mpa The Concrete Centre

Design Concrete 2024

The Concrete Centre Student Architecture Competition

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Front cover image: Textured concrete made using a flexible form liner. Image courtesy of NOE Betongestaltung GmbH.

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The Concrete Centre is the central development organisation for the UK cement and concrete industry. Its objective is to assist all those involved in design and construction to realise the full potential of concrete as an adaptable and sustainable construction material.

For more information on The Concrete Centre visit **www.concretecentre.com.**

The Concrete Centre is part of the Mineral Products Association, the trade association for the aggregates, asphalt, cement, concrete, dimension stone, lime, mortar and industrial sand industries.

Introduction

Design Concrete is a national student competition which encourages architecture students to explore the benefits of designing sustainably with concrete. This year's brief is to submit innovative concrete designs for a nature and art centre and/or associated artists' studios within the bio-diverse setting of the Ouse Fen Nature Reserve. The competition is open to students studying at schools of architecture, landscape architecture and the built environment in the UK, and is free to enter.

Benefits for students

- Develop an understanding of ways to design with concrete to improve its sustainability credentials.
- Develop an understanding of the ways in which concrete can enhance a building's performance.
- A chance to enhance portfolios for prospective employers.
- Gain familiarity with innovation in the manufacture design and construction of concrete.
- Develop skills in communication, planning and technical design.
- A chance to win £250 for the winning entry.
- An opportunity to gain national recognition for the design work.

Essential skills

This competition seeks to raise awareness and skills related to the design, specification and use of concrete, highlighting the sustainability considerations required of the built environment to address climate change. The ubiquitous and versatile nature of concrete means that most, if not all, architects in their practicing life will need to specify concrete in some form in their buildings. There are key design and specification decisions that architects can make to enhance the sustainability of the concrete used in their projects. This competition aims to upskill architecture and design students, to make more informed, responsible and sustainable decisions when designing and specifying concrete in practice.

Reading list and learning resources

A suggested reading list and learning resources for students participating in this competition can be found at **www.concretecentre.com/designconcrete**

This year's challenge…

To design a nature and art centre and/or associated artists' studios within the Ouse Fen Nature Reserve. Submissions should demonstrate an exploration of the sustainable and creative potential of concrete and its construction techniques.

The design must feature concrete as a significant component of the proposal, demonstrating an understanding of how concrete can be used to reduce whole life carbon, provide climate change resilience and support a more circular economy. The judges will also be looking for design creativity and flair with proposals that exploit concrete's potential for unique forms, pattern, texture and colour. Entrants must also demonstrate their investigation into manufacturing and construction processes of concrete.

Suggested locations for the proposed structures are outlined on the site information image on page 5 of this document, but entrants may choose to locate them in an alternative part of the site and should provide a good reason for doing so within their submission.

There are no specific size or space requirements stipulated for the buildings. The following list of accommodation is provided as a guide, and entrants are welcome to deviate from this list if preferred.

Art and Nature Centre

- Reception and entrance area
- Café
- WCs
- Gallery and exhibition space
- Education space
- Equipment storage
- Staff office
- Bin and recycling store
- Plant room

Artist's studios

- Internal work space naturally ventilated
- External covered work space elevated above the ground and / or water
- Entrants should assume that separate WC facilities will be available at the new public toilet next to the car park. The design of this can be included in design proposals if so wished, however is optional.

A wide range of learning resources including publications, webinars and case studies are available free of charge on The Concrete Centre website: **www.concretecentre.com.** This also includes the back catalogue of Concrete Quarterly magazine at **www.concretecentre.com/archive**

A specific list of resources useful for students taking part in the competition can be downloaded from **www.concretecentre.com/designconcrete**

Sustainability

Concrete's role in delivering a sustainable built environment through performance benefits is increasingly recognised and utilised by design teams. The use of local low carbon concrete mixes, aggregates, recycled content, lean low-waste forms, and modern methods of construction, together with concrete's potential to provide passive climate change resilience and energy efficiency, are just some of the ways in which concrete can be used within highly sustainable buildings.

