



The BACSA Manual:
A Practical Handbook for
The Care of Old Tombs and Cemeteries in South Asia

London 2020

Introduction

This is a practical handbook for the management of old European cemeteries in South Asia. It is the first publication dealing specifically with the problems of maintaining and restoring these cemeteries, which today form an important part of the heritage, and the tourist industry, in South Asia.

This short and simple manual helps identify the procedures and materials that should be used. It is meant for anyone commissioning or carrying out repair works. It identifies common problems in old cemeteries and how to solve them.

Cemetery locations in South Asia range from sharply-sloping hillsides to desert plains and tropical areas with heavy post-monsoon growth. There is a wide variation of tomb types too but there are basic principles that can be applied to the majority of these cemeteries. Tombs were mostly constructed from locally-sourced building materials, which can still be used today for repair work.

Restoration work should be carried out sensitively and should retain as much of the historic fabric and character as possible. Regular maintenance should then be put in place.

The British Association for Cemeteries in South Asia (BACSA), which has produced this manual, is a London-based NGO (non-governmental organisation) charity established in 1976. Its remit is to cover the old European cemeteries wherever the English East India Company set foot and afterwards up until 1947.

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PART ONE

1. The Cemetery

1.1 Parts of a Cemetery

Taking care of a cemetery, graveyard, or burial ground includes three things: the overall site, the old graves and monuments, and the new burials.

The overall site includes the boundary walls, gates, gatehouses, graves, trees, any built structures including chapels, cemetery offices, approach roads, the neighbourhood, and any other related services or structures.

It is useful to have a documented plan and drawings of their locations, dimensions, and other details. This information should be collected from old files and comprehensive digital drawings that can be made by an architect or building surveyor.

This information is extremely useful while planning, making estimates, and supervising day-to-day management.

1.2 Vision for the Cemetery

Once the information has been collected, it is important first to assess the overall condition of the cemetery, identify the problems, and formulate a general vision.

The maintenance and care of a cemetery is not a single 'project' but an ongoing 'process' because it should outlast several generations. Therefore it is important to develop a simple, sustainable, and incremental vision for the whole area.

A tentative budget for the development work, with a timeline, is useful in planning, raising funds, and execution. The vision will be different depending on whether the cemetery is 'closed for burials', has a heritage status, or is a cemetery in use.

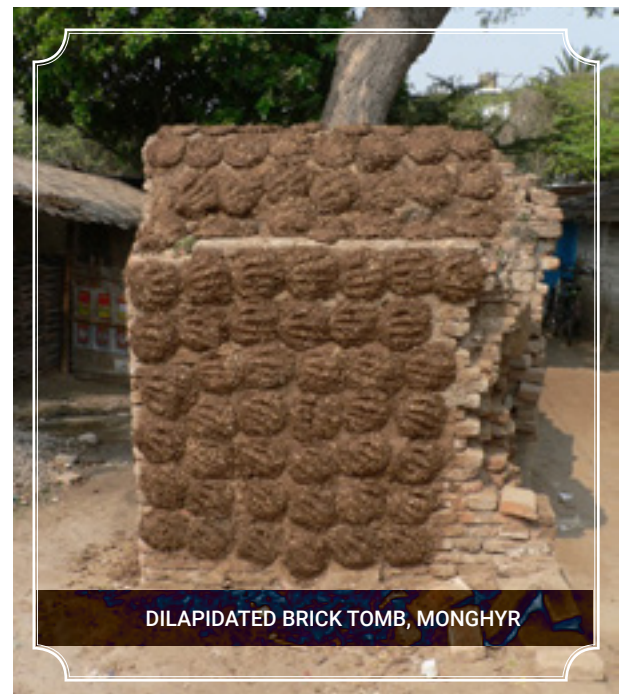
Space for visitors including relatives and tourists, office staff, burial registers, computers, toilets, etc. has to be thought about.

1.3 People to Run the Cemetery

A cemetery requires people who can manage it. If it is a closed cemetery there should be at the very least a caretaker, some gardeners, and a manager.

If the cemetery is in use, an office with a manager and maybe an accountant is needed. If the cemetery is of historic importance, an archaeologist or conservation architect could be part of the team. Staff can be employed part time, full time, or as consultants.

Every cemetery needs a group of trustees who should meet at regular intervals to formulate the vision, help in fund-raising, monitor the work and the fund flow. They should also employ, determine, and outline the responsibilities and duties of the staff who need to be supervised regularly.



2. Historic Structures

2.1 Historical Significance

It is important firstly to understand and document the 'historic' status of a grave, monument or isolated memorial. In common terms, any built structure that is more than a hundred years old and may have associations with a particular person or event is considered 'historic'. A 'heritage' grave, monument or isolated memorial is one that attracts the patronage of a national heritage organisation, or an NGO and is listed by that organisation. (see below 2.2)

2.2 Protective Organisations

When a 'heritage' grave, monument or isolated memorial is recognised and adopted by one of these organisations, it is then termed as a 'protected monument' and no work can be done on it without permission from the relevant organisation. Other old structures may be 'historic' but they have no legal protection. Thus it would be helpful to keep a record of all local rules related to cemeteries, burials, and heritage.

National Organisations

India

Archaeological Survey Of India (ASI),
State Archaeology Departments
INTACH (Indian National Trust For Art & Cultural Heritage)

Pakistan

Department Of Archaeology And Museums
Heritage Foundation Of Pakistan

Bangladesh

Department Of Archaeology

Sri Lanka

Department Of Archaeology

Myanmar/Burma

Myanmar Archaeological Association

2.3 Non-Historic monuments

Three types of graves and monuments fall under the designation of 'non-historic' and do not need restoration. These are:

- a) monuments of new burials
- b) graves, old or new, but with no monument
- c) 'historic' monuments that are broken beyond repair and cannot be restored.

