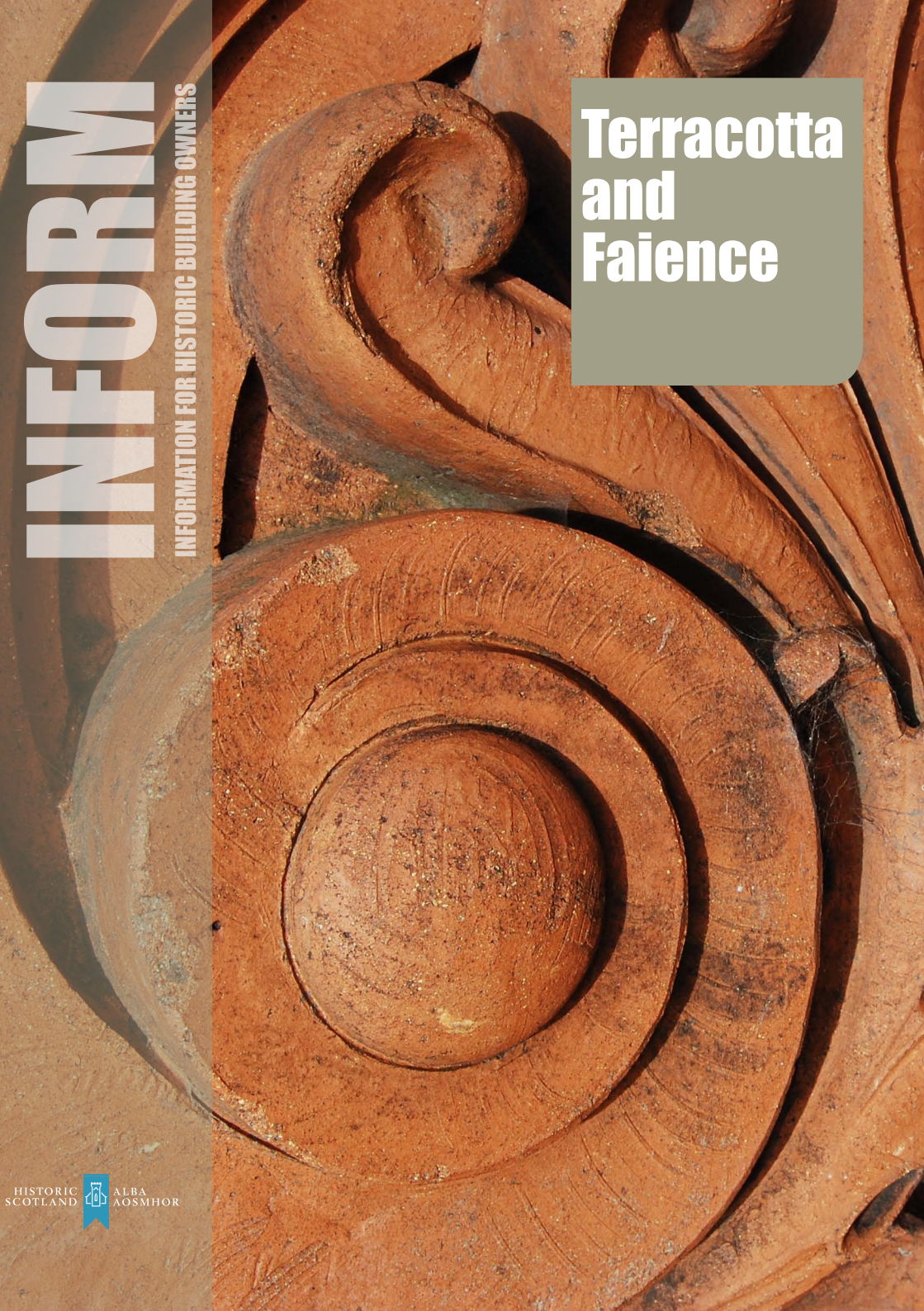
INFORM

INFORMATION FOR HISTORIC BUILDING OWNERS

Terracotta and Faience



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What is Terracotta and Faience?

