Stone faced precast	**Published Date: 20/04/2009**

Precast panels can be used as a backing to a natural stone facing, particularly on prestige projects. This enables most of the decorative features of stone to be utilised, whilst maintaining the advantages of precast construction.

Whilst most types of stone can be used, those most commonly applied are limestones and sandstones, slates, granites, marbles and hard limestones. There is no specific distinction between limestone and 'hard' limestone, but it is generally accepted that the latter can be polished.

For each type of stone there is a range of finishes which can dramatically change the appearance of the stone.

Limestone & sandstone – fine rubbed, tooled, sawn or riven
Slates – riven, flame textured, sawn or fine rubbed
Granite – polished, honed, axed, dolly pointed, flame textured or tooled
Marble & hard limestone – polished, eggshell or honed

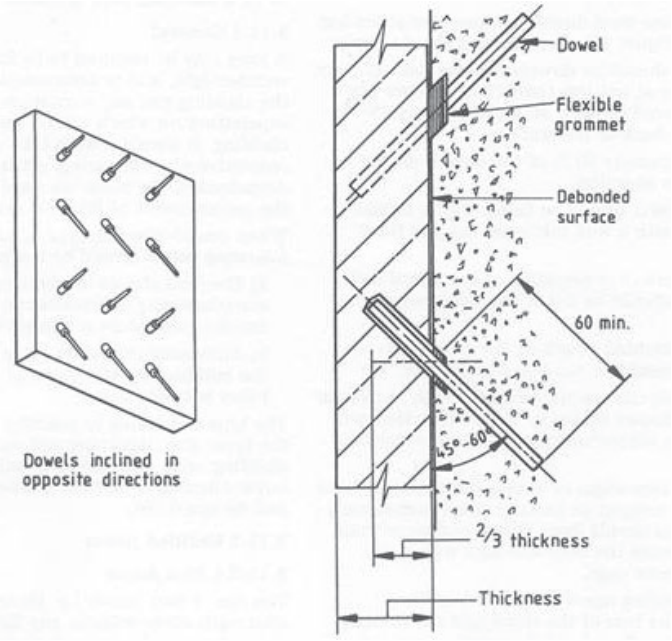
With some stones, e.g. Portland, there are other factors such as shell content etc which can affect the suitability.

The minimum thickness of stone facings is specified in BS8298 table 4, which can be summarised as:

Granite, homogeneous marble, slate, hard limestone = 30 mm
Limestone, sandstone = 50 mm
Brecciated marble = not advisable

These are minima, and there may be details where thicker sections are preferable

The method of manufacture is for the mould to be constructed as usual, although it may be a 'skeleton' construction for economy. The stone are placed 'face down' in the mould, and stainless steel dowel pins are epoxied (see sheet 2.4) into the back face (see diagram). The rules for these pins are:



a) Diameter not less than 4.7 mm (we use 6 mm dia)
b) Not less than 11 pins per m2 (historically 1 pin per ft2)
c) Slope approx 45o to face of stone
d) Approx 50% of pins in opposing directions
e) Flexible grommet to have wall thickness at least 3 mm
f) Depth of penetration into stone to be 2/3 thickness
g) Length embedded in concrete not less than 60 mm
h) Stones not having a support or another stone below must have pins no more than 100 mm above the bottom edge, and within the reinforcement cage

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Stone other than granite should be tested to show that there is adequate strength for this type of attachment. Most precasters have existing tests on a range of stones.

The maximum size of stone is limited both by architectural requirements and by the type of stone. Availability may also be a factor with some stones such as Portland. Small pieces of stone should normally be avoided, but if used then particular attention must be paid to the anchorage.

A debonder is applied, and the steel pins have rubber grommets, to allow thermal movement of the stone to occur. A normal reinforcement cage is placed, and the unit cast as usual.

Packers are placed between the stones to give a constant joint width. When the unit is turned over, the joints are cleaned out and sealed. The choice of sealant must be carefully considered since some types may cause staining with certain stones. In cases of doubt, tests should be carried out. It is also possible to fill the joints with a gun applied 'lime mortar'.