In all the above cases, no restoration materials and methods need to be used and 'new' and 'contemporary' materials and designs can be used for their reconstruction which may be chosen by family members or guided by prototypes suggested by the Cemetery Trust and authorities.

Local contractors approved by the Trust may be used to execute the work. An architect or engineer may or may not be employed. This would largely depend on the wishes of family members.

Designs and estimates prepared before the start of work should be approved by family members who should also supervise the work which is similar to the construction of new graves. Such graves should also be maintained by the families working together with the various Trusts. Non-historic monuments are not eligible for 'heritage' grants.

2.4 Appropriate restoration

Construction systems change over time and a hundred-year-old structure would have to be repaired using methods that are different from contemporary work.

Thus the first thing to do is to identify those structures that are of 'historic' value and need sensitive restoration.

3. Maintenance & Management

3.1 Security

Security is one of the largest problems in nearly all cemeteries in South Asia for one reason or another. Therefore the first and foremost thing to be done is to secure the site with a sturdy boundary wall. Keep that wall in good condition, repairing it as soon as it gets damaged.

The site should be properly lit and closed circuit cameras (CCTV) installed if possible. A caretaker (also known as a chowkidar) should oversee the security and should preferably stay with his family on site.

Living alone in a large open space can be a little daunting for a single person especially if confronted by drug addicts, drunk people and thieves with guns or other weapons. Cemeteries at night can become a den for illegal activities and home to tramps.

It is advisable to have regular contact with the local police and the nearby community who can be approached for help if needed. The gardeners could be encouraged to stay on site if space permits.

3.2 Landscape and Maintenance

The next thing that needs attention is to make the whole cemetery accessible for easy maintenance and movement of people.

The paths and roads need to be kept clear at all times.

To prevent the cemetery from flooding, it is essential to keep a good drainage system in place and the drains should be cleared before the rainy season.

Where cemeteries are located in tropical climates, regular clearing of vegetation is required especially after the monsoon season.

Sometimes it is useful to replace the 'weeds' and wild growth by a more manageable planting pattern. This, however, would need a regular supply of water.

3.3 Housekeeping

Regular sweeping and cleaning in the cemetery is required. Wet leaves, moss that grows during monsoons and fallen pine-needles in hill cemeteries, can all become slippery and dangerous for staff and visitors.

Large cemeteries need a systematic mode of operation since using simple brooms and other hand-held equipment can be very time consuming and cumbersome.

A system for collection of organic waste and garbage should be worked out in collaboration with the local corporation.

Appoint someone to oversee the working and maintenance of all the services including electricity meters, lighting, pumps, drainage, CCTV cameras, payment of the bills and taxes, etc.

3.4 Visitors, plans, and records

Making the cemetery 'legible' for someone who needs to find a family grave is very important. Visitors should be made to feel welcome and a busy cemetery will help to deter vandalism. Use clear but not intrusive signage to indicate the row numbering system, the toilets, entrances and exits, etc.

Provide a general site plan on a board at the entrance to the cemetery, with the name of the cemetery, its address and a contact phone number if possible. Care should be taken that the signage is of a material that thieves are not interested in and nature cannot easily damage.

Inside the cemetery the site plan indicating plot numbers, rows, and burial records where they exist should be available on site for easy reference.

Digital methods and applications can be used for making the cemetery legible and accessible.

3.5 Maintenance check list

It is important that the cemetery and restored structures within it are inspected regularly.

Weekly and monthly inspections should include checking the growth of intrusive vegetation and also any damage or cracks in the walls and tombs. Try to avoid causing further damage when removing large plant infestations from monuments, especially where roots have penetrated the structure.

Annual inspections should be thorough and detailed. Record all damage, its extent, and identify and prioritise action to deal with it.

Minor issues should be attended to by a local supervisor whereas a major problem should be brought to the notice of the concerned authorities. As is commonly said, a stitch in time, saves nine.

Secure the cemetery from vandalism, antisocial activities, illegal buildings (encroachments) and intruders.

Identify and map where the drains and services run. Keep drains clear and repair fabric as soon as damage is spotted, to prevent it worsening.

Repair paths including edges before problems develop.

Remove rubbish regularly.



PART TWO

4. Restoration of Structure

4.1 Types of monuments

European tombs in the 17th century were often large, two-storey structures with domes, elaborately decorated with columns and finials. These are nearly all protected monuments.

In the 18th century funerary architecture was influenced by the neo-classical revival in the West, and geometrical shapes including obelisks, pyramids and single columns, sometimes with urns, were fashionable. The size of the tomb indicated the wealth and status of the person interred.

19th century tombs reflect Victorian Britain's religious revival, with gothic architecture, crosses, sentimental inscriptions and statues. Tombs became simpler in the 20th century, flat slabs laid horizontally in the earth; inscribed headstones or a stepped marble plinth topped with a cross.

