



INSULSLAB SFRC

HIGH QUALITY FOUNDATION SYSTEM





INSULSLAB SFRC

A FOUNDATION SYSTEM THAT OFFERS BOTH COST SAVINGS AND EXCELLENT THERMAL PERFORMANCE

Insulslab SFRC (Steel Fibre Reinforced Concrete) is an innovative, high quality, patented foundation system that is suitable for use on a wide range of soil types. Insulslab SFRC is available exclusively through SIG Insulations stockists.

When compared to traditional methods of foundation production such as beam and block and raft foundations, Insulslab SFRC is quicker to install, more environmentally friendly, offers excellent thermal performance and significant cost savings.

This shallow foundation system requires minimal excavation, is simple to design and construct and facilitates easy compliance with Part L (Section 6 Scotland) of the Building Regulations, without the need for an additional layer of insulation and screed. By using a proprietary Robust Details construction, it also meets Part E (Section 5 Scotland) requirements for sound insulation.

Not only is Insulslab SFRC proven to save over £1,000 per plot on foundation costs (based on an average plot size of 50 sq/m) when compared to traditional raft or beam and block methods, it also achieves typical U-values for detached domestic buildings of 0.11 W/m²K.

This is based on an exposed perimeter divided by area (P/A) ratio of 0.48.

A COMPLETE SYSTEM

Insulslab SFRC is a complete system, based on a type of raft foundation which comprises a series of interlocking expanded polystyrene pods, forming a substantially rigid 'waffle' shaped slab. Steel fibre reinforced concrete is poured over the top to form the finished foundation. The steel fibres are manufactured in the UK by ArcelorMittal.

SIMPLE TO DESIGN AND CONSTRUCT

General arrangement drawings, i.e. layout for the foundation, can either be produced by the developer's engineer or by arrangement with Insulslab SFRC stockists. There is no requirement for detailing traditional reinforcing, resulting in further significant savings. The structural calculations for the steel fibre reinforced concrete are produced by ArcelorMittal, whose product liability insurance covers the design of the steel fibre reinforced concrete within the raft.

A FULL SERVICE SOLUTION

A complete specification and installation support service is available from Insulslab SFRC's specialist technical team, including engineering, U-value calculations and on-site technical support. General arrangement drawings and quantified costs can also be provided, as well as steel fibre reinforced concrete calculations from ArcelorMittal.

CERTIFICATION

ArcelorMittal steel fibres are BBA approved for use in foundations in conjunction with Insulslab (visit www.insulslab.com for full details). Insulslab SFRC is also NHBC/LABC/Zurich approved and is recommended by the BRE.



ARCELORMITTAL

ArcelorMittal is the only steel fibre manufacturer with a production facility in the UK and the world's largest steel producer, with a total of 116 million tonnes of crude steel produced annually.

For full technical details on the Insulslab SFRC system, a Technical Manual & Installation Guide is available.

For a copy of the Manual, further information or sales enquiries:

Call 0114 285 7138
Email sales@insulslab.com
Visit www.insulslab.com





TOMORROW'S PERFORMANCE... TODAY

Insulslab SFRC offers substantial benefits for the developer, architect, structural engineer and ground worker.

For further information on 'Insulslab SFRC in action' turn to the case studies on pages 8 to 10.



COST SAVINGS

This simple foundation solution provides:

- A typical saving of 25 - 33% over traditional beam and block/raft.
- Increased speed of construction/quicker completion times.
- Minimal excavation, less disruption, reduced waste disposal.
- No trenches required.
- Reduction in labour costs.

THERMAL PERFORMANCE AND SUSTAINABILITY

Insulslab SFRC complies with Part L (Section 6 Scotland) Building Regulations when correctly specified and constructed, providing:

- Typical U-values of around 0.10 - 0.12W/m²K, depending on P/A ratio.
- Greater flexibility within the overall design of the thermal envelope.
- Significant contribution to Code for Sustainable Homes and BREEAM credit scores.
- 'Future-proof' – low U-values facilitates further Code level upgrades.
- Green Guide Rating B (raft foundation).
- Reduced waste disposal and minimal site traffic.
- Less intrusive system; perfect for brownfield sites.
- Less volume of concrete required.

