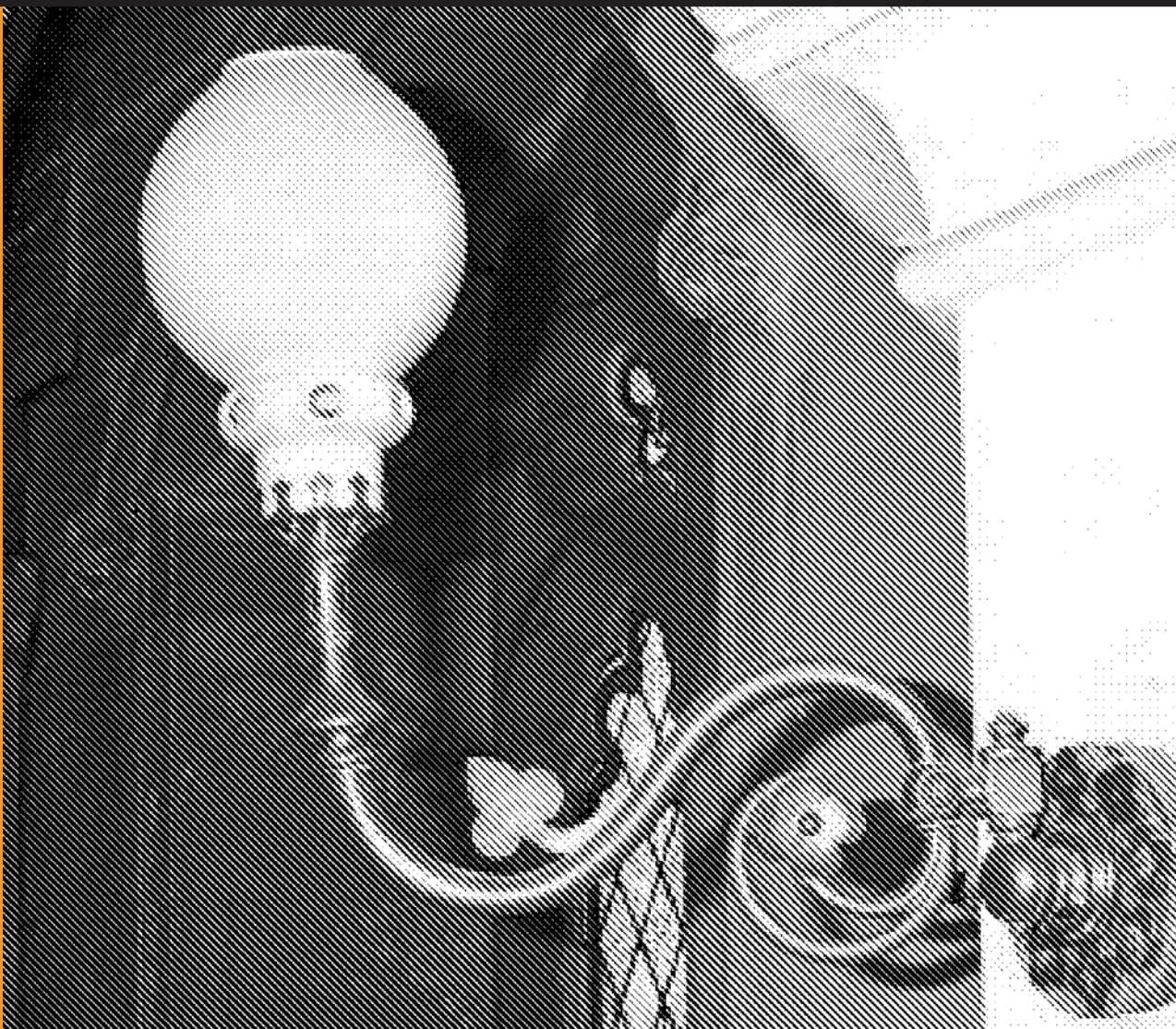


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PRINCIPLES OF CONSERVATION PRACTICE

Engineering the past to meet the needs of the future



This paper is the first in a series of information guides aimed at providing “easy to understand” advice on the most appropriate conservation and installation principles for incorporating building services into historic or traditionally constructed buildings, many of which will be listed.

SERVICES COVERED ARE:

- 1 Principles
- 2 Water
- 3 Electrical
- 4 Heating
- 5 Lighting
- 6 Fire Alarms

This first guide presents the general principles of good conservation practice that applies to all installations, irrespective of building service.