Submissions should demonstrate exploration and use of:

- Lower carbon cements
- Resource efficient forms (e.g. post-tensioning, ribbed slabs, thin shell, hollow core, 3D-printed elements)
- Use of thermal mass for passive cooling and heating
- High thermal performance of enclosure
- Responsible and local resources
- Resilience to climate change
- Design for longevity and future reuse
- Insitu/masonry/precast or hybrid concrete structure

Design for disassembly
Circle House, Denmark, by 3XN and Lejerbo

Image: Tom Jersø, as featured in Concrete Quarterly, spring 2022

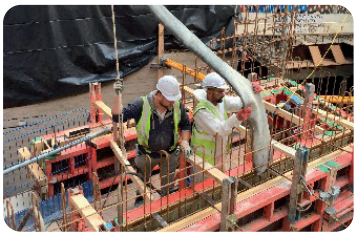
Ultra thin shell concrete structure
Hilo, Munich, by supermanouevre and Block Research Group

Creativity, manufacture and construction

Concrete does not need to be boxy or grey! It offers great scope for achieving a range of textures, forms, colour and pattern. The possibilities are almost endless. Understanding the process of making concrete and the materials that are used, either in the factory or on site, is key to exploring concrete's potential.

- Concrete can be used in many different parts of a building, including foundations, structural frame, walls, cladding, floors, roof and even furniture. It can be cast insitu, using formwork (moulds) or pre-made (precast) in a factory to be assembled on site. The concrete can be made especially for your project or selected from premade elements. Buildings often utilise a combination of techniques (hybrid construction).
- Other more innovative manufacturing and construction techniques include use of alternative formwork, glass reinforced concrete, rammed and sprayed concrete and 3D printed concrete.
- The texture of whatever concrete is poured into will be imprinted into the surface of the concrete. Conventionally concrete is poured into plywood or steel formwork, but it can also be cast against fabric, rubber, plastic, wax, cardboard, almost anything really provided you can remove the formwork.
- More often than not, concrete is left 'as struck' straight out of the formwork. Concrete's texture and colour can also be altered after it has been cast. These 'post-finishing' techniques include acid-etching, bush-hammering and grit-blasting to achieve varying degrees of roughness, revealing the colours of the aggregates within.

Image: Bennetts Associates



In-situ concrete
The Royal College of Pathologists, London, by Bennetts Associates

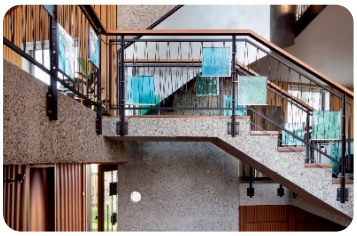
Image: PCE Ltd

Precast concrete off-site manufacture
Assembly building C Bristol by AHMM & PCE Ltd

Image: PCE Ltd

Precast concrete on-site lifting and install
Assembly building C Bristol by AHMM & PCE Ltd

Image: Mole Architects



Shot-blasted concrete
The Houseboat, Dorset, by Mole Architects

Image: Blue Cube Marine Ltd

Textured concrete
Mumbles Sea Hive, Wales, by Blue Cube Marine Ltd, using Reckli rubber form liners

Image: Concept Shed Ltd

Fabric Formwork
The Root Dome at The Eden Project, Cornwall, by Concept Shed Ltd

GRC cladding panel
Elizabeth Line stations, London, by Grimshaw Architects and Bryden Wood

Image: Graphic Concrete

Surface retardant treated concrete
Pihlajalaakso sound barrier, Finland, by Ramboll and Graphic Concrete

Image: PCE Ltd

Acid-etched concrete
Bromley South Station, London, by TBA

Image: Iwan Baan, as featured in Concrete Quarterly, summer 2023

Sprayed concrete
Richard Gilder Center, New York, by Studio Gang

Image: Block Research Group

3d printed concrete
Striatus bridge, Venice, by Zaha Hadid and Block Research Group

Image: Graeme Massie Architects

Pigmented board marked concrete
Respite Pavillion, Scotland, by Graeme Massie Architects