HEALTH AND SAFETY

The system contributes positively to Health & Safety requirements:

- Insulslab SFRC is safer to install as fewer trenches means fewer associated risks.
- Manual handling is minimised throughout construction.
- Fewer components helps minimise site traffic.
- Less risk of injury due to absence of rebar and mesh.
- No heavy blocks to lift.





SYSTEM CHARACTERISTICS AND COMPONENTS

The complete Insulslab SFRC build comprises the following key components:

- Insulslab pods.
- Steel fibre reinforced concrete.
- Pre-cut vertical and horizontal Insulslab edge strips.
- Gas membranes/damp proof membranes.
- Insulslab adhesive.



INSULSLAB PODS

PATENT NO. GB2385071

The interlocking 'waffle' element of the expanded polystyrene pods is important as it helps reduce any risk of vertical or lateral movement of the pod when the concrete is poured. Extremely strong expanded polystyrene (EPS) is used in the pods' construction, to sustain the compressive forces involved. Wastage is kept to a minimum as any cut pods required can often be used in other areas.

Insulslab overall pod dimensions:
1200 x 1200mm x 350mm deep.

Services can be placed anywhere within the waffle slab design of the system, but it is advisable to discuss this with ArcelorMittal or the structural engineer.

The steel fibre reinforced concrete, when correctly installed and in accordance with the grade and slump details below, provides many benefits:

- Excellent impact strength.
- Maximum edge protection.
- Improved fatigue endurance.
- A higher level of shrinkage and crack control.
- Greater bearing capacity.
- Steel fibres do not damage power floats or concrete pumps.

GRADE AND SLUMP DETAILS

Concrete mix: 0-10mm and 0-20mm blend (the proportions will depend on the gradation of the local materials) or 0/16mm aggregates.

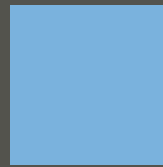
Concrete grade: C35 with 350kg/m³ CEM I or CEM III cement and W/C ≤ 0.50 using super-plasticiser so that the slump is between 180 and 225mm (S4 type EN206/BS8500) at pump.

For further information on ArcelorMittal steel fibre concrete, visit www.insulslab.com and refer to the

following documents:

- Tab-House™ method statement
- HE+1/50 datasheet





HOW Insulslab SFRC WORKS

Following the setting out and excavating of the plot(s) to the appropriate level (nominal 600mm below finished floor level) the following installation sequence applies:

1. Compact hardcore 225mm at perimeter, 150mm to remaining area allowing services to be installed within this process.
2. Lay Insulslab horizontal edge insulation.



3. Overlay 1200g DPM or gas membrane extending up to 500mm beyond edge of shutter at perimeter.

4. Install the "all in one" edge shuttering profile to perimeter of plot securely bracing down for single pour method. (see Manual for 2 stage pour)

5. Lay the interlocking Insulslab pods working from one corner of plot with uncut pods to the GA drawing layout, making openings for services where required.

6. Working to ArcelorMittal specification, the steel fibre reinforced concrete 180-220mm slump can be poured working from perimeter edge inwards.

7. Power floated finish of initial concrete set and seal.



8. Remove shutter profile for re-use.
9. Apply waterproofing paint to exposed faces of the edge beam.
10. Dress DPM around toe edge beam of foundation back to band course of brickwork.
11. Place Insulslab vertical edge insulation to perimeter edge of toe.

FULL INSTALLATION DETAILS ARE AVAILABLE IN THE INSULSAB TECHNICAL MANUAL:

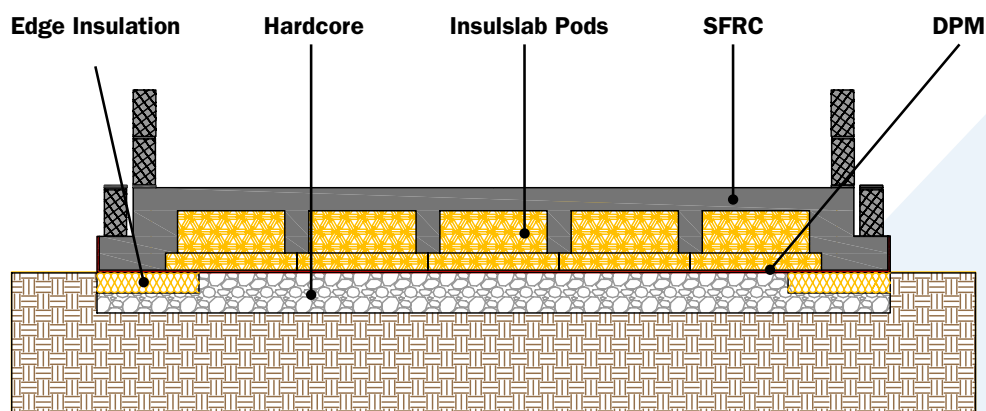
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TRADITIONAL FOUNDATION COMPARISONS

