

SCOTTISH DEVELOPMENT DEPARTMENT
SCHEDULED ANCIENT MONUMENT: LOCHINDORB CASTLE: BADENOCH & STRATHSPEY: HIGHLAND
SUPPLEMENTARY ARCHITECT'S REPORT: JOHN KNIGHT: INSPECTED: 7 SEPTEMBER 1983

No work appears to have been carried out on the castle since the advisory report prepared by Mr Douglas Hogg in 1974. The earlier report therefore remains cogent, and this report can be deemed supplementary to it, highlighting works now considered critical.

1. NORTE COURTYARD WALL

Fill voids at base of round tower on north-west salient by tamping and pinning with matching rubble. Consolidate tear at junction of tower and curtain by rebuilding facework and grouting voids in the core behind.

Take down and rebuild bulged masonry below blocked window to "hall" matching the coursing and style of build from photographs. Rough-rack window itself where jamb stones are missing (see specification).

Rough-rack tower on NE salient to support facework. This may also require inserting or forming concrete lintels within the core of the wall to support corework, particularly at junction with east courtyard wall. Pin voids at base of tower.

2. EAST COURTYARD WALL

Urgently consolidate overhanging masonry to gateway by rough-racking etc taking care not to obscure bar holes etc.

3. SOUTH COURTYARD WALL

Rough-rack torn junctions with salient towers, and consolidate within towers.

4. WEST COURTYARD

Support voussoirs to arch by rough-racking.

5. OUTER BAILEY WALL

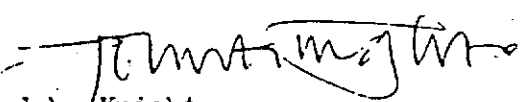
A serious fracture occurs though probably of long-standing. Stitching by the removal of facework and the insertion of pre-cast concrete bonders into the core should be attempted, replacing the facework but not attempting to disguise the fractured extent. Some limited gravity grouting would be worthwhile.

Urgently pin voids at base of wall due to water erosion and rough-rack voids above.

Fractures are developing towards the south end of the outer wall on both inner and outer faces: tamping and pinning voids should assist the stability of the wall, but if fractures develop, stitching will be required.

6. GENERAL

All recommendations for overall consolidation, excavation and turf removal in Mr Hogg's report should be carried out in the long term. A general specification describing consolidation techniques is attached.



John Knight
Architect
October 1983

MUNICIPAL COUNCIL

After discussion with HBM's architect, the following items were considered to be priorities for consolidation work on the castle. Most of these are as previously identified, but with some modifications and comment, while one particular item has been added which he considers of primary importance.

1. OUTER CURTAIN WALL, E SIDE

Packing and repointing of the basal voids along the whole stretch of this wall, either side of the gateway. This should be faced at approximately 10cm back from the original face so that the repaired areas are identifiable. Mortar work on the face should conform to the original. Help will be given in formulating this mortar.

The large vertical crack to the N of the gateway should be tested for movement with glass tell-tales prior to work beginning. Subsequent consolidation (infill or non-ferrous cross-pinning) would depend on the identification of movement.

Other areas of collapsing face should be treated in the same way as the basal voids, i.e., clearing and refacing 10cm back from the original face.

2. Main curtain walls. Short stretches and occasional isolated voids near the base treated as above.
3. Saviour arch, W curtain. Identified as necessary to protect the wall above the arch without concealing the architectural features of the arch itself. This apparently requires infill of voids adjacent to the arch to secure the springers. Infill above, in an area where the facing has fallen off, to be recessed as before. A bit complex this.
4. ~~Corbelled~~ area adjacent to SW tower, E side. The architect considered this worth numbering stones, removing, and replacing according to measured photographs/drawings. Considered a priority, and a useful exercise for the work squad. Would require the specialist supervision particularly of the Cawdor mason.
5. Window wall, W side of the 'Hall', N side of castle.

It is considered inappropriate to remove the blocking, and suggest that the wall is consolidated at the lower levels to preserve this. The discussion between architect and inspector was inconclusive on this one. Suggest leave to a second phase and use tell-tales, etc to determine movement and direction, if any, of the masonry at this point. This might also allow for HBM to reach an agreed policy for this particular area.

7. OTHER

Costings required, and sources of same, for SMC.

Stone for consolidation work, construction of jetties. This might be a slight problem, as they do not want large quantities of material removed from the dump of unmortared stone at the SE corner. Some may be used - other might perhaps come from below the water-line. What quantities are involved?? They suggest eventually a wooden stair over this feature to provide access to a visitor circuit.

ANCIENT MONUMENTS

GROUTING AND POINTING ETC OF MASONRY

MATERIALS

SAND

Sand used for mortar should be of a type similar to that employed originally in the wall to be treated. In many mediaeval mortars fine grained or dirty sands have been used, but it is an accepted rule that such sands should be avoided. Sand should be clean, sharp and as coarse as is permissible to match the original mortar.

LIME

The lime should be ^{blue limestone} good hydraulic lime, such as hydrolysed hydraulic lime. Should the lias lime available prove uncertain in its setting properties, a dehydrated lime may be used.

CEMENT

Portland cement to conform to BS 12 : 1972.

MORTAR

For tamping use cement mortar in the proportion of one part cement to 2 parts sand.

For pointing use lime mortar prepared by mixing lime and sand in the proportion of 2 parts lime to 3 parts sand in a dry state on a boarded platform. Allow the mixture to stand until the lime is cool and then work up with a shovel using a minimum quantity of water.