INTRODUCTION AND PRINCIPLES

What are we setting out to achieve when we extend, repair or replace the building services installed within a historic or traditionally constructed building? Usually the answer is to accommodate either a change in building use, a desired improvement in internal conditions or facilities, or to incorporate equipment and/or changes necessary to meet legislative requirements.

In conservation it is often said that to do nothing or nearly nothing is better than action, but with the relative short life expectancy of 25 – 30 years for building services, even those early systems of historic significance, ‘nothing’ is rarely an option for building services engineers.

The philosophical approach to general conservation can be summed up under three headings:

- Why do we wish to conserve?
- What are we trying to conserve?
- How should we conserve?

Building services are unfortunately often viewed as the ‘youngest’ and least historically important part of a listed building, (the earliest historic services usually date from around 1850-1860), so the three questions are rarely applied. This has resulted in a lot of early examples of heating, ventilation and lighting systems being badly converted, removed or lost.

Therefore addressing the three philosophical questions:

- We conserve early examples of building services installations because they are rare and every bit as important a part of this country’s industrial heritage legacy as early steam trains, railways, pumping stations and metal hulled ships.
- We are trying to conserve these examples in as original state as is possible, for example by leaving original radiators and pipework and reusing them as part of a refurbished system. It will be a rare occasion that a fully functioning, unaltered early Victorian heating or lighting system will be found, but when that does happen, minimum intervention should be the standard.
- Where complete conservation is not possible, due to modern safety standards alterations may have to be considered in order for part of the installation to survive. These should be kept to an absolute minimum and carefully thought through before executing. As much of the original installation should be kept in situ and carefully recorded before any modifications are carried out.

SURVEY, BUILDER'S WORK, INSTALLATION AND REVERSIBILITY

Before any work starts a thorough and systematic investigation, through both desk-top (for example studying plans, record drawings, system test certificates, periodic surveys etc.) and on-site surveys, must be carried out. This will provide a clear and co-ordinated picture of what services and routes exist against what is required. It can then be established:

- a. whether any of the existing building services are of historic significance;
- b. if any part of the installation is in good enough condition that it can be retained and used within a modernised system and finally;
- c. if anything that cannot be integrated into the new design is of sufficient historical interest that it should be photographed and recorded before being taken out.

Only once this knowledge is gained can any invasive work be considered. The extent of this will be determined by judging the value of the additional information and improvement in installation gained against the damage and disturbance to the historic fabric. The more that is known about the construction and limitations of the building, the more this will help determine and constrain the extent of the building services design. Pre-existing, accessible voids, slots, holes and service routes must, wherever possible, be reused to minimise the additional permanent scarring to a building that a new installation may cause.

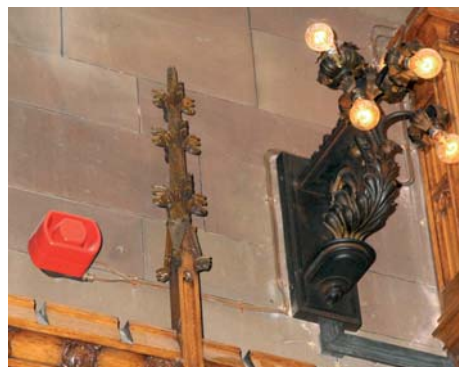
If new builder's work openings are absolutely necessary then all must be done to ensure that as many services as possible share a common route through the building. This will minimise the loss of historic fabric and along with designing in spare capacity will ensure, at least in the short term that further loss of building fabric is contained. Where the building design lends itself to offering suitable routes, a surface installation may sometimes be a better solution, for example where mouldings, column capitals cornices, balustrades can disguise the presence of a carefully installed cable or pipe. However it is important to ensure that an installation of this type does not cover up, damage or interrupt the view of important building features and surfaces, nor should it create dirt traps or staining patterns from any resulting heat and air movement.



Here is an example of lost building services heritage – an early Perkins HPHW (high pressure, hot water) pipe coil radiator system – (details courtesy of the CIBSE Heritage Group, see www.hevac-heritage.org for more information).

This was removed from a church in Northaw, Hertfordshire in 2002 having existed there since 1885. With some imagination and forethought this early example of a central heating installation might have been saved for future generations. Even if the radiators and pipework could not be satisfactorily put back into service, they could have been left in place, (as the National Trust have with Cragside House in Northumbria), or fully recorded before being removed and hopefully kept as a museum exhibit. As with this example even if the pipework could not be reused, it might have been possible to incorporate the pipe coil radiators into the new heating system. This would have been a better solution than removing all of the original Perkins installation.