Terracotta and faience are both formed from ground clay mixed with sand or powdered fired clay which has enough plasticity that it can be moulded into a shape. Such materials are harder and fired to a higher temperature than an ordinary clay brick would be and as such require clay of a higher quality. The difference between terracotta and faience is that faience is covered with one or more glazes whereas terracotta is not. The glazing imparted on faience is sometimes used to imitate stone.

Both terracotta and faience were a cheaper alternative to carved stone as many units could be cast from the same mould and can often be found as a cladding or facing material on buildings.

Where this was the case they were attached to the masonry by metal ties or anchors, the ceramic material being hung on the load bearing structure. Units were often manufactured hollow to make them lighter and easier to use. Sometimes these hollow units were manufactured with what was known as webbing, a series of reinforcements to make the unit more rigid.

One of the most significant properties of terracotta is the "fire skin" which develops when it is fired. When removed this fireskin is impossible to replace and the loss of this quality leaves terracotta vulnerable to soiling and deterioration. The same is true of the glaze applied to faience. Ironically the most common cause of the loss of a fireskin on architectural ceramics is cleaning.

Fig. 1: A magnificent example of a faience clad building, Glasgow

The deterioration of terracotta and faience

In common with all building materials, if not properly maintained, terracotta and faience will deteriorate over time. This deterioration can take a number of forms and be caused by various factors.

The main indicators of deterioration are as follows:

- Glaze crazing or spalling
- Material spalling
- Cracking
- Rust staining from failed anchoring systems

The main cause of such deterioration is water ingress. This can be caused by cracks in the material allowing water to penetrate, excessive wear caused by water run-off from defective rainwater goods or the inappropriate attachment of fixings rupturing the surface fireskin or glaze. One of the worst causes of this type of damage, however, is inappropriate cleaning.

It is important when dealing with failures in either material to bear in mind that in a number of cases defects may have existed since the building was erected. There was (and still is) a belief that the material is completely waterproof and therefore it was often not detailed correctly at the time of construction. This can mean that when repair work is taking place new detailing which was not part of the original design such as improvements to drip detailing and flashing may have to be devised. Where this is the case it is important to ensure these are sympathetic to what was there originally.

A further cause of problems affecting both forms of architectural ceramic is structural deterioration of the building to which the material is attached and bonded. This is particularly true where the material is attached to a ferrous metal structure that has begun to rust causing oxide jacking.

Fig. 2: Spalling has led to the loss of the terracotta fireskin leaving the material vulnerable to further decay

Glaze crazing and spalling

Crazing of the surface of faience can occur fairly soon after manufacture and is not in itself likely to be a serious problem. Whilst it can lead to moisture penetrating into the material, unless the crazing is leading to deeper cracks or spalling no repair should be required.

Where the glaze applied to faience is spalling it will be necessary to have the damaged areas re-glazed as the spalling will allow water to penetrate the material behind. When this is being undertaken any loose material should be removed and an acrylic based re-glazing product applied to exposed areas. It should be noted that the repair will almost certainly not have the longevity of the original material and should be monitored for any signs of deterioration (in which case it should be carried out afresh).

Material spalling

Spalling is caused by water penetrating the material and then migrating back to the surface or freezing in cold weather causing it to expand.

Where spalling is minor the best solution may be to paint with the same reglazing product as in the case of glaze spalling to prevent water ingress whilst avoiding the expense of replacement.

Where the spalling is more serious and there is a substantial deterioration of elements and loss of original fabric it will be necessary to replace these elements. Spalling can cause serious problems if not attended to early as it can lead to further deterioration of both the ceramic material and the anchoring systems which hold it to the building behind.

Fig. 3 Small areas of material spalling can be repaired using a fill of hydraulic lime mortar

Deterioration of the anchoring system

As these parts of the structure of terracotta and faience architecture are hidden from view such deterioration is often hard to detect unless a serious problem has occurred. Any evidence of displacement of elements, spalling or rust staining should be followed up with a thorough investigation to check for potential failure of anchoring systems. A serious failure of anchoring systems will put the public at risk.

The cause of such deterioration will most likely be water ingress causing a failure of ferrous metal fixings due to saturation and associated decay. When repair is being carried out the source of this water should also be rectified.