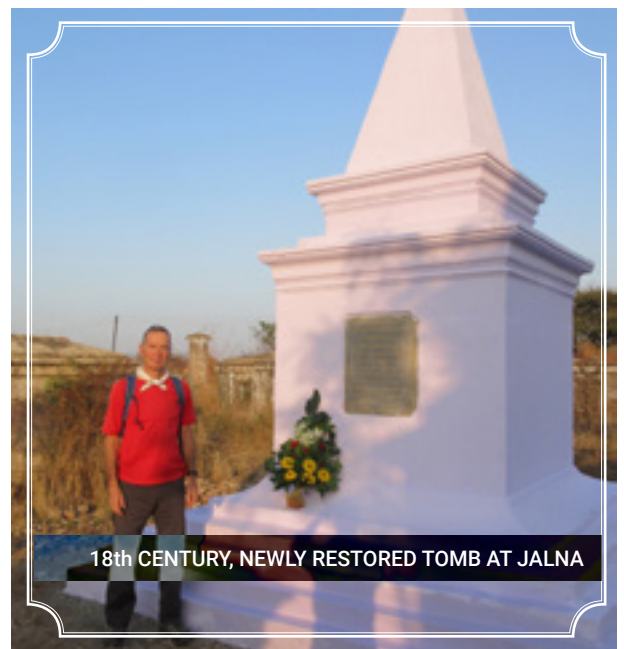
Other common types are barrel tombs, a curved semi-circle, like a barrel cut in half, and box tombs, square or rectangular 'boxes' resting on a plinth, with the body interred below.



17th CENTURY DUTCH TOMB IN THE NARINDA CEMETERY, DHAKA



19th CENTURY TOMB AT RAWALPINDI, PAKISTAN

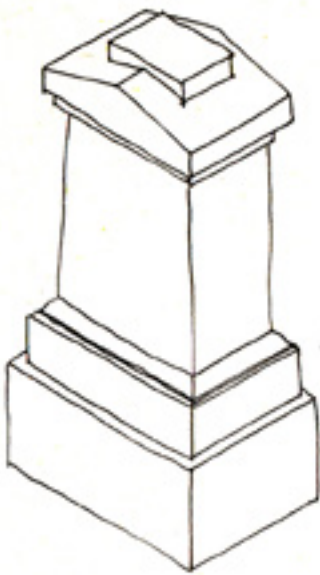


18th CENTURY, NEWLY RESTORED TOMB AT JALNA

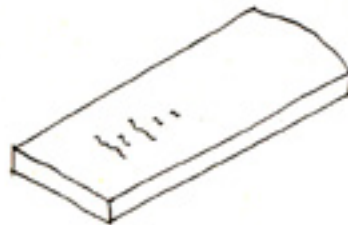
4.2 Elements of a grave

A simple grave can be divided into three parts:

- a) the below-ground structure or vault for the coffin(s).
- b) the plinth supporting the structure, sometimes with a kerb.
- c) the above-ground structure including one or more information panels such as a ledger stone, headstone, foot stone, or a monument or a combination of these.



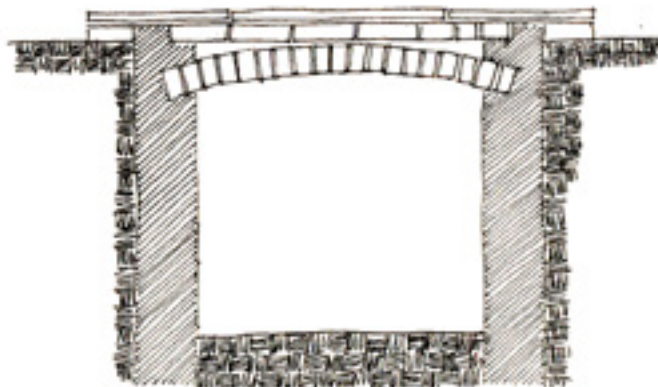
MONUMENT



LEDGER STONE



HEADSTONE



CONJECTURAL CROSS SECTION THROUGH A BRICK VAULT OF CRYPT BELOW

4.3 Construction methods and materials

Sandstone and marble, quarried in the Indian sub-continent, was used by those who could afford it but the majority of 18th and 19th century tombs were constructed with a brick core covered by chunam (stucco). Fine chunam included powdered sea-shells mixed with lime, surkhi (powdered brick) and jaggery (cane sugar product as a binding agent), but locally available materials like clay mortar and lime plaster were also commonly used.

Small rectangular bricks, known as lakhori and orange/red in colour, are often revealed as the outer covering of stucco/plaster degrades. It was also common to use locally prepared bricks and easily available stones. Because of wide variations in the materials used, a material analysis should be done before starting restoration.

Inscription plaques of stone, marble or slate were inserted into one or more sides of the monument.

Pillars, columns and tall monumental features used iron rods as a core or backbone around which the bricks were laid. Rods were also used to anchor brick domes and decorative pottery urns above brick-built mausolea. Iron railings surrounding the monuments were popular and although nearly all have been removed, the holes where they were inserted can still be seen on many kerbs and plinths.



4.4 Common causes of damage

There are four major causes for damage to graves and monuments:

- a) An inclement climate; the rains and high day-time temperatures, particularly in the tropical regions of South Asia.
- b) Lack of maintenance accounts for the decay of graves and monuments, especially as they become overgrown with vegetation and root systems damage the foundations.
- c) The third major cause is new burials in old graves. Carved ledger stones, and other stone cladding, when removed and re-used after a second burial, often causes a great deal of damage. If the structure below the stones is not properly levelled or constructed, the top of the grave sags, causing the monument placed on top to sag too and sometimes break.
- d) Vandalism, graffiti and reckless handling by visitors and tourists also cause considerable damage to the graves.