With this type of surface installation the fixing and positioning of the clips and brackets are also of importance as these must respect the buildings' requirements on spacing, and not those of manufacturers' or relevant standards. Fixings should be made into material that is sacrificial and not permanent, for example mortar rather than stone or brick. With all installations, intervention should be kept to a minimum and strict observance to the principle of reversibility should be adhered to.



The surface clipped cabling here could have used the top of the panelling below to disguise the route of the mineral insulated cable to the fire alarm sounder; also clips have been fixed into the stone and not the mortar



A fine example of a functioning early building services installation is that of the John Rylands Library in Deansgate, Manchester. The library was founded by Mrs Enriqueta Augustina Rylands, widow of the successful cotton entrepreneur John Rylands. She assembled one of the world's finest collections of early printed books and manuscripts housed in an outstanding neo-Gothic building that was opened to the public in January 1900. The ventilation, heating, electric lighting, as well as the architectural and structural elements, are of international significance. It was, and still is, heated by a dual duct system with radiators acting as terminal heaters. The original electrical installation was a DC supply via a bronze conduit and trunking system. The building has long since been rewired but reused many of the old conduits. The original light switches have only just been taken out of use, but have been left in place.



St Alban the Martyr Church in Swaythling, Southampton – this Grade 2 church dating from 1933 was designed in the Gothic style by a group of architects including Nugent Cachemaille-Day.

When necessary work was carried out on the heating system the luminaires were found to be the original units designed by Cachemaille-Day himself, still serving their function as one of the main sources of illumination within the church.

Unfortunately these were found to be unsafe by today's wiring standards in not being earthed and therefore had to be disconnected.

Their future use is now dependant upon finding funding for the rewiring and necessary careful dismantling and refixing of the fragile wooden sections from which they are made up.



This principle applies equally well to the fixing of any component within a building services system, for example a light switch or a fire alarm break glass unit may need the additional help of a pattress, or other secondary support system, to enable the mortar joints to be used, see sketch.

In the final design, all routes, openings and making good must be co-ordinated and agreed with the building's conservation accredited architect. Any builder's work openings still found to be needed must be approved before work commences.

Where loss of historic fabric is inevitable the disruption should be taken as an opportunity to additionally survey, record and/or repair other services found. All necessary builder's work must be done with far greater care than is the norm, this will mean that it will usually take far longer to remove, replace or renew any building services installation in an historic building. This should be taken into account when preparing tenders and programmes. Service routes may need to be more convoluted and or longer than usual to accommodate the structure.

If an historic building is to continue to have a productive future use then it is essential to anticipate additional service requirements. This may not need to be any more than leaving empty or oversized wireways and ducts, but by doing this, it will minimise disturbance to the building fabric when those future services are required.

When installing a new building services system into an historic building there is sometimes a tendency, especially when trying to produce what someone thinks is an 'authentic' feel to the new works, to 'copy' the old.

This is often done by installing a pastiche of Victorian styles. Unless there is a clear precedent, with preferably, records to indicate what once existed, it is not appropriate to artificially age the look of the installation. It may instead, be far better to install modern contemporary equipment which makes no effort to look antique, but importantly in an arrangement that is synergistic, that still respects the architectural styles and design of the building. If it is felt that duplicating an earlier design is the correct path to follow then the new elements must be clearly identifiable as copies, probably by keeping detailed records or marking the copied units accordingly.

Where old services cannot be reused, but retain particular significance to the building, it is important that if it is possible to leave them in place, as with the lighting at St Alban the Martyr Church, that they are left in a safe state. This equates to leaving them in a condition where nothing can cause future disruption to the historic fabric, for example services are disconnected, made safe or drained down and then recorded. Their removal should only be considered if they have no historic significance or could pose a future danger to the historic fabric.

The installation of any building services installation implies in most cases the fixing of equipment to the fabric of a building. English Heritage seeks to ensure that any works to historic buildings do not disturb or destroy historic fabric.

The information in this publication is based on our current knowledge. Whilst every effort has been made to ensure the accuracy of the advice given, English Heritage does not accept liability for loss or damage arising from the use of this information. This publication is intended as a general guide and should not be used as a substitute for professional advice.

The inclusion in this publication of any company, group or individual, or any product or service, should not be regarded as either a recommendation or an endorsement by English Heritage or its agents."

DESIGN METHODS

Conventional approaches to building services design will rarely work completely successfully in an historic building. Strict adherence to British and European standards is unlikely to receive approval from any official historic conservation agency; therefore design engineers should research the subject before starting a project.

