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STONE

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Granite - the stone that endures

With a crushing-stress of about 20,000 lb. to the square inch, granite is the toughest natural stone. Since the dawn of history men have built with this material, which is found in most parts of the world; for always its tremendous strength and endurance have recommended it.

THE geological history of granite is the key to its strength. It is an igneous rock which is believed to have been formed by the very slow cooling—deep under the earth's crust—of molten material produced by radio-active energy. The extremely slow rate of cooling caused almost perfect crystallization of the rock, which was subjected during the process to tremendous pressure. Granite is generally composed of felspar, mica and quartz (one of the hardest common minerals).

Most British granites are grey or red (depending on differing mineral constituents); they are found in Cornwall, Devon, North Wales, Westmorland, and in Aberdeenshire and South West Scotland. Black and other colours are imported in the form of rough blocks, to be sawn, dressed or polished in this country.

Granite has been widely used in architecture since the time of the Cornish megaliths, and wherever found locally it was the natural building material, whether for the solid domestic fortresses of the mediaeval Lowland chieftains, or for the vast *Escorial* monastery in Spain.

By the nineteenth century, when improved transport made it available in places far from the quarries, granite began to be widely used for important buildings, its subtle colourings and the fine polish that can be imparted to its surface being appreciated, as well as its hard-wearing quality. Norman Shaw chose granite for the



ARCHITECT'S MODEL OF T.U.C. MEMORIAL BUILDING, WHICH IS TO HAVE CLADDING OF POLISHED GREY CORNISH GRANITE. ARCHITECT: D. DU R. ABERDEEN, B.A., F.R.I.B.A., A.M.T.P.I.

lower storey and arch of New Scotland Yard, and the same material is used for the lower courses of County Hall, Westminster.

Because the texture of granite does not lend itself to elaborate decorative work, architects during the last fifty years have used it mainly for strictly functional purposes—in particular, for plinths, bases, door and window surrounds, and thresholds, for all of which it is specially suitable. The new river wall erected on the South Bank

of the Thames for the Festival of Britain is a striking example of its application. This is one of the largest recent granite constructions in the country, the stone having been worked at several quarries in Cornwall and delivered by sea direct to the site. It is also being used in the construction of the Metropolitan Cathedral, Liverpool, which—next to St. Peter's, Rome—will be the largest building in the world for public worship.

The enormous strength of granite, and its resistance to weathering, make it a valuable material in civil engineering. The advantages of these characteristics have been long recognized, and more than five million tons are said to have been used in the breakwater across Plymouth Sound, completed by Sir John Rennie in 1823. Other typical examples of the use of granite for withstanding the constant wear of water are the Eddystone and Fastnet Lighthouses.

For bridges, too, it is one of the soundest materials known. Sir George Humphreys used dressing granite for the piers, cutwaters and pylons of Lambeth Bridge, and the clean lines and impressive dignity of the Cornish granite abutments are an outstanding feature of the Gateshead Bridge at Newcastle-on-Tyne.

A further, and popular, use of granite is in monuments and memorials. Great developments in the use of the stone for this purpose took place after 1803, when a method of polishing was rediscovered.

Granite has subtlety of colour; and by its nature gives nobility to the form in which it is fashioned. But most important of all is its ability to resist the ravages of wind and weather, an essential factor in any building that is to endure.



THE 12TH-CENTURY LAUNCESTON PARISH CHURCH (CORNISH GRANITE)

KEMNAY GRANITE WAS USED FOR THE FACADE OF MARISCHAL COLLEGE, ABERDEEN. ARCHITECT: A. MARSHALL MCKENZIE.



Location of principal quarries
throughout England, Scotland & Wales



2 Creetown Granite

SOURCE Creetown, Kirkcudbrightshire.

GEOLOGICAL Biotite Granite Cambrian system
(approximate age 500 million years).

COLOUR Light grey.

CHARACTERISTICS Medium grain, even texture
and uniform in colour. Will take sharp arrises
and can be masoned to fine detail.

AVAILABILITY To suit demands.

SIZES Practically any size in blocks up to 10 tons
in weight.

FINISH Rock face, fine-axed, eggshell finish,
polished.

PHYSICAL PROPERTIES Density 170 lb. per cu. ft.
Water Absorption 0.12%
Crushing-strain 1,380 tons per sq. ft.