The site

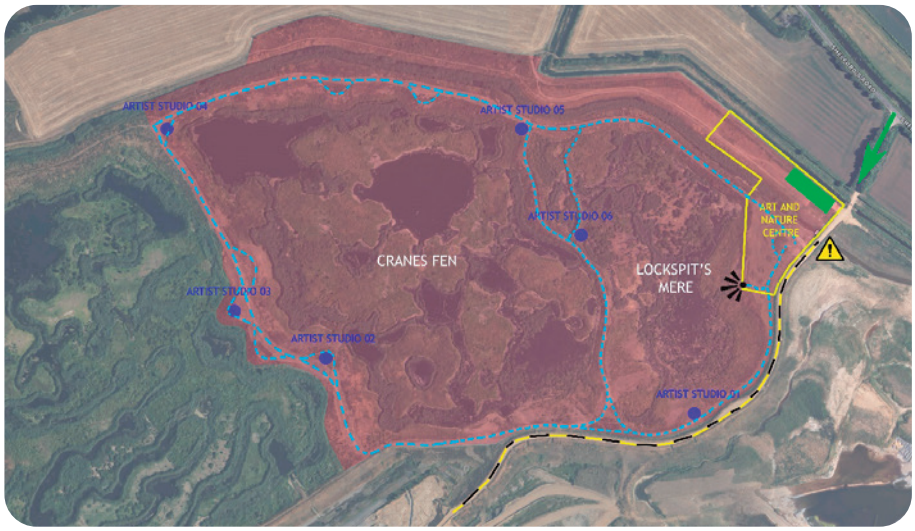
The site for the project is located within the Ouse Fen Nature Reserve in Cambridgeshire.

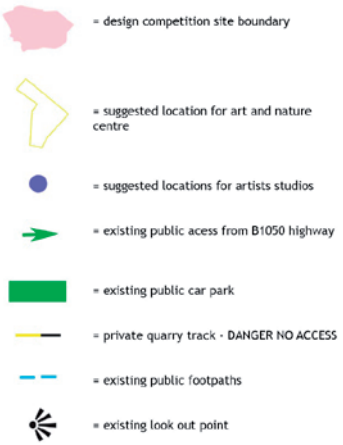
In 2001 the Royal Society for the Protection of Birds (RSPB) and Hanson UK embarked on an ambitious plan, combining gravel extraction with conservation to create a major new wetland habitat. The RSPB is a charitable organisation that works to promote the conservation and protection of birds and the wider environment. Hanson UK is a leading supplier of aggregates, asphalt, cement and ready-mixed concrete.

Over a 30 year period, 28 million tonnes of sand and gravel will be extracted and the quarried areas prepared for restoration. Staff and volunteers started the first reed planting in 2004 and by 2013 over 130,000 reeds had been planted. By the summer of 2021 the new wetland habitat covered the size of 417 football pitches, providing homes for wildlife including bearded tits, marsh harriers, bitterns and invertebrate communities. A new public entrance and car park opened in 2021 providing a gateway for visitors to the wetland, and a series of marked footpaths through the site allow visitors to experience the unique and inspiring wetland habitat that has already been created.

Once the project is complete there will be over 32 km of trails for visitors to explore the reserve. The Hanson RSPB wetland project continues and by 2030 The Ouse Fen Nature Reserve will be nearing completion. It will be the largest conservation project following mineral extraction in Europe and will be the UK's biggest reedbed.

The site consists of a variety of landscapes providing students with exciting opportunities for contextual design. Open grassland, expanses of water, infant woodland and sloping reed bed margins all provide unique and interesting terrain to site design proposals within. Student's designs should be informed by and respond to these special and unique landscape features.





Site information – Full details and CAD plans can be downloaded at ***www.concretecentre.com/designconcrete***

Site information

A full pack of site information including scaled drawings, photographs and film footage can be downloaded at:

www.concretecentre.com/designconcrete

The site is open to the public. Whilst there is no specific requirement for students or tutors to visit the nature reserve to take part in the competition, entrants are welcome to visit the publicly-accessible areas of the site should they wish to do so.

For individual visits to the site, details regarding access and facilities can be found on the RSPB's website at:

www.rspb.org.uk/reserves-and-events/reserves-a-z/ouse-fen

Due to the nature reserve being an area of protected natural habitat, group sizes are limited to a maximum of eight people under their own direction.

For groups larger than eight people, it may be possible to arrange a visit to the site and adjacent working quarry with an introductory talk and guided tour, in the autumn, if arranged with the competition organisers in advance. Autumn is the preferred time for larger group visits due to bird nesting seasons. Please register your interest for a pre-arranged group site visit by ticking the relevant check box in the online registration form at **www.concretecentre.com/designconcrete**.

Expressions of interest to arrange a group visit should be made no later than 1st September 2023.

All visitors must keep to the marked public footpaths at all times in the nature reserve.

Access is not permitted, under any circumstances, to the working areas of the quarry site without prior agreement and supervision.

Assessment criteria

The entries will be judged using the following assessment criteria:

- Demonstration of an understanding of concrete as a material, its potential uses, benefits and sustainability credentials.
- Compliance with the project brief.
- Imagination, flair, aesthetic appreciation and innovation.
- Safety, function and robustness.
- Buildability and maintainability.