Amongst the likely affected installation types are:

- a. Lightning protection
- b. Fire alarms
- c. Lighting
- d. Heating
- e. Ventilation

Problems may occur on the interpretation of standard guidance and lateral thinking is often required to find a workable solution that does not compromise the installations integrity or purpose. Using conventional design thinking will rarely work.

With imagination, flair and an eye on the past, our building services heritage can be preserved and integrated, and historic buildings equipped with the technology to enable them to survive the demands of the 21st century and beyond.



Rotary bronze light switch – John Ryland's library

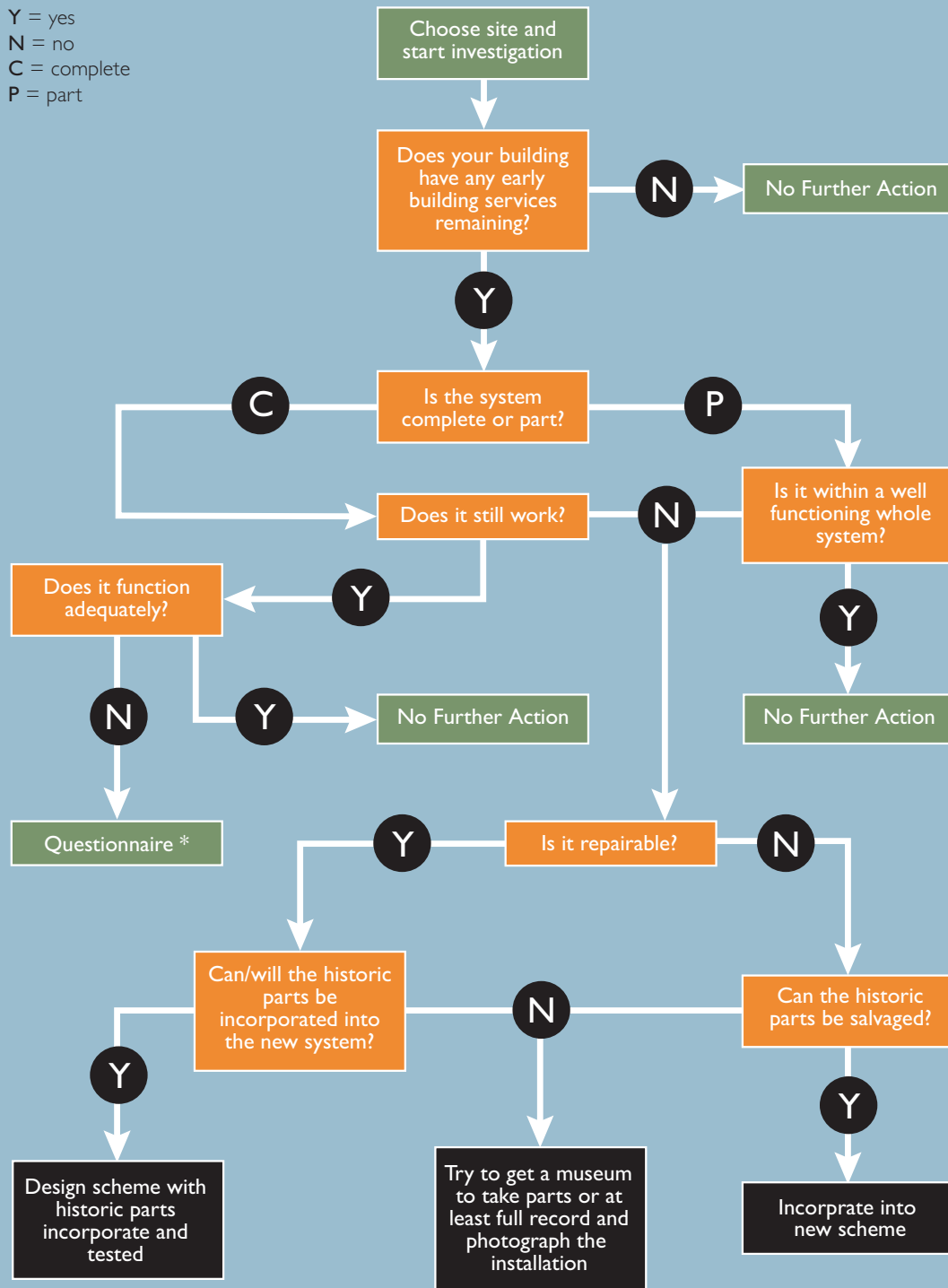
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DECISION MAKING FLOW CHART

Y = yes
 N = no
 C = complete
 P = part



* Obtain feedback from the building owner or custodian.

