

PRECAST CONCRETE LIFTING



Safety and Best Practice

Introduction

The concrete industry

Over 35 million tonnes of products per year are produced by the UK precast concrete industry. A huge range of precast products is now in use, from stairs, flooring and culverts, to walls, drainage pipes, structural frames and architectural cladding. In recent years we have seen a rise in precast room modules or 'pods', used in commercial buildings, such as hotels and student accommodation, but also in the housing market.



Technology

The landmark report by Sir John Egan, *Rethinking Construction*, highlighted the advantage of prefabricated technologies and some of the advantages that this has over more traditional construction methods such as '...speed of construction, lower cost, reduced need for skilled labour and achievement of zero defects'. *Source: Rethinking Construction – The Egan Report.*

Precast concrete lifting systems are used extensively throughout the industry and provide a safe, effective and efficient way of moving and positioning precast units. There is a variety of systems to choose from that will meet the requirements of any application and project.





Environment

Concrete is one of the most widely used materials in the world. Every year almost one tonne of concrete is produced for every human on the planet. Twice as much concrete is used in construction than the combined total of all other building materials, including wood, steel, plastic and aluminum. The concrete industry has an enormous responsibility to ensure that the production, transportation and final use of concrete products has as little impact on the environment as possible.

Perhaps surprisingly, concrete is one of the more environmentally friendly and cost-effective construction materials available. When compared with other materials, concrete is one of the lower consumers of energy per unit volume. Concrete has excellent thermal mass properties that can be utilised in energy-efficient buildings, and can even be recycled into aggregate for use in new construction.



The Concrete Targets 2010

The aim of The Concrete Targets 2010 scheme is to reduce reportable accidents and improve health and safety throughout the industry. The scheme is a continuation of the original Concrete Targets scheme, launched in 2001, which was a response to a government 'Revitalising Health and Safety' initiative. The scheme will run in parallel with the annual British Precast Health & Safety Award.

As associate members of The British Precast Concrete Federation and manufacturers of quality precast lifting and fixing systems, Halfen give their full support and commitment to the scheme.

"I am fully in support of the Concrete Targets 2010 scheme. The present scheme has already delivered a 45% reduction in reported accidents with resultant cost savings for participants. I urge all companies in the industry to get involved and sign up."

*Dr Elizabeth Gibby, Director,
Injuries Reduction Programme,
Health and Safety Executive*

Responsibility for Safety

The UK construction industry comes second highest in work related illnesses, non-fatal and fatal injuries. However, the use of precast lifting components is one area of construction that continues to enjoy an excellent safety record. To continue this trend we must ensure that components, and the precasting process, meet the highest standards.

The Construction (Design and Management) Regulations - CDM

The purpose of the CDM Regulations is to improve the management of health and safety throughout all stages of the construction process. The CDM Regulations extend the duty of care at the pre-site stage to designers and clients, but they also concern building contractors and end users alike.

The latest revision of the CDM Regulations came into force in April 2007 with the aim of simplifying the regulations and improving clarity. The changes placed greater emphasis on planning and management of a project rather than the need for paperwork. However, the basic premise of shared responsibility and management of health and safety at all stages of the building's lifetime still applies.



In relation to precast concrete lifting and health and safety, issues can arise in several areas:

1. The manufacture of the lifting component
 - Quality of raw materials
 - Batch labelling raw materials
 - Testing raw materials - chemical compounds
 - Component testing
2. The Precaster
 - The right lifting component for the right application
 - Correct design, specification and casting techniques
3. On-site transportation, storage and handling
 - Correct storage
 - Correct lifting techniques
 - The right machinery for the job
 - Clear communication between machine operators and ground crews

Quality Lifting Components

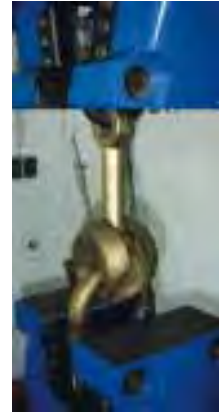
Certification and testing

All production plants manufacturing Halfen lifting systems are accredited to DIN EN ISO 9001. This means that constant inspection and maintenance of machines is carried out during manufacture. Also, the flow of production, from materials arriving to products being delivered, is under constant scrutiny. This is based on the testing instructions stipulated in DIN EN ISO 9001. Quality comes first and is maintained throughout each step of production.