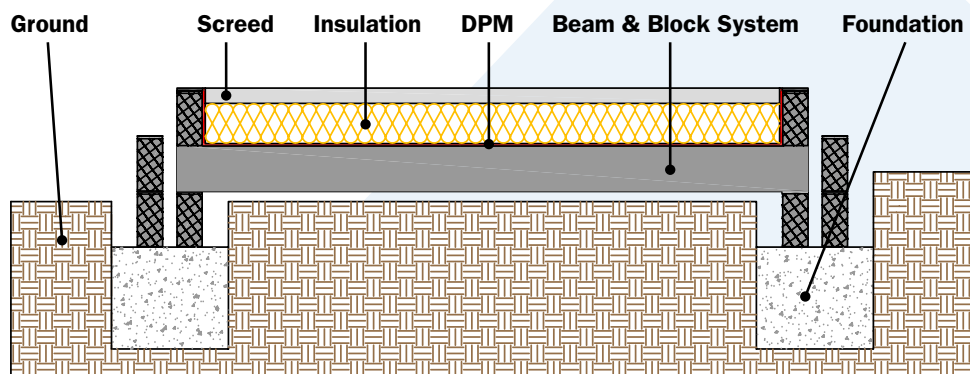
The following graphics illustrate comparisons between Insulslab SFRC and the two traditional foundation builds.

Insulslab SFRC Foundation



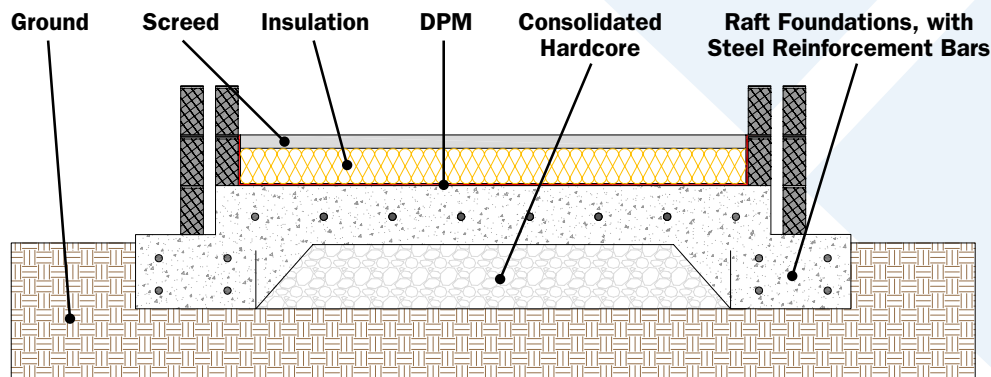
- Low U-values can easily be achieved.
- Clean, clear, clutter free site.
- Minimal spoil to be removed.
- Quick access for following trades.
- No screed required.
- Accepted by NHBC and LABC requirements.
- Insulslab SFRC foundation will also deliver approximately 3.5% additional carbon saving over Part L on a mid-terraced building, with 4.5% saving on an end-terraced building.

Beam and Block Foundation



- Low U-values achieved only by increasing the depth of insulation.
- Cluttered sites, with trenches.
- Spoil to be removed.
- Can have restricted access for following trades.
- Screed required.
- Potential difference between design depth and actual depth required.

Raft Foundation



- Low U-values achieved only by increasing the depth of insulation.
- Spoil to be removed.
- Can have restricted access for following trades.
- Screed required.
- Costly design, supply and fix of steelwork.
- Exit costs can be significantly higher than anticipated due to mounds washing away, requiring over and above concrete.



INSULSLAB SFRC APPLICATIONS

Insulslab SFRC is suitable for all types of construction and building methods for both residential and commercial constructions of up to four storeys high.

