CROSS Safety Report

Concerns over experience of subcontractors appointed for domestic concrete works

This month's report raises concerns that some contractors lack the knowledge, experience and understanding of basic reinforcement fixing and detailing requirements.

Reporter's submission

A reporter is concerned that some small to medium contractors, working mainly with residential extensions and small new builds, lack the knowledge, experience and understanding of basic reinforcement fixing and detailing requirements. In order to reduce costs, the reporter has noticed a trend where no suitably experienced concrete subcontractor is hired for the reinforced concrete (RC) works.

Interpreting reinforcement drawings

The reporter goes on to say that at one specific site, nobody was able to read the reinforcement bar (rebar) drawings of a small piled RC raft slab, i.e. in the text tagging a bar range, they did not know which number refers to the number of bars, which to the relevant spacing and which referred the bar mark. This resulted in the wrong bars being used in wrong positions and most bars did not lap by more than 200-250mm. The U-bars to perimeter beams were also missing.

> **SITE VISITS BY THE DESIGNER OR ANOTHER COMPETENT PROFESSIONAL CAN HELP IDENTIFY INCORRECT INSTALLATION BEFORE DEFECTS BECOME PERMANENT**

The site worker's lack of experience became apparent when they questioned, 'What could go wrong if the concrete is poured with the rebar as it is?' This highlighted their unfamiliarity and lack of understanding of proper detailing and reinforcement practices. The reporter notes that, although these reinforced structures may be smaller in domestic projects, it is just as crucial to design and construct them according to current codes and guidelines.

Level of workmanship

This is not rare with small residential extensions or small new-build sites. The reporter feels we need to reiterate to the clients and contractors the level of workmanship expected, especially with more specialised parts of the works, i.e. fixing of steel bar reinforcement.

This might also demonstrate the need for an accreditation system, i.e. only accredited personnel and/or companies would be able to conduct such works. This would put the onus on the contractor/subcontractors to provide compliant and good quality workmanship says the reporter.

The full CROSS Safety Report, including links to guidance mentioned, is available on the CROSS website (report ID: 1548) at **www.cross-safety.org/uk/safety-information/cross-safety-report/concerns-experience-subcontractors-appointed-domestic-concrete-works-1548**.

Key learning outcomes

For domestic clients and project managers:

- →| Check that your proposed builder is suitably qualified, experienced and has completed similar projects safely in the past
- →| Recognise that even small reinforced concrete elements may require specialist knowledge and appropriate supervision to ensure structural safety and durability

For civil and structural design engineers:

- →| Consider the likely competence of the construction team when developing reinforcement details and use clear, robust and practical detailing. The complexity of reinforcement detailing should be proportionate to the expected competence of the contractor
- →| Highlight to clients when reinforced concrete works require specialist contractors, enhanced supervision or additional quality control measures

For the construction team:

- →| Ensure reinforced concrete works are carried out or supervised by personnel who understand reinforcement drawings
- →| Introduce inspection hold points before concrete pours so that reinforcement can be checked and corrected if necessary

Expert Panel comments

RC work, even on relatively small domestic projects, requires an appropriate level of competence because incorrect reinforcement placement, inadequate laps, or omitted bars can significantly reduce structural performance. Members express concern that some small residential projects may be undertaken without contractors or subcontractors who are sufficiently familiar with reinforcement detailing, bar schedules, or the importance of correct placement during construction.

The panel observes that the level of complexity in RC work can vary considerably. Simple domestic slabs may require only basic reinforcement installation skills, whereas piled rafts, transfer structures or complex foundations require a much higher level of technical understanding and supervision. Designers might therefore consider whether the proposed construction details are proportionate to the likely competence of the workforce and whether simpler solutions could reduce the risk of construction errors. Early engagement regarding contractor competence and the complexity of the proposed works is considered particularly important on domestic projects, where the client may have limited technical knowledge and may not appreciate the need for specialist concrete subcontractors.

Clients need to be satisfied that the contractor they intend to appoint can do the job safely and without risks to health. This means making enquiries about the competence of the contractor – do they have the right combination of skills, experience and knowledge? The degree of competence required will depend on the work. Similarly, the level of enquiries required will be determined by the level of risks and the complexity of the job. On domestic scale projects, clients can engage with their designers for support in selecting a contractor. The Health and Safety Executive provides helpful guidance on their website for domestic clients including the application of the Construction (Design and Management) Regulations 2015 (CDM 2015).

Communication between designers, contractors and clients is very important. Reinforcement drawings and schedules can be difficult for inexperienced site teams to interpret, and therefore engineers should ensure that the requirements are clearly explained where necessary. The trend of outsourcing detailing work abroad in recent years may hinder early career engineers from gaining valuable experience in reinforcement drawing. Learning to detail and interpret these drawings is essential for effectively checking site installation. Good detailing for buildability is essential as compliant design does not necessarily equate to a buildable design. Speaking to experienced steel fixers on site and asking for feedback on your details is a good way of improving detailing skills. Reference should also be made to the guidance provided in the *Standard method of detailing structural concrete* (Fourth edition) guidance **(www.istructe.org/resources/guidance/standard-method-of-detailing-structural-concrete)**.

The panel also notes that reinforcement is concealed once concrete is poured, and defects may remain undetected for the life of the structure. Inspection and supervision are therefore essential, particularly at key hold points before concreting. Site visits by the designer or another competent professional can help identify incorrect installation before defects become permanent.

Members further observe that responsibility for quality assurance on small domestic projects can sometimes be unclear. However, all parties involved in the design and construction process should recognise the importance of ensuring that RC works are carried out by a suitably qualified and experienced contractor.

What is CROSS?

Collaborative Reporting for Safer Structures (CROSS) helps professionals to make structures safer by publishing safety information based on the reports it receives and information in the public domain. CROSS operates internationally in the UK, US, and Australasia. All regions cover structural safety, while CROSS-UK also covers fire safety.



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How reporting to CROSS works

The secure and confidential safety reporting system allows professionals to share their experiences to help others.

Professionals can submit reports on safety issues related to buildings and other structures in the built environment. Reports typically relate to concerns, near misses or incidents. Find out more, including how to submit a safety report, at **https://bit.ly/cross-safety**. Your report will make a difference.