Quality components meet the following criteria:

- Highest quality materials
- The highest quality manufacturing processes
- Loading specifications designed to the highest safety factors
- Stringent testing procedures
- High standards of quality control
- Compliance with the correct standards and certifications

All lifting equipment manufactured by Halfen has an EC conformity declaration (CE-sign) showing their safety for the application. This safety is assured by constant tension tests on anchors and lifting clutches and spectral analysis on raw materials. In order to ensure the life of the lifting clutches, all Halfen lifting clutches undergo dynamic testing.



Tests have proven that a minimum safety factor of 4.0 is achieved on the stated working loads for lifting clutches. In the case of in-house tension tests of transport anchors, a triple safety factor against steel failure is stipulated according to the safety regulations for transport anchors and systems.



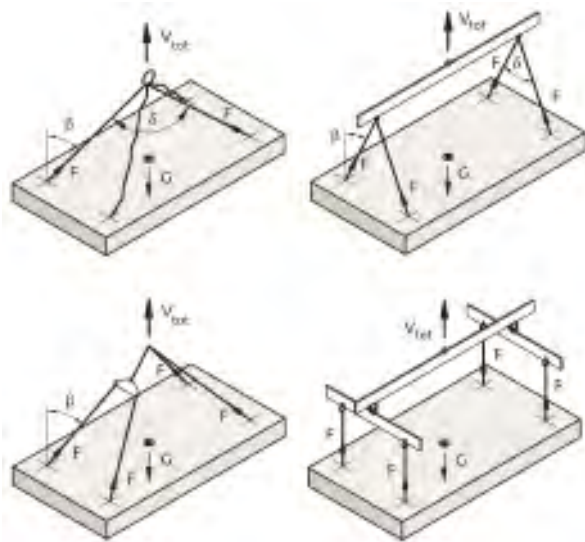
Note: Only original Halfen parts are guaranteed to be compatible with each other, eg, Halfen ring clutches are only designed for use with Halfen recess formers and cast-in anchors.

Use of Lifting Inserts

Best practice

Of course the success of precast lifting inserts is not just dependent on the quality of the component, but also on the design and techniques used by the precaster. Considerations may include:

- Total weight of element (including adhesion to mould)
- Length, height, and depth
- Positions of cut-outs and openings
- Rigging arrangements
- Additional lifting inserts for multiple lifts
- 'Cross matching' of system components



A lifting system consists of a cast-in anchor, recess former and ring clutch. The ring clutch is only attached to the anchor when required for lifting. The ring clutch is a strong, high quality product and subject to rigorous safety checks. It may be stored and used for many jobs.

The following safety factors apply:

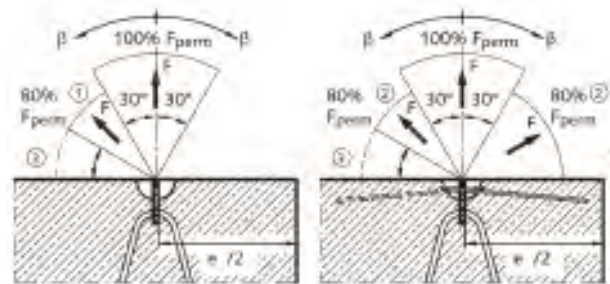
- Failure of steel component $\gamma = 3$
- Failure of concrete $\gamma = 2.5$
- Failure of cable wires $\gamma = 4$

To guarantee the safe application of Halfen components all operatives must be familiar with the correct operating instructions.

