

A lighter choice

As the construction industry works towards sustainable recovery, choosing the right aggregate for a project's concrete is key for engineers, contractors and their clients. Gareth Moores of Lytag explains further and looks at a recent project where the choice of aggregate played a major part in the project's success.

As we look towards economic recovery, it is the most efficient, sustainable and best value practices that will see the construction industry to true recovery. Choosing the right aggregate to be used in a project's concrete can help engineers and contractors to deliver this best value requirement for their clients and can have a major impact on project costs, quality and sustainability.

number of benefits in terms of project time frames and costs. Structural concrete manufactured using Lytag lightweight aggregate, for example, is 25% lighter than traditional concrete but retains the same structural integrity. This means that spaces can be designed with larger structures and greater spans, and a reduced number and width of columns, ultimately providing building owners and occupiers with maximised usable floor space and increased commercial value.

When this material is used in precast concrete – from smaller concrete products such as lintels, posts and street furniture, to large-scale units for bridges and stadia – it provides a weight saving of approximately 25% over normal-weight precast concrete. This can allow greater efficiency in terms of production techniques, reduced fixings, logistics and crane requirements, all of which can mean substantial time and cost savings for a project.

Lightweight secondary aggregate in practice

The advantages of choosing the right aggregate for a project's concrete are well illustrated in the development of a new £22 million, seven-storey office development adjacent to the Old Bailey Crown Court in the City of London. Constructed within the existing structure's footprint, the new building has been designed to remain sympathetic to the site's historic surroundings, while also exemplifying the best of modern design. Testament to the project team's success in achieving this is the commendation the project received in the 2010 Civic Trust Awards.

On a site of such historic value, reducing the impact on the remaining archaeology was a key consideration and to build on this site, the design team and contractors had to adhere to restrictions to ensure its preservation.

The stability of the ground was also critical. The soil at the site is composed of soft clay containing glacio-sedimentary structures derived from the last ice age. Anomalies have been created in the soil where remnants of ice that have been trapped in the clay have melted to form small voids and affected ground stability.

Reducing the dead weight of the 7904m² building helped the project's design team to overcome both

Above and right: Old Bailey, London.

A sustainable solution

Using recycled or secondary aggregate in concrete can boost a project's sustainability credentials, as it both reduces demand on quarried aggregate and diverts material that may otherwise be sent to landfill as waste. Lytag lightweight aggregate, for example, is manufactured by sintering fly ash, a by-product of coal-fired power stations and provides similar, or often improved, performance as quarried aggregate.

As client demand and government legislation to lower the environmental impact of building look set to keep on growing, improving sustainability through secondary aggregate is an effective 'quick win' to implement

In addition to the 'green' advantages, concrete made using a lightweight secondary aggregate can provide engineers, contractors and their clients with a



of these challenges. Engineering consultancy Pell Frischmann was able to greatly reduce the structure's weight by specifying Lytag lightweight aggregate for the concrete to be used in the floors of the building. The lighter-weight concrete slabs on metal decking combined with a lightweight steel-frame structure greatly reduced the overall dead weight of the building. This meant that the impact on the remaining archaeology and the pressure on the soil were significantly reduced.

Flexibility

Using Lytag lightweight aggregate to manufacture lightweight concrete with the same structural integrity as concrete made using traditional aggregate enabled Pell Frischmann to design spans of 9m with 203 UC sections.

This allowed for greater services flexibility without increasing the frame costs. Strux synthetic fibre reinforcement was added to the lightweight concrete as a replacement for steel reinforcing on the metal decking.

Using concrete made with secondary lightweight aggregate in this development not only allowed the project team to overcome the challenges presented by the site and the preservation requirements, it also contributed to the sustainability of the project.

As value, performance and a lower environmental impact are increasingly demanded of concrete, using lightweight secondary aggregate offers engineers and contractors a simple and sustainable way to meet client demands. ●



Lytag lightweight aggregate granules.



The lighter-weight concrete slabs on metal decking combined with a lightweight steel frame structure greatly reduced the overall dead weight of the building.



There's more than one PFA

With a history of use spanning over 50 years Pulverised Fuel Ash (PFA) and Furnace Bottom Ash (FBA) are by-products of coal fired power station electricity generation. They are widely used in construction to reduce environmental impact - for example as a cement replacement in concrete.

By using PFA and FBA you can be confident you are diverting material from landfill, reducing CO₂ emissions and yet gaining a considerable number of technical benefits.

Do you want to know more about reducing your carbon footprint?

Contact us and ask about our free lunchtime presentations

UK Quality Ash Association

Maple House Kingswood Business Park
Holyhead Road Albrighton Wolverhampton WV7 3AU
tel: +44 (0)1902 373365 email: enquiries@UKQAA.org.uk

www.UKQAA.org.uk