4.5 Common problems

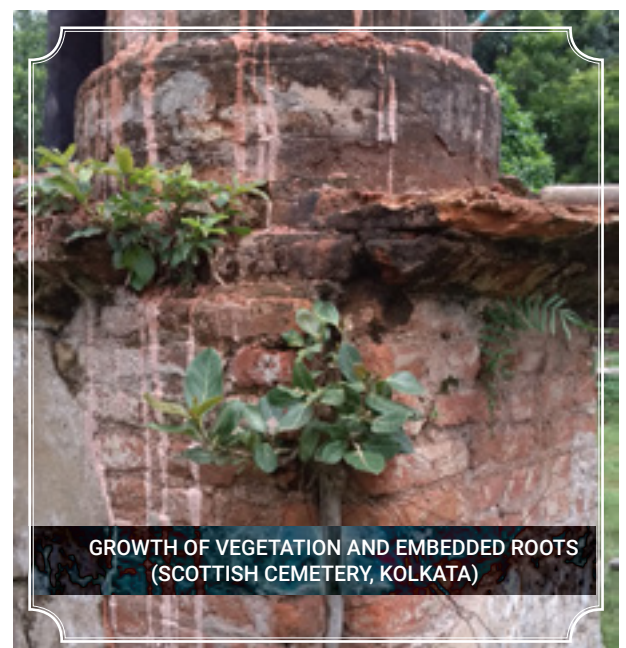
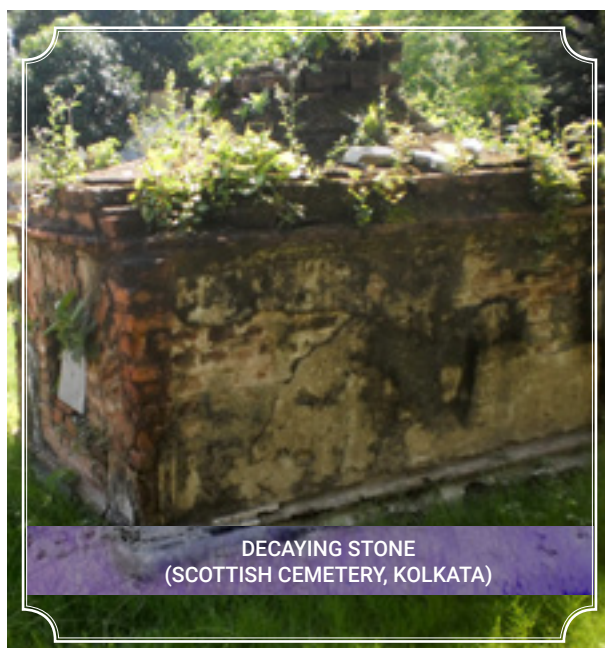
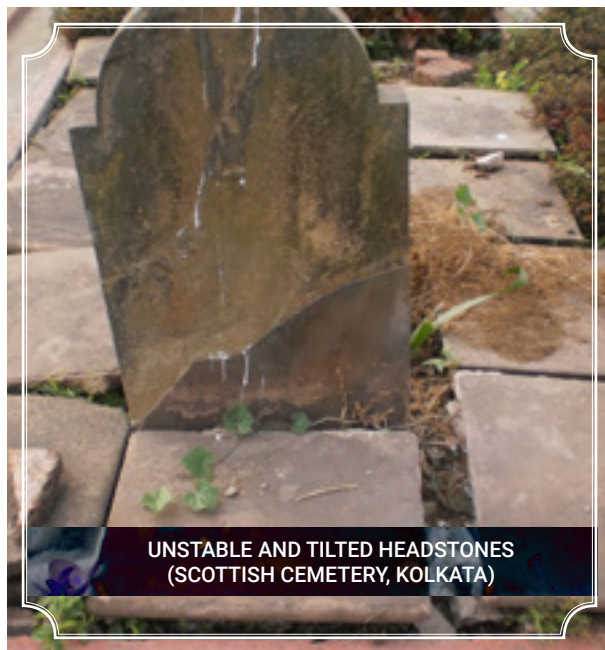
Subsidence, which results in headstones and monuments tilting or collapsing.

Graves collapsing from ground settlement.

Plant and root growth in and around monuments and graves.

Monuments and headstones collapsing due to structural weakness or specific damage.

Decaying materials can include stone decay (even marble can suffer from repeated monsoons) and damaged or lost lead lettering on inscriptions.



5 Planning Repair Works

5.1 Documentation

The first thing that needs to be done before restoration is to document carefully the structure which means photographing it from all sides, taking care to include small details.

A measured drawing including a plan, section, elevation, and a few construction details is useful in reconstruction and estimation.

After this a careful study of the materials used, especially the types of stone, mortar and plaster should be done. (see paragraph 4.3 above)

Finally, all lettering, especially in case of ledgers, should be noted for future reference.

An old photograph of the grave or monument, with any history that is available, is useful during restoration.

Photo documentation should be done before, during, and after restoration.

5.2 Surveying

The second stage of restoration planning involves a Condition Survey of the monument. All defects and problems of the monument have to be noted.

Visual defects like the presence of vegetation, cracks, and discoloration are often symptoms of problems, as well as the problems themselves.

Thus, vegetation may indicate poor maintenance, with the collection of dirt resulting in the germination of small plants that rapidly increase in size.

Similarly, cracks may be a result of sagging, settlement of the ground or the penetration by roots of vegetation, bushes and trees.

Therefore, before any intervention is proposed, it is important to assess the situation and come to a decision regarding the major problems that have led to the damage and decay, rather than carrying out symptomatic repairs that will not ensure a healthy and long life for the monument.

