

Use of Natural Clay Bricks in Coastal Environments (UK & Ireland)



Coastal environments in the UK and Ireland present unique challenges for masonry materials due to increased exposure to wind-driven rain, salt-laden air, higher humidity, and potential freeze–thaw cycling. Natural clay bricks remain a viable and durable solution when selected and detailed correctly. This advisory note summarises key considerations for their appropriate specification.

1. Environmental Exposure

Salt Exposure

- Airborne chlorides can crystallise within the pore structure of bricks and mortar, potentially causing surface disruption over time.
- Bricks with **low water absorption** and **high density** offer the greatest resistance to salt ingress.

Moisture & Wind-Driven Rain

- Coastal zones are typically categorised as **Very Severe Exposure** under UK and Irish classification systems. A zone of up to 8 Km from the coast can be considered a saline potential environment. The extent of this influence also needs to be checked along major estuaries and rivers.
- Prevailing conditions in both countries is generally from the southwest, however seasonal variation indicates weather can originate from any direction with its greatest impact on coastal locations.
- Bricks should therefore be selected from the highest durability categories:
 - **F2/S2** bricks to BS EN 771-1 (freeze-thaw & soluble salt resistance).
 - Use a manufacturer that goes beyond these standards (Ibstock)

2. Brick Selection Criteria

Strength & Durability

- Choose clay bricks with:
 - Low water absorption (typically <10%).
 - Proven frost resistance, F2 rated only!
 - Minimal susceptibility to efflorescence and salt crystallisation.

Manufacturing Type

- **Wire cut or engineering-quality bricks** generally outperform soft mud bricks in harsh marine climates due to their tighter pore structure.
- Consider glazed bricks for particularly exposed façades.

Colour Stability

- In high-salt, high-UV locations, select bricks with fired-in colour rather than pigment-applied finishes to ensure long-term appearance retention.

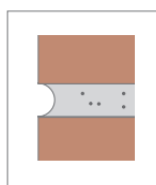
3. Mortar, Joints & Detailing

Mortar Specification

- Use a durable mortar class suitable for severe exposure:
 - Consider **M6** or **M12** mixes depending on structural requirements.
- Specify mortar that uses a sulphate resisting cement.

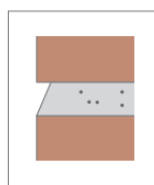
Joint Profiles

- Prefer **weather-struck** or **bucket-handle** joints to improve moisture run-off.
- Avoid flush and recessed joints in exposed coastal façades.



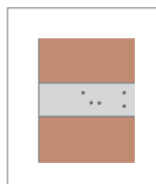
Curved (Bucket Handle)

This joint gives an improved appearance over a flush joint, with little reduction in its strength. Owing to the compressing of the joint and the superior bond, it has good weather resistance and is suitable for all grades of exposure.



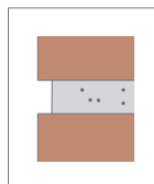
Struck or Weathered (Weather-struck)

This produces a contrasting effect of light and shade on the brickwork. Such joints, when correctly formed, have excellent strength and weather resistance and are suitable for all grades of exposure.



Flush

This gives maximum bearing area and is often favoured when coarse textured bricks are used. With some brick types the finish may appear a little irregular. Suitable for moderate and sheltered exposures as the mortar joint has not been compressed by the finishing tool.



Square Recessed (Raked)

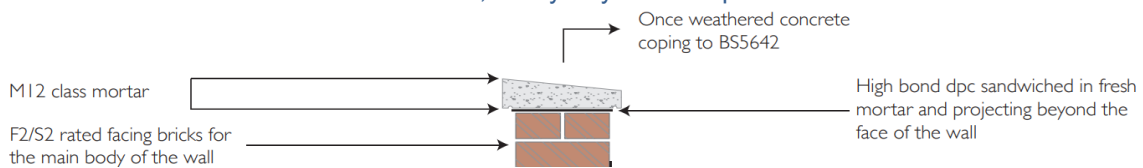
This can produce interesting articulated joints, but weather resistance and strength will be considerably less than with other joints. Use only with frost resistant bricks in sheltered exposure conditions. The recess should not exceed 3-4mm and is not recommended with full fill cavity insulation.

Movement Considerations

- Coastal conditions often increase thermal expansion.
- Ensure recommended spacing and detailing of movement joints to reduce cracking pathways for moisture and salts.

4. Construction Quality

- Good workmanship is critical in coastal masonry.
- Key measures include:
 - Follow the guidance of BS 8000-3 Workmanship on constructions sites – Masonry.
 - Protecting of site stored bricks and incomplete walls from saturation during construction.
 - Ensuring full mortar joints (no voids).
 - Ensure correct installation of DPCs, cavity trays and stop ends.



5. Maintenance & Lifecycle Considerations

- Periodic inspection is recommended to identify early signs of salt crystallisation, mortar erosion, or pointing deterioration.
- Repoint using compatible, durable mortars that preserve the original performance characteristics.
- Avoid impermeable surface coatings that can trap moisture within the brickwork.