Typical build types are:

- Residential housing and apartments.
- Commercial developments including education, health, public sector, offices.
- Good *and* poor ground conditions, to a low of 50kN/m².
- When below 50kN/m² then Insulslab SFRC can act as a cap on piles.
- High point loads from framed buildings would need their own foundation therefore specific advice would be required from structural engineer. Refer to Structural Engineers' manual.

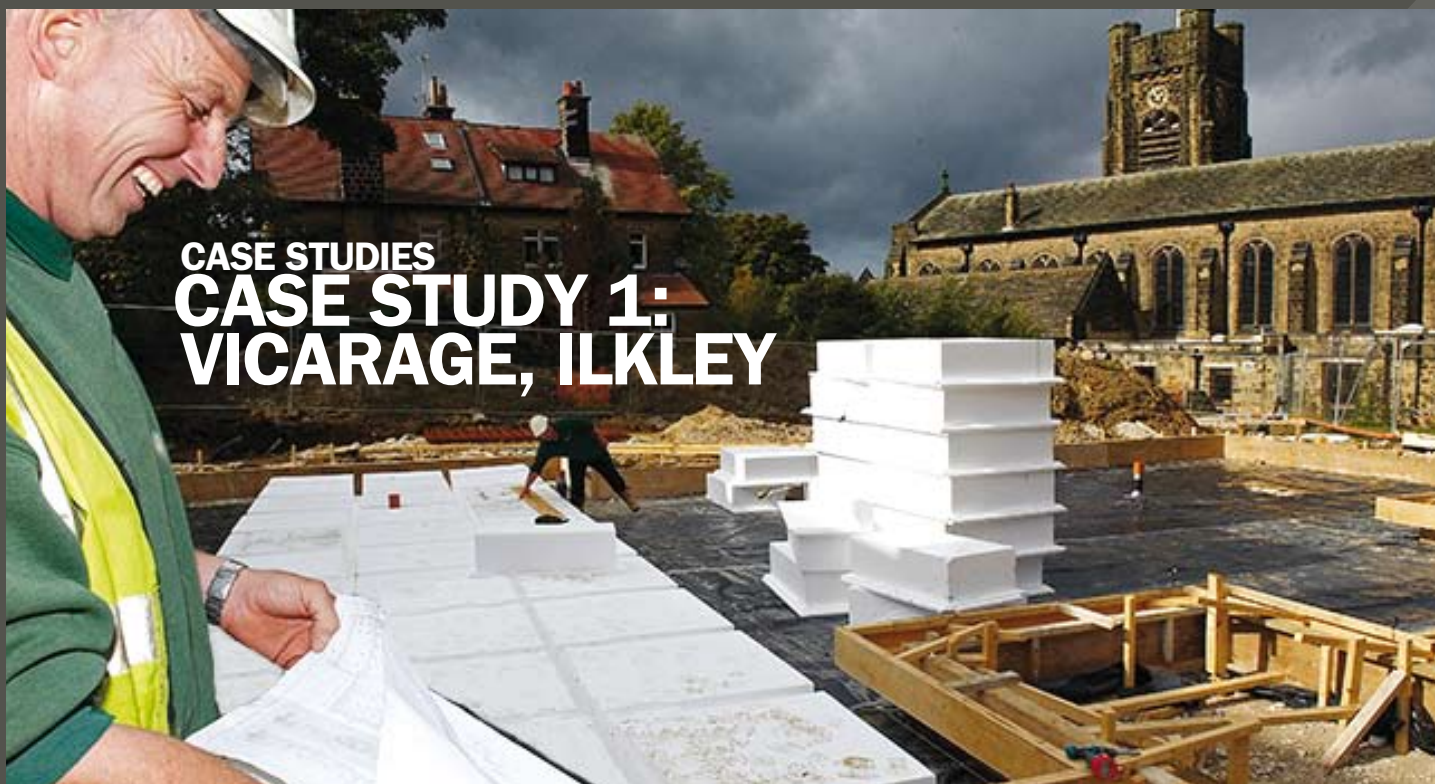
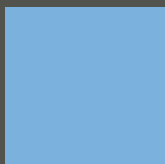
Insulslab SFRC can be used:

- On sloping sites – see **Technical Manual** for full details showing how steps can easily be accommodated.
- As a cap on piles.
- On contaminated soils.
- On brownfield sites.
- On sites where clay heave is an issue.

FULL INSTALLATION DETAILS ARE AVAILABLE IN THE INSULSLAB SFRC TECHNICAL MANUAL.