5.3 Estimating Costs

The Documentation and Condition Survey of the monument can be done by any technical person like an engineer or architect, but they should have some knowledge of repair and restoration of historic structures.

Once the problem has been assessed, the engineer or architect will draw up an estimate based on bills of quantities which will outline not only the procedure of works to be undertaken but also help the client/ family member/Church to get an idea of how much the restoration will cost.

Quotes can then be taken from two or more contractors, again who have some prior knowledge of working with historic structures. Work should then be awarded to the one with reasonable rates and technical knowledge.

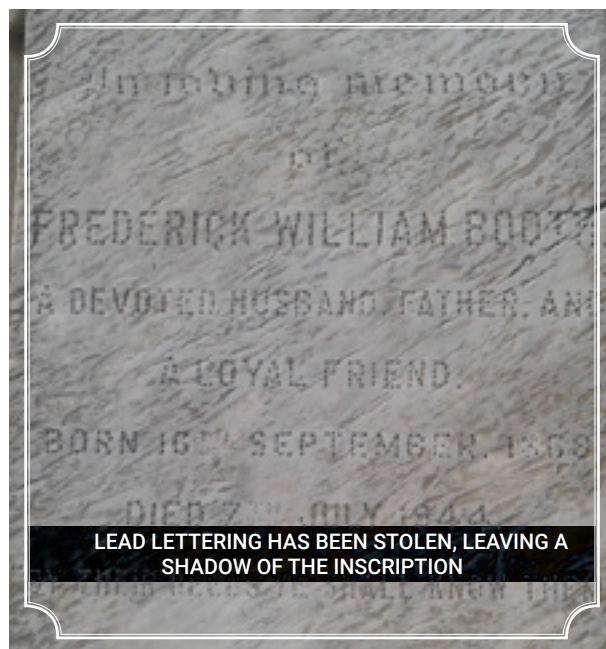
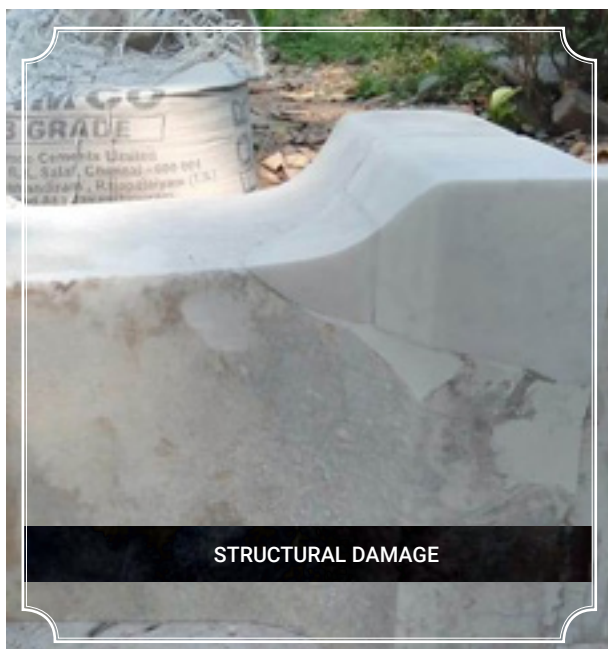
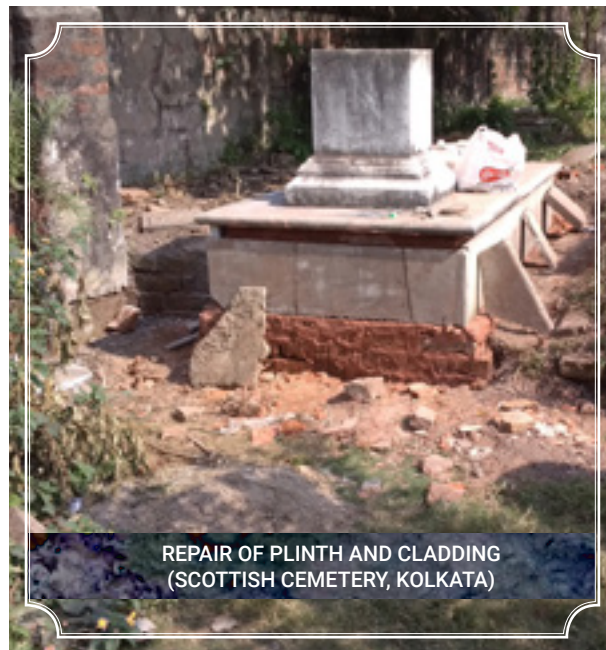
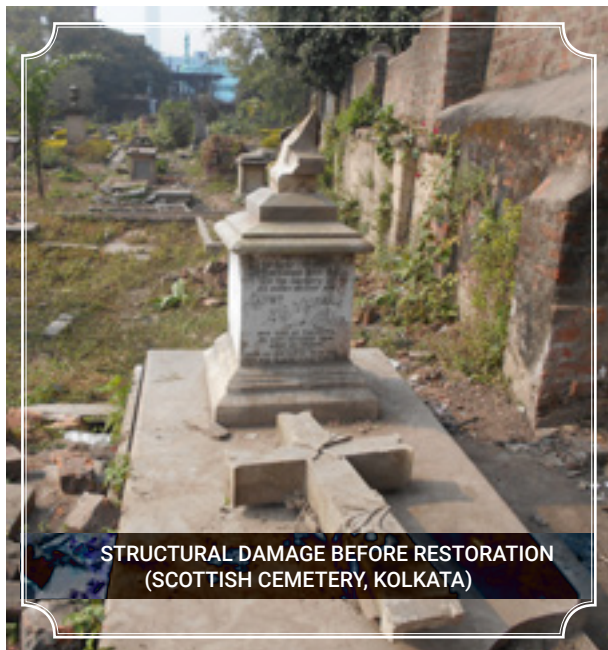