Fig. 4: In this faience clad structure spalling of the material has revealed deterioration of the anchoring system

Repointing

As with any element which forms masonry in a building, there will be periodic need to re-point. This helps to keep the internal structure of a terracotta or faience system dry and is therefore of as much importance as with other masonry structures. When this is being carried out it is important to use a mortar which is compatible with that used originally. It is also vital to avoid damaging the surrounding terracotta or faience units and to ensure mortar is not allowed to stain the surface of the material.

By using lime based mortar, moisture which has penetrated into the structure of the building will be allowed to evaporate through the joints. An impervious cement based mortar should not be used as this will not allow moisture to escape in that way. Likewise, waterproof caulking of joints should be avoided. As well as the binder it is important that a fine sand be used as the aggregate for repointing mortar for architectural ceramics.

Fig. 6: Re-pointing work should be undertaken using lime based mortars and can be coloured to blend in with the architectural ceramic.

Fig. 5: Missing pointing should be replaced to avoid water ingress and further deterioration

Cracking and damage to the material

Cracks can develop in both terracotta and faience as a result of structural movement in a building or stresses caused by loads or alterations. Where such cracks do occur it is likely that the elements will require to be replaced. A thorough investigation should take place into the cause of the cracks and this should be remedied before replacement terracotta or faience is put in place.

One of the most common forms of damage which occurs to terracotta and faience is through the drilling of holes for signs or other elements such as wires and cables. Such interventions can allow to water penetrate behind the fireskin or glaze leading to deterioration of both the ceramic material and the anchors which hold it to the rest of the structure. Such holes can be patched or pointed with a hydraulic lime mortar. It is important that this action completely seals the hole to prevent further moisture ingress.

Whilst not appropriate for re-pointing, a waterproof caulking material can be used to fill small holes or cracks which do not warrant the replacement of the element but if left un-repaired, would allow water to penetrate the surface of the material and lead to further deterioration.

Fig. 8: Missing pointing should be replaced to avoid water ingress and further deterioration

Fig. 7: Cracked terracotta which could be repaired by filling as in fig. 8

Replacement

Sometimes terracotta and faience elements have failed to such an extent that replacement is the only option. In all cases where replacement is necessary the preferred option should be replication of the original material. Whilst alternative options such as Glass Reinforced Plastic or Glass Reinforced Concrete are sometimes proposed these can have significant drawbacks. There is a danger in using materials which are heavier than the original hollow terracotta as this could have an adverse effect on the structure into which it is bonded.

There are still a limited number of companies who can manufacture replacement elements in terracotta and faience faithful to original patterns.

Where elements are damaged or deteriorated beyond repair it is possible to obtain replacements. Specialist advice should be sought from appropriate manufacturers on how best to achieve this.

Replacement units should be anchored using stainless steel or non ferrous fixings rather than the iron or mild steel fixings to reduce possible corrosion in the future. However, it may not be advisable to anchor replacement elements into the same holes which held previous fixings as these may be a source of weakness and a new hole may have to be drilled to take fixings.

Fig. -9: A replacement terracotta unit manufactured to replace one which had suffered severe deterioration

Cleaning

Both faience and terracotta were designed to be cleaned fairly easily. Most elements can usually be cleaned simply with water and a little soap. A soft bristle brush may be used on dirt which is harder to remove. In particularly severe cases of soiling steam cleaning may be appropriate. The use of abrasive cleaning methods, strong acids or metal bristle brushes should be avoided as these may lead to the glaze or fire skin being abraded. This damage is irreversible and will lead to the long term deterioration and ultimately need for replacement of the elements affected.

Conclusion

Terracotta and faience are a highly decorative part of our built heritage and can be found on many buildings throughout the country. Careful maintenance is required to ensure the long term survival of such elements and when repair is necessary this should be carried out in a careful and sympathetic manner. This will allow the survival of these elements for many years to come.

Contacts and Further Reading

Ashurst N. *The investigation, repair and conservation of the Doulton Fountain, Glasgow*
Ashurst J., and Ashurst N., *Practical building conservation : English Heritage technical handbook. Vol. 2, Brick, terracotta and earth*

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