

# Marine aggregates in concrete

Marine aggregates are the sand and gravel deposits found on the inner continental shelf off the UK coast.



The Channel Tunnel Rail Link



Canary Wharf Station

Similar in geological origin and mineral composition to their terrestrial equivalents, many having been deposited by 'Ice Age' rivers, in valleys now submerged by the sea.

## How can they be used?

The shape, strength and other physical characteristics are generally identical to high quality land-based aggregates and as such the end uses are no different. Their main use is in the manufacture of concrete, but they are also widely used in the production of:

- Asphalt and coated products
- Masonry and paving blocks
- Drainage and fill materials
- Leisure and sport facilities
- Industrial applications

## How should they be specified?

There are many European Standards applicable to the use of granular material. BS EN 12620 is the predominant specification concerning the use of aggregates for concrete supported by UK national guidance document PD 6682-1.

It is therefore recommended that any clause inserted into contract specifications for aggregates for concrete be based upon the guidance given in BS EN 206-1 and BS 8500-2.

## Are they different from land-based aggregates?

The main differences between the majority of land-based aggregates and marine aggregates are the presence of **Chloride** (from sea salt) and **Shell**, in marine material (as detailed overleaf).



The Severn Bridge



Wimbledon



Bluewater Shopping Centre

- **Chloride content**

As chlorides may be present in concrete from other constituent materials, eg. cement and admixtures, the contribution from aggregates should be kept in perspective. The two issues relevant to chlorides are:

- i **Alkali Silica Reaction (ASR):**

Since marine aggregates are petrologically similar to land-won aggregates they are no

more or less susceptible to ASR. The possible contribution to available alkali by sodium and potassium salts is strictly controlled for both land won and marine aggregates. In washed aggregates this contribution is relatively small but is required to be taken into account by the concrete supplier when conforming to guidelines and specifications relating to minimising the risk of alkali silica reaction.



Fleets of dredgers operate on licenced areas. Dredging is closely monitored by the Crown Estates to ensure that licence conditions are met



Quality aggregates being washed and screened as part of the onshore processing operation

- ii **Corrosion**

A concern to specifiers is the need to avoid corrosion in concretes containing steel reinforcement. Guidance is given in BS EN 206-1 and BS 8500.

Electronic monitoring during processing ensures that specification requirements are met.

- **Shell content**

Shell, like limestone, is predominantly calcium carbonate, which is stable in

concrete. Nevertheless a check on shell content of coarse aggregate is carried out to ensure compliance with BS EN 12620. It should be recognised that as with chlorides, shell can also be associated with land-based deposits.

#### **Certification**

Product certification in accordance with the Factory Production Control requirements of BS EN 12620 is available on request.

## Recommended publications



- **BS EN 12620** - Aggregates for concrete
- **PD 6682-1** - Guidance on the use of BS EN 12620
- **BS EN 206-1** - Concrete - specification, performance, production and conformity
- **BS 8500-1** - Complimentary standard to BS EN 206-1
- **BS 8500-2** - Complimentary standard to BS EN 206-1
- **BRE Digest 473** - Marine aggregates in concrete
- **BRE Digest 330** - Alkali-silica reaction in concrete
- **Aggregates from the sea** - BMAPA ([www.bmapa.org](http://www.bmapa.org))
- **BRE** - Special Digest 1

Produced by



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The British Marine Aggregate Producers Association is one of the constituent bodies of the Quarry Products Association, the trade association for the aggregate, asphalt and ready-mixed concrete industries. Secretary Richard Griffiths.

The Cardiff Bay Barrage