Grave Inspection Form

Name on grave from site 	Date on grave from site 	Others mentioned on grave (Name and dates from site) 	
Principal Tomb Material (circle) Brick and Plaster Brick and Stone Clad Stone Slab Stone carved Other Stone (tick one) Granite/ Marble/ Sandstone/ Other	Overall condition (circle one) Good Recognizable & Stable Recognizable & unstable Broken Green patch Remark Name/ No name		
Dimension of grave (m) from site Length Width Height	Material of tombstone Tombstone present Yes No Stone (tick one) Granite/ Marble/ Sandstone/ others	Technique of inscription (circle one) Painted Incised Surface mounted letters Inlay Other Condition Legible/ Not legible	
Inscription from site 			
Indicative Sketch of Grave Flat With Headstone/Vault Monument			Photograph
		other	

Format for the Estimate for the Restoration of a Grave
Photograph & sketch with all dimensions mentioned to be attached

SNo	Items	Man days/Qty	Rate	Total (INR)
A.	Inspection & Documentation			
i	Clearing of grave			
ii	Dismantling of top surface for inspection			
iii	Measurements for sketch			
iv	Photo documentation			
v	Preparation of preliminary budget			
B.	Restoration of plinth			
i	Removal of bricks & dismantling			
ii	Repair of brick vault			
iii	Repair of plinth			
iv	Plaster of plinth with compatible materials			
v	Preparation of surface for placing ledger stone			
vi	Preparation of foundation for headstone			
C.	Stone repair			
i	Repair of headstone with compatible adhesive and rebar's			
ii	Cleaning of stones with soft brush and water			
iii	Replacement of headstone & ledger stone in place			
D.	Documentation			
i	Regular photo documentation			
ii	CD/pendrive of photos & other documentary evidence			
E.	Cost of materials used			
i	Lime			
ii	Cement			
iii	Sand			
iv	Surkhi			
v	Stone			
vi	Other			
F.	Supervision			
G.	10% Profit including all taxes			
	TOTAL AMOUNT			



6 Practical Repair Methods

6.1 Restoration materials

Construction into the 20th century was done using lime and clay as binders and river sand as aggregate.

Clay or mud mixed with sand was used for mortar, and lime and sand mixes were used for plastering.

Burnt brick powder (surkhi) was commonly used in both mortar and plaster for a quick set.

It has been noted that graves that were meant for family burials used weak mortar so that they could be easily re-opened and re-used, whereas graves with large monuments used stronger mortar and plaster.

An assessment of the old materials and re-use of similar compatible materials for mortar and plaster is advisable, especially having a colour, porosity, and strength match.

6.2 Parts of the monument

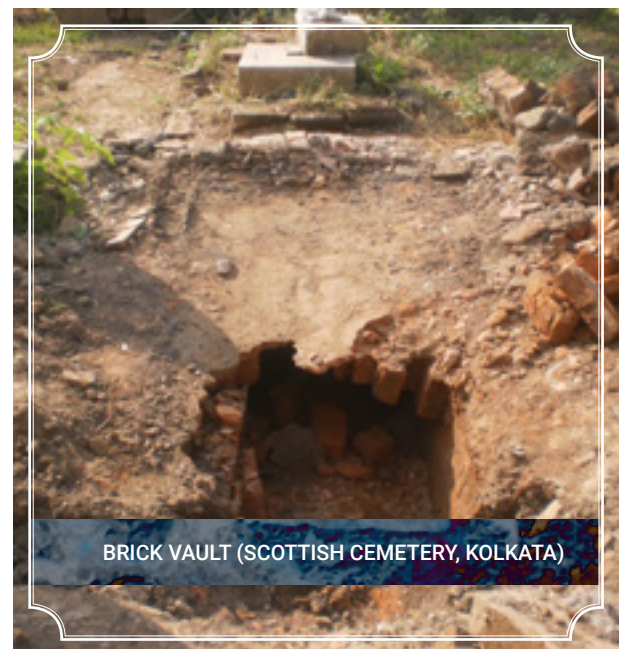
Any grave or monument can be divided into three parts:

- a) the subterranean structure.
- b) the plinth.
- c) the information portal that may be a ledger stone, headstone, footstone, or a monument.

Brick has been the most commonly used material for the construction of the subterranean part and plinth of the graves. The plinth may then be plastered or clad with stone.

The members carrying the inscriptions are usually thick pieces of stone. If damaged, these stones are difficult to replace.

Care should be taken to dismantle the structure slowly and study the materials, especially the size of bricks used and the thickness and quality of stones used for cladding and those used for inscriptions. Restoration should be done using similar bricks and stones.



6.3 Minimum intervention

Minimum intervention is considered the best strategy for restoration. Thus, no unnecessary work should be undertaken if the monument is in good condition.