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Visit www.insulslab.com**





CASE STUDIES CASE STUDY 1: VICARAGE, ILKLEY

When the Diocese of Bradford planned to build a new Vicarage at one of its parish churches, it decided this was going to be no ordinary Vicarage.

The C of E Church of St John's located on the outskirts of the famous Yorkshire spa town of Ilkley in the Parish of Ben Rhydding has been serving local parishioners for over 100 years. However, when the Diocese made the decision that a new Vicarage should be built (in the grounds of the old one) it adopted a very 21st century approach to designing in a number of "green" measures.

The Diocese approached Skipton based architects, Wales, Wales and Rawson (WWR) to design the new Vicarage. As Liz Haestier, in charge of the project for WWR, commented, "It became clear in early discussions with the Diocese that they wanted a property that was well insulated and fuel efficient.

From that initial brief, we opted for a traditional stone and block, super insulated property, with a conventional concrete strip foundation and floor slab."

However, it was not until discussions began with the developer assigned to the project, Ilkley based Landmarks UK, that a radical new approach to the foundation was considered. Landmarks is a long standing customer of SIG Insulations' Orion Trent branch in Bradford and together they proposed a solution based on a super insulated foundation slab.

David Robinson, the man tasked with managing the build from Landmarks UK takes up the story, "We worked very closely with SIG Insulations and structural engineers to assess the ground conditions of the site and it became clear that Insulslab SFRC would provide significant benefits to us, the architects and the Diocese.

We could see the benefits operationally and financially during the build and the Diocese could see the benefits financially and environmentally of the buildings' thermal performance over its lifetime.

Combining Insulslab SFRC with underfloor heating and the use of a ground source heat pump was clearly going to deliver an extremely energy efficient property."

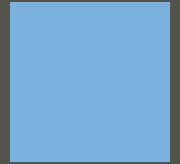
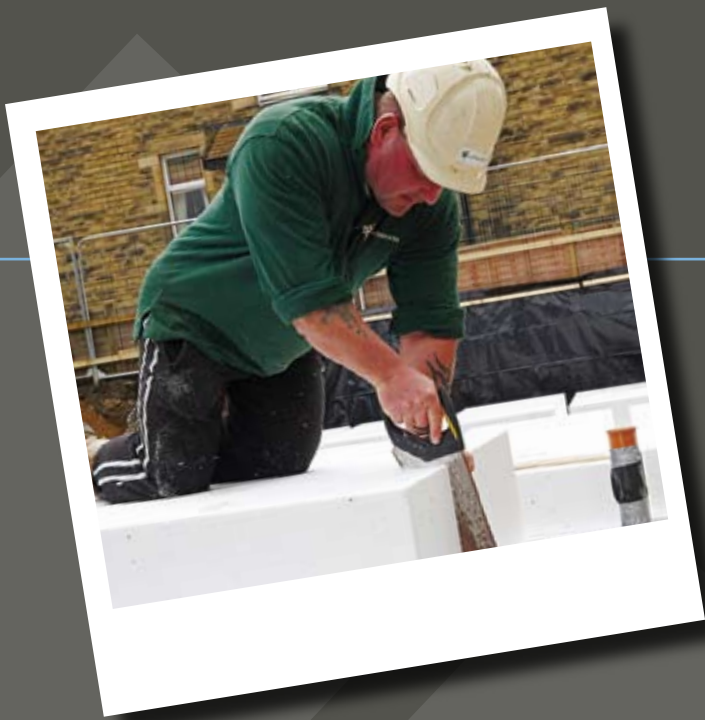
Once the initial assessment was complete, Landmarks and WWR went through a more detailed examination of the Insulslab SFRC solution with the technical team from SIG Insulations. This process allowed all the relevant information to be supplied to engineers and Building Control who could then green light the Insulslab SFRC installation. This meant WWR could then recommend Insulslab SFRC to the Diocese and once approved, work on site could begin in earnest.

The site works begin

The Builder - David Robinson (Landmarks UK)

Because of the location of the site, a quite densely populated residential area, access and disruption to local neighbours could have been a potential problem. Immediately, Landmarks could see significant benefits at the groundworks stage.





David Robinson explains, "The site was sandwiched between two existing properties with limited access so major excavation work would have been a real issue. In addition, protected trees on site could remain untouched as there was no requirement to dig deep trenches."

