown, architects have risen to the challenge of sustainability on all counts.

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Austenitic – austenite, also known as gamma-phase iron (γ -Fe) is a metallic allotrope of iron or a solid solution of iron with an alloying element.

Photovoltaics – devices designed to convert sunlight into electricity.

A sculpture depicting three deer - presumably in response to the resident herd of fallow deer on the site - was commissioned from *Mor Design* following a long consultation process with the local community as part of the planning agreement with the Council and led by the authority's arts officer.