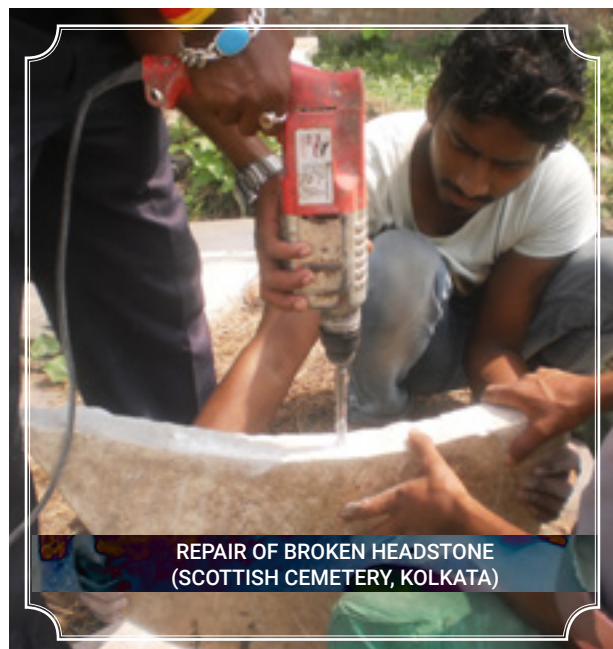
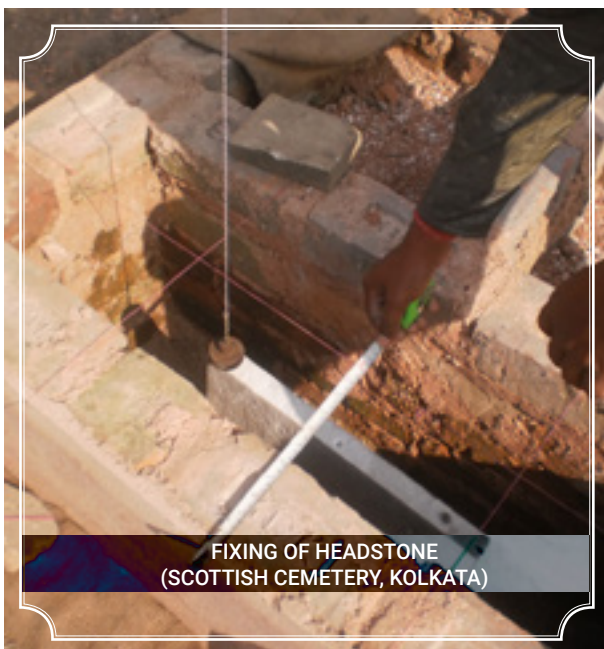
In the name of restoration, one often sees the mechanical polishing of stones to shine them and stuccoed and plastered monuments clad with 'new' stones. This not only destroys the aesthetic value of the historic structure but also damages the old materials.

6.4 Subsidence and structures below ground

First test the stability of the structure. If it is stable, there is no need to start work from below the ground.

If it is unstable, investigate the reasons and condition and defects of the structure below ground. High rainfall often causes uneven ground settlement. This speeds up the growth of plants with deeply embedded roots and is often the main cause of settlement.

With a large unstable monument above the grave, methods such as underpinning with concrete, stone or brick should be used to strengthen the foundations.





Repair of a structure, such as a plinth or vault below ground, is difficult and sometimes impossible if a huge monument sits on top of it. Engineering advice may be required.

If the grave is a simple plinth with no large monument, it may be more effective in the long term to dismantle carefully the stone cladding and brickwork, and rebuild the whole structure after removal of roots, than to use advanced methods.

Note: if the plinth is opened below ground, there is the problem of exposing existing bones and re-burial is needed. This is a major issue in India, for example.

6.5 Cladding and dowels

Cladding of stone is a construction technique that is commonly used and the same technique can be used for cladding the plinth and monument. The tough part is often repairing a broken headstone or ledger stone or a heavy ornamental stone.

Traditionally, stone or iron dowels were used to join stones. Iron dowels rust and have been found to be a major reason for the damage of stones. It is important therefore, to remove and then carefully replace iron with stainless steel or fibreglass pins for fixing.



Stone fixing adhesives, available locally, can be used to fix broken stones along with dowels and pins.

6.6 Lettering

The biggest challenge in grave restoration is the lettering. Most historic monuments had lead lettering. The lead was either stolen or has disappeared from the inscriptions. Today not only has it become illegal to use lead, but also craftsmen cannot be found to do this locally. Importing such services can be very expensive.

Even the other types of lettering that were carved with deep valleys to produce shadows, or the use of contrasting inlay work, are all expensive as craftsmen are not readily available.

It is still easier to find stone carvers to carve missing stone pieces; but ordering the thick pieces of matching stones becomes a very expensive exercise. It has not been possible to resolve this issue for small structures like graves so restorers have been painting in the lettering or using a polymer infill, both of which are untidy and do not last long.

It is important to look at this issue carefully. An additional plaque giving the necessary details, installed nearby or carefully on the monument, would seem a better option.

6.7 Stone cleaning

Last but not least is the important issue of cleaning the stone. Care must be taken not to use any mechanical or chemical means to clean stones as it not only damages the lettering and ornamentation, but also destroys the protective top hard layer of the stone.

Cleaning with soapy water and scrubbing with a soft jute or rough cloth is advisable for all types of decorative stones. People often try to make a monument shine in an attempt to present a 'restored' appearance but this does more damage than good to the structure.

Some biocides and other chemicals are available in the market for cleaning but they have to be tested before using.

Some hydrophobic coatings that prevent biological growth, often the reason for discolouration of stones, are commonly used. But these are neither permanent nor always reliable.



Glossary of Technical Terms

Chunam: Stucco, a lime-based plaster covering.

Conservation: The Protection of interesting and important structures and buildings.