The interpretation of the above criteria by the award judging panel will be final and formal feedback will not be provided.

Eligibility

- Design Concrete is open to undergraduate students enrolled in UK schools of architecture, landscape architecture and the built environment.
- Entries can be single, joint, or from teams of up to four students.
- The competition is aimed at students in their second and third years of undergraduate study although alternative course structures are also eligible if agreed in advance.

University submissions

Each university will be asked to select a maximum of three students' work for submission.

Independent submissions

Independent submissions of work from students whose universities are not embedding the competition brief within their course will also be reviewed and considered but only five such submissions will be shortlisted for judging at the national level alongside university submissions. Entries cannot be entered via both routes. Students submitting independently of their university must provide proof of an active university email address.

Submission stages

Step 1 – Registration

3rd August 2023 - 5th January 2024

Universities and independent students should register their interest to enter the competition by filling in the online form at **www.concretecentre.com/designconcrete** by 5th January 2024. Once registered, each university will be provided with three unique finalist entry reference numbers to be included on their submissions along with instructions as to where the final submissions should be uploaded. Each independent student (i.e. those not at a university running the competition in their course) will receive their unique entry reference number and instructions on how to submit directly once registered.

Step 2 – Submission

3rd August 2023 – 16th April 2024

Each university/student is to upload their anonymous submissions and separate contact details forms to the online storage platform provided by The Concrete Centre. For team submissions, the contact details for every student involved in each submission must be provided. All submissions to be uploaded before 5pm on 16th April 2024.

Submission requirements

A maximum of three A1 digital presentation boards are permitted for each student/team submission. The competition entries should be submitted as digital PDF files. It is essential that all submissions are anonymous from both a student and university perspective. Each student's unique entry reference number should be clearly marked on all boards forming the design entry. No other form of identification or distinguishing mark should appear on any part or file name of the submission.

Presentation boards should visually communicate the design, sustainability proposals and the supporting ideas in a persuasive and descriptive way.

This should include the following:

Scaled drawings

Scaled, annotated drawings should be included in the student's submission. Drawings may be prepared using appropriate CAD software, or by hand. In either case, notes and dimensions should not be smaller than the equivalent of an 11pt font when printed at A1.

Drawings must be to an appropriate scale. The drawings should show the following:

i. Site plan.

ii. General arrangement floor plans of all levels.

iii. Section(s) through the proposed design showing relationship to site context, methods of inhabitation and scales of space.

iv. Elevations of the proposed design showing its form shape and materiality in relation to the existing context.

v. Construction detail(s) showing interconnection of concrete building elements.

Models and views

Images of 3d modelling (either digital or physical) should be included on the student's submission boards. All 3d modelling must show the design proposal accurately located to scale in its surrounding context. 3d images should convey the unique atmosphere, character and inhabitation of the spaces and places being created by and within the design proposals.

Students are also encouraged to include precedent images of existing concrete to illustrate inspiration of form, texture and colour and construction.

Awards

The winner(s) of the national competition will receive a certificate(s) and a prize of £250.

The judges may decide on a joint first prize in which case the above prize money will be divided up by the judging panel at its discretion. Runner(s) up will also receive a certificate(s). Certificates will also be provided to the universities of award winners.

Presentation

The prizes and certificates will be presented at an event. The prize winners and tutors will be notified of further details regarding date and location in advance. Extracts from the winning and shortlisted entries will also be exhibited and publicised on The Concrete Centre's social media platforms and website along with credits.

Rules

1. Complete design entries must be received by the final deadline of 5pm on the 16th April 2024. Late or incomplete submissions will not be accepted.
2. Each student will be allocated a unique entry reference number which should be clearly marked on all pages forming the design entry. No other form of identification or distinguishing mark should appear on the boards or any part or file names.
3. A successful competitor must be able to satisfy the judges that he or she is the bona fide author of the design that he or she has submitted.
4. Competitors should retain the originals of the designs and drawings submitted.
5. Any entry may be excluded from the competition if:
   - The competitor does not meet the eligibility requirements.
   - The entry is received after the competition closing date.
   - The competitor discloses his or her identity in the submission.
   - The competitor attempts to influence either directly or indirectly the decision of the award judging panel.

The Weston, Yorkshire Sculpture Park,
Feilden Fowles Architects

www.concretecentre.com

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The Concrete Centre is part of the Mineral Products Association, the trade association for the aggregates, asphalt, cement, concrete, dimension stone, lime, mortar and industrial sand industries.

www.mineralproducts.org

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