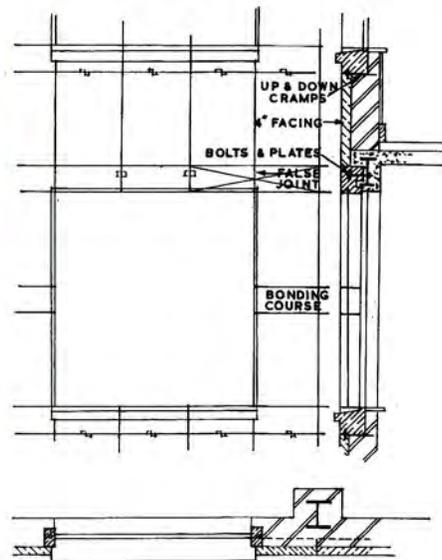
WHERE USED Creetown Granite has been used
extensively for engineering, building and monu-
mental work, not only in this country but also
overseas.

TECHNICAL DATA

Building with stone

BOTH ITS PROVEN QUALITY OF WEATHER-
resistance and its aesthetic characteristics make
stone, with the aid of modern machinery and
new techniques in working and handling, infi-
nitely adaptable to a wide variety of purposes in
building.

As a facing material for traditional style archi-
tecture, there is evidence enough of its durability.
For slab-facing in contemporary design, it has
been used extensively in recent years, being
entirely satisfactory for the purpose, as well as
economical. For dressings to brick elevations
there could be no finer combination of materials.



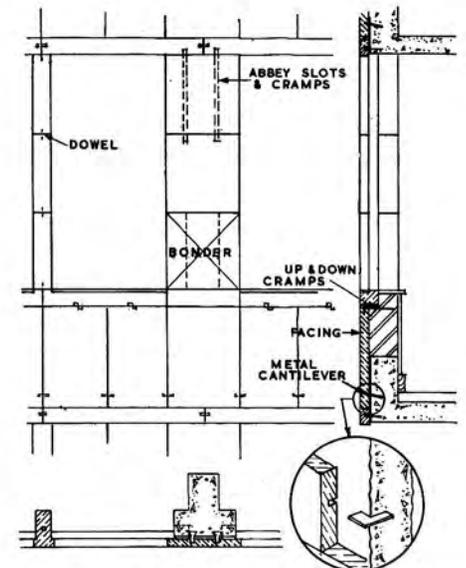
CONSTRUCTIONAL DETAILS

Where stone is used as a slab-facing in framed
structures, careful consideration must be given
to securing the slabs to the structure. If occasional
bonding-courses can be provided, so as to transfer
the load to the structure itself, a simple arrange-
ment of cramps and dowels is generally all that
is necessary.

For slabbing that is of uniform thickness over
fairly large areas, and does not get a bearing on
the structure, metal supports from the structure,
as well as cramps, must be provided. Each job
has its own problems, and it is not possible to
prescribe a standard code for these fixings; but
the two sketches indicate an arrangement that is
frequently used.

All metal fixings should be of non-ferrous
material and of adequate strength.

Except in the case of granite, thickness of slabs
for external work should not be less than 3 in.,
and—where structural design will permit—great-
er thickness is to be preferred. Granite is usually
2 in. maximum thickness, but may sometimes be
1½ in. or even 1 in. The type of stone to be used
must also be taken into account when specifying
the thickness of slabbing, and this has a bearing also



Interior decoration, too, offers great scope for
natural stones, especially those which can be
polished or semi-polished. There are varieties of
stones particularly suitable for paving, either
internal or external, and these can be both
decorative—through a selective colour-combina-
tion—or strictly utilitarian where heavy traffic
is likely.

In landscape architecture, also, there is
probably no other material so 'right' in the way
of design and harmony as natural stone; and
where waste by-products from the quarries and
masonry works can be utilized for this purpose,
considerable economy will result. Stone for
house-building is again finding favour in stone
districts, where the new mechanical aids are
making for economical production.

Stone is the first of building materials—first
in age, in adaptability, in value and economy.
It has distinctive characteristics that neither the
skill of man nor the ingenuity of his machines
can imitate. It is permanent, serviceable,
beautiful.

on the actual details of construction. It is recom-
mended that the masonry contractor should be
consulted before the designs are prepared, as not
only can he advise on thickness of slabs and
methods of construction, but also considerable
economy can often result from an arrangement
of jointing that will enable him to make the best
use of his machinery.

ADVISORY SERVICE

The British Stone Federation has
made a close study of all the prob-
lems relating to the use of stone, and
has set up an advisory panel, which
is freely at the service of architects
and others, to give advice and help
on stone matters. Inquiries should be
addressed to the Secretary, The
British Stone Federation, 70 Victoria
Street, S.W.1.