Dowel: A projecting peg used for joining parts of a structure; it may be metal, stone or wood.

Grave: The ground for a particular burial or linked group; it may be surrounded by a kerb.

Headstone: A simple memorial slab at the head of a grave.

Inscription: Written information on the monument.

Kerb: The stone or masonry surround to a grave.

Lakhori: Small baked brick.

Ledger Stone: Stone slab covering a tomb, with inscription indicating identity of occupant.

Members: Parts of the monument.

Monument: The above-ground memorial structure of a grave.

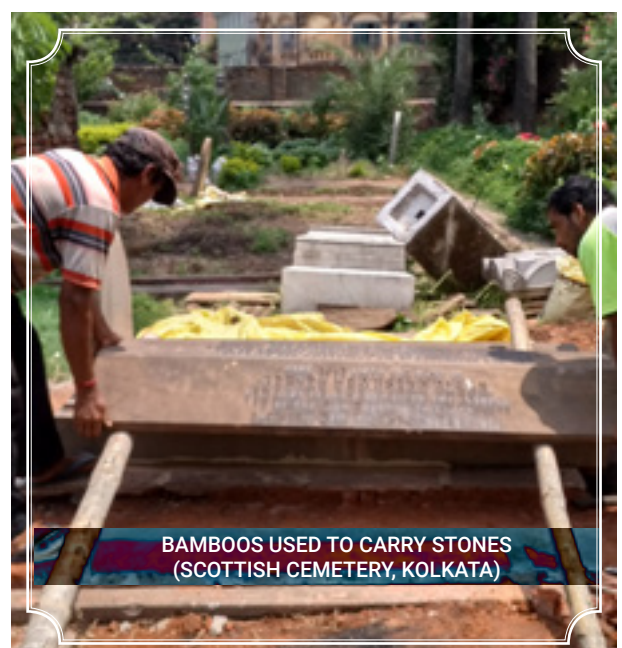
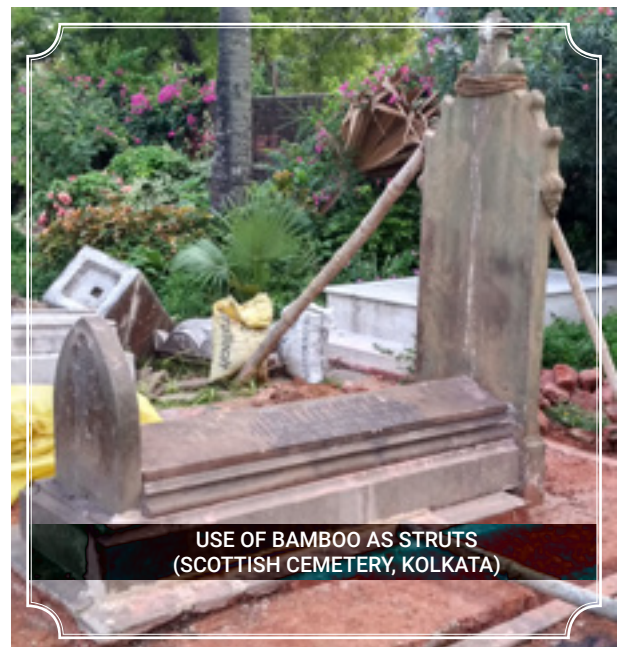
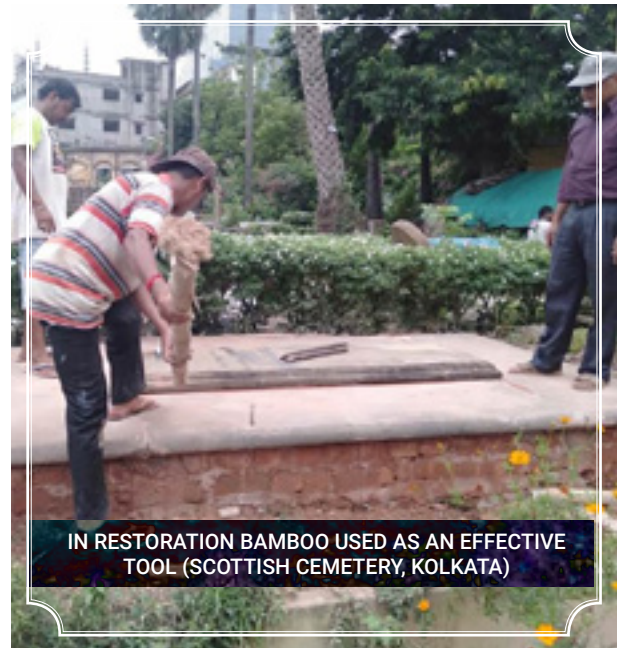
Plinth: A stone or concrete pad supporting a monument.

Rebar: Reinforcement bars.

Repair: Specific physical action to improve the condition of a feature or structure.

Restoration: The process of returning a cemetery fabric or a structure to its historic good condition or evoking this.

Vault: The below-ground structure of a grave in which coffins are interred.





RESTORATION TEAM (SCOTTISH CEMETERY, KOLKATA)

BACSA aims to bring together people with a concern for the many hundreds of European cemeteries, isolated graves and monuments in South Asia. It offers a limited number of small grants to help with repairs and restoration works for these. See our website for more information: www.bacsa.org.uk

BACSA has funded a substantial number of restorations in South Asia, not only in the Indian sub-continent, which includes India, Pakistan, Bangladesh and Sri Lanka, but also in Myanmar (Burma), and Malaysia.