CEMENT GROUT

To mix the grout, or, as it is sometimes called, liquid cement, the can or receptacle should be filled with water to within 3" of the top. The cement is emptied into the water and stirred continuously until the required consistency of grout is obtained. A usual proportion is $1\frac{1}{2}$ parts of water to one part of cement. Thorough mixing is essential and it should be continued until the whole of the cement is in suspension with no solids in the bottom of the can.

To economise, it is sometimes possible to use sand with the cement in the proportions $\frac{1}{2}$ part cement, $\frac{1}{2}$ part sand to $1\frac{1}{2}$ parts water. It is important, however, that the sand should be very fine and of practically the same specific gravity as the cement.

METHODS

RAKING OUT JOINTS

Joints should be raked out to remove all dirt and loose mortar. They should then be thoroughly washed with clean water by means of a hose or a garden syringe. It is essential that the masonry be thoroughly wet when pointing is commenced.

TAMPING

The joints should be thoroughly filled with cement mortar to within $1\frac{1}{2}$ " to 2" of the face of the masonry and consolidated by pressing in with the appropriate tools so that no voids are left.

POINTING

The remaining $1\frac{1}{2}$ " to 2" deep joints should be thoroughly filled with lime mortar, care being taken to ensure that the mortar adheres thoroughly to each side of the joint. Superficial pointing has no durability and must be avoided.

FINISHING OF POINTING

New pointing should harmonize in colour and texture with the old. A smooth finish should be avoided and, after the joints have been filled and compacted, a slightly roughened effect can be produced either by the use of a jet of water from a garden syringe, or by stippling with a bristle brush. The former method must be employed with care and discretion as a strong jet has a tendency to scour the mortar; the latter method is to be preferred as it assists in tightening the joint and leaves a roughened or weathered surface.

New pointing must be kept damp during hot weather. It is desirable to avoid pointing during frosty weather, but if it is necessary to do this work when there is a likelihood of frost, the work must be thoroughly protected.

It is sometimes unnecessary to point every open joint in a wall as very often the mortar, although weathered back from the face of the stone, may still be sound and hard in the joint, and unless the mortar is recessed more than $\frac{1}{2}$ " there is usually no need to fill such joints.

Mediaeval pointing was usually struck off flush with the face of the masonry. In course of time the mortar has weathered back and the edges of the stone have become rounded off. In order, therefore, to obtain a tight joint, the surface of the pointing should be slightly recessed so that the mortar does not spread over the rounded edges of the stone. If the mortar is brought out to the surface of the stonework a thin skin is spread over the edges of the stone. This skin will, in time, weather off leaving a pocket readily enlarged by wind erosion and which will hold moisture and so accelerate the deterioration of the stonework.

DISPLACED MASONRY

Displaced masonry, such as facework which has bulged, should be taken down and the stones rebbed in their original position. For this purpose the stones should be numbered or otherwise identified.

Where metal clamps or ties are necessary, these should be of a non-corrosive metal, such as "Delta" metal, and in no circumstances should any iron or steel be used.

FRACTURES

Fractures must be treated according to circumstances. Minor fractures should be filled with liquid cement, but those of a more serious nature should be dealt with by bonding the sections of masonry or by other measures as circumstances demand. In thin walls this can be done by inserting bonders across the fracture at intervals in the facework. Where thick walls are concerned, dovetailed reinforced concrete bonders should be inserted in the body of the wall. The spacing of bonders is governed by the thickness, height and other conditions affecting the stability of the wall.

VOIDS

The external appearance of the wall will usually give some indication as to its general condition but if there is any doubt it can be tested by sounding with a hammer. If, on tapping the wall face, a dull or hollow sound is obtained, it is almost certain that voids exist, but where the wall is solid, a solid or ringing sound is produced. As testing proceeds all hollow sounding parts should be marked or otherwise noted.

If the wall is found to be in a precarious state, having large voids, or being honey-combed and merely a mass of loose rubble, a decision must be reached as to whether it is advisable to withdraw the face work, remove the loose core and reconstruct with solid masonry rather than treat with grout. If grouting is adopted, the work must in any case be carried out with extreme caution, otherwise there will be the possibility of a collapse while the work of cleaning and washing, in preparation to the grouting, is being carried out.

Small voids are normally treated with grout.

GROUTING

Before grouting can be carried out the area of wall to be dealt with must be thoroughly washed out with water to remove all dust and dirt and to ensure that the surrounding masonry is well moistened to allow proper adhesion of the grout to the stonework. Failure to clean and thoroughly moisten the wall will result in an independent mass of grout which will fail to perform the function for which it is intended.

The use of liquid cement, known technically as grout, avoids, under normal conditions, the necessity of dismantling and rebuilding defective masonry. Grouting with liquid cement may be done either by hand or with a machine, but both methods require considerable care.

Hand grouting is usually adopted for small fractures and voids, the liquid cement being poured in through an aperture using a can or other suitable receptacle. The area affected should be divided into convenient sections to ensure that all cavities are completely filled. Where voids are being dealt with, the aperture should be level with the top of the void thus preventing the possibility of air pockets.

HARLING

All beds and joints should be raked out to form a key and the surface thoroughly damped before harling.

Render and float to a fair surface in 2 coats with a mixture consisting of best Portland cement and clean gritty sand in the proportion of one part Portland cement to 3 parts sand, waterproofed with an approved water-proofer.

Before the floating coat is set, rough-cast with dashing coat consisting of 3 parts 3/16" rough grit (not pebbles), 1 1/2 parts sharp sand and 2 parts semi-hydraulic hydrated lime, gauged with 1/4 part cement.

An inherent light tint can be achieved if grit and sand of a light or near white colour are used.

It is always advisable to have an area of about 2 square yards done for approval before the main work is done.

Ancient Monuments
Edinburgh