6. Summary

Natural clay bricks can be highly durable and aesthetically successful in UK and Irish coastal environments when correctly specified. Key priorities include:

- Selecting high-durability F2/S2 bricks (or equivalent).
- Ensuring robust detailing and mortar specification and joint profile for severe exposure.
- Maintaining good construction quality and periodic inspection.

Proper material choice and design coordination will ensure long-term performance, resilience, and visual quality in coastal locations.

Reference should also be made to *Ibstock Technical Information Sheet A11: Durability of Masonry in Finished Construction*, which provides further guidance on durability considerations in practice.

This document highlights the importance of assessing micro-conditions of exposure, as defined in PD 6697 (Table 15 and associated guidance). The MX exposure classes describe the environmental conditions that masonry—both brick and mortar—will be subjected to during its service life.

The distinction between MX3.1, MX4 and MX5 lies primarily in the severity and nature of exposure, particularly in relation to:

- moisture and degree of saturation
- freeze–thaw cycling
- the presence of salts or aggressive chemicals

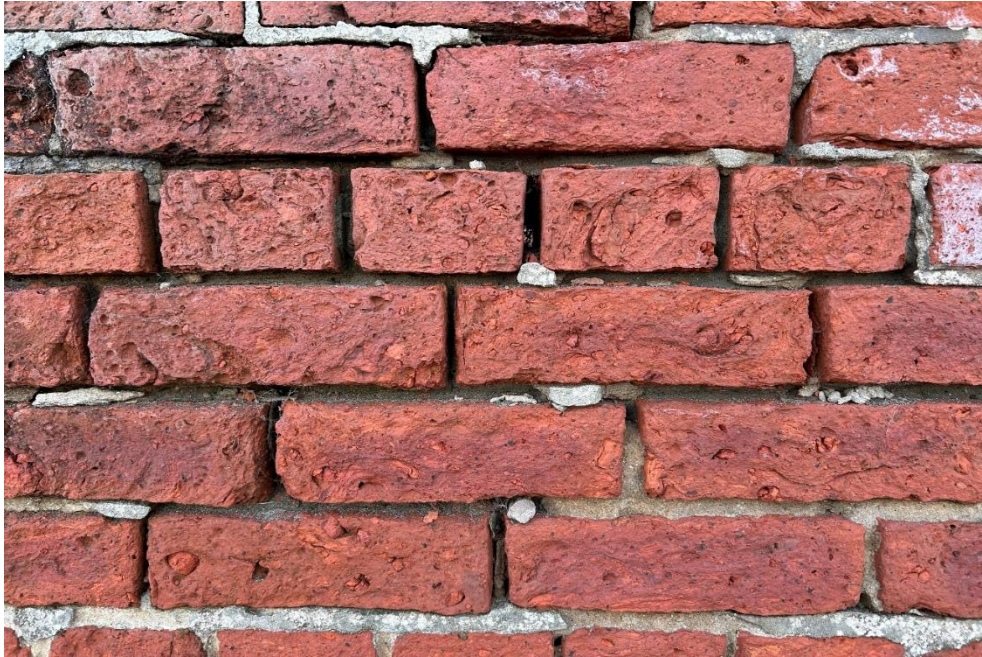
Understanding these differences is essential to ensure the correct specification of materials and detailing, thereby achieving the required durability performance of the masonry.

Examples of Costal Brickwork

Shelter Hall on Brighton’s promenade is a new-build reconstruction of the original 1880s structure. The project called for highly skilled bricklayers to form the distinctive imperial double-English bond using Ibstock’s Cheddar Red bricks, which give the building a bold, robust character that complements the Victorian seafront. With very low water absorption and high compressive strength, these bricks—combined with 7 mm lime-mortar joints—enhance both the visual quality and long-term durability of the façade. The elevations incorporate a blend of machine-made and handmade bricks of uniform size, along with up to 42 special units, including corner and tapered bricks, all seamlessly integrated with the pre-cast stone masonry.



Regular inspection and maintenance of the mortar joints on this brick boundary wall along the Yorkshire coast could have prevented the further deterioration of the brickwork. The wall, approximately 120 years old, was originally built with lime mortar but was later repointed with a cement-based mortar that is incompatible with the brick, ultimately reducing its long-term durability.



This brick boundary wall sits a short distance inland on the Yorkshire coast. At nearly 50 years old, it has deteriorated due to the use of an unsuitable brick specification. The bricks installed were rated F1 for frost resistance and S1 for soluble salt content—classifications that do not provide sufficient robustness for ‘severe’ or ‘very severe’ coastal environments. As a result, moisture absorption has led to frost damage and expansion within the brickwork, causing spalling to the brick faces and tension cracking in the mortar joints.

Additionally, the concrete cappings were installed without a DPC beneath the mortar joint, allowing moisture to penetrate directly into the brickwork and further accelerating the deterioration.