Perhaps the most significant advantages derived from the minimal excavation were the real savings in time and money.

David Robinson continues, "The trenches required for traditional foundations can become particularly problematic when digging up to 1800mm deep. Any trench collapse at the sort of depth becomes a serious health and safety issue. In the last 12 months we have encountered significant rainfall and I've lost count of

the number of times we have needed to shore up trenches filled with water and then pump them out."

In addition, Landmarks also realised benefits from not having to deal with manual handling of blocks in deep foundations and not having to employ specialist groundwork contractors.

Landmarks are very familiar with process of "shuttering" on foundation jobs so this part of the project was completed quickly and easily. In fact, they were even able to use some of the shuttering from a previous job. Excavation was only required to the depth of the shuttering (450mm).

Commenting on the shuttering, David Robinson said, "Producing shuttering for

foundations is something we are used to and clearly there are advantages to carrying out a single pour. However, I realise this is not always the procedure of choice for many contractors but Insulslab SFRC is also certificated for a two-pour installation."

The Structural Engineer - Andy Worship (GHW Consulting Engineers)

Before a final decision to go with Insulslab SFRC could be made, SIG Insulations worked very closely with Andy Worship from GHW Consulting Engineers to satisfy the architects and Building Control that Insulslab SFRC was a viable option.

Andy Worship explains, "When a new method is proposed to construct something as fundamental as a foundation slab, a whole raft of questions will be asked by architects and Building Control that need answers. After evaluating the performance of the Insulslab pods in combination with the steel fibre reinforced concrete, providing those answers was pretty straightforward."

Insulslab SFRC provides a cost-effective alternative to 'traditional' semi-raft and rafted foundations, as well as a cap on piles and replacement for beam and block. In combination with a well compacted granular blanket it can also be used as an alternative to deep trench fill foundations on shrinkable clay soils which was the case with the Vicarage project.

In addition, the reinforced concrete mix (Tabix HE 1/50 steel fibres at 40kg/m³) eliminates the need for traditional cut & bent reinforcement to be detailed, procured and site fixed offering significant time and labour savings."

The Architect - Liz Haestier (Wales, Wales and Rawson)

"We were fortunate to have a lot of assistance and support from SIG Insulations who were on hand to answer all our queries and concerns. Their technical support was crucial in working together with our engineers, contractors and Building Control to ensure all parties were happy with the new system."





CASE STUDY 2: TT ADVENTURE (TREE TOP ADVENTURE PARK) SNOWDONIA

With this type of site, being one of differing ground bearing conditions, the Insulslab SFRC foundation system showed how it can provide a straightforward and cost effective solution to such issues. Half of the foundation was cut into the Welsh hillside and the other half was made up from compacting the excavated spoil.

On this particular project Insulslab SFRC offered a 'calculable' raft price and

provided an overall saving of more than 15% when compared to other alternative foundation systems. The developer also estimated that Insulslab SFRC had saved approximately nine working days, with three men on site per day. Site costs and environmental impact were also greatly reduced due to a lack of cart away. All this added up to significant savings in time and money for the developer.



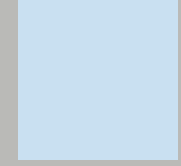
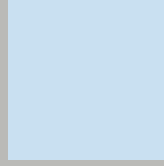
CASE STUDY 3: MIXED RETAIL PREMISES DROITWICH

The redevelopment at Olbersely Street, Droitwich showed the incredible versatility of the Insulslab SFRC foundation system. The problem posed was to extend an oblong building on three of its four sides but with all the new sides having curved elements. With conventional foundations these curves would have taken skilled operatives considerable time to correctly place the reinforcing bars. However, with the steel fibre reinforced concrete that is used in conjunction with the Insulslab pods no such outlay of time was needed. Even further time savings were made because the Insulslab SFRC foundation

does not need to be screeded and so the 53m³ pour and power floating were both accomplished on the same day. In addition, the Insulslab pods were easily cut with hand tools meaning full thermal efficiency was maintained throughout the unconventionally shaped foundation.

Lee Ferreday of Hewlett Civil Engineering commented that Insulslab SFRC, "Is an effective and efficient solution to foundation designs. The installation of Insulslab SFRC at the Droitwich project was carried out without any issues and to a quick programme."





A4 Sheets

ENQUIRIES:

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