Lifting inserts require proper embedment and anchorage to function effectively. Anchorage can be affected by:

- Proximity to edges
- Proximity to holes, recesses or edge rebates
- Proximity to other lifting devices that are loaded concurrently
- Concrete thickness
- Concrete strength at lifting
- Embedment depth
- The presence of cracks
- The proximity of reinforcement or prestressing tendons
- Tension stresses in the concrete around the anchorage

Precasters must not only use quality components, but ensure that these are installed in the correct way by fully trained and qualified staff. Component manufacturers can contribute to this process by providing quality technical support to their customers.





Client Support

Halfen's reputation does not stop at providing excellent quality precast lifting inserts. Halfen offers extensive pre and post sales technical advice and support to its customers.



Support services

- Comprehensive technical and operational manuals giving information on loadings, advice on assembly, setting-out and operation
- Halfen's technical advisory service will give assistance in choosing the correct systems and help resolve more complicated and problematic applications. It is aimed at assisting designers and end users with practical advice and can evaluate the cost-effective option, re-design and re-cost where necessary as well as advise on selection and use of Halfen products and systems including compliance with relevant regulations
- Bespoke computer calculation software that facilitates scale drawings and parts lists for print-out
- NBS clauses (National Building Specification)
- Product seminars/toolbox
- CPD seminars
- Halfen E-Learning Academy is a new web-based learning facility designed to make presentations available online. A comprehensive 'Precasters Best Practice' training course will be available in 2007

Research and Development

Halfen's Research and Development Group are responsible for the development and enhancement of both new and existing products. Research and Development are responsible for:

- Application and maintenance of products subject to official approvals
- Manufacturing and analysis of prototypes
- Completion of type statistics
- Application for type test
- Preparation of material specifications

Vigorous product testing is carried out in-house and the department assists with internal and external monitoring of approved Halfen products and Halfen product applications. The Research and Development team also works closely with external testing authorities and universities as well as various international standardisation committees (eg, CEN, SGF, fib).





**International Competence Center
Technology – ICT (technical support)**

Halfen places great value on quality, reliability and service, considerations that can only gain in importance in an increasingly global marketplace.

ICT operates at an international level and gives Halfen customers advanced technical support and a full range of services from a single source.

The ICT's customers are typically engineers, architects, contractors, precasters and all subsidiaries of the Halfen Group.



- Careful inspection of incoming enquiries
- Work checked by a second set of eyes

- Qualified engineers
- High degree of specialisation



- Years of experience
- Proven in numerous major projects throughout the world

- Extensive product range
- Expertise available from one source

Halfen

Halfen Ltd

Halfen has been providing fixing, support and restraint, reinforcement and lifting solutions to the UK construction industry for more than 30 years. Halfen in the UK benefits from a pool of international experience and expertise allied to considerable research and development resources, making us industry leaders in our field. Halfen is part of the Halfen Group, which operates worldwide through 15 companies and divisions.



Our established product ranges have achieved an excellent reputation for providing cost-effective and reliable solutions to the requirements of modern construction. We develop co-ordinated products and services dedicated to specific specialist markets, including precast concrete, reinforcement and curtain walling.

Halfen are affiliated to many industry organisations including the British Precast Concrete Federation, and The Stone Federation Great Britain. Many of our reinforcement products are UK CARES approved.



Halfen Product Range:

Cast-in channels and accessories

Adjustable connections in concrete and steel structures.

Concrete reinforcement products

Products associated with the structural reinforcement of concrete. The products are a blend of the traditional, as well as the very latest in reinforcement technology.

Precast lifting and support systems

Entire range of precast lifting and fixing systems, including the Frimeda safety lift and Deha spherical head (Modform) systems.

Brickwork supports, restraints and facade systems

A range of brickwork and natural stone support and restraint systems, along with structural and architectural bracing for today's modern facades.

Framing systems

This system offers a modular, non welded, fully adjustable off the shelf solution to your pipe support requirements.



The Halfen Group

With over 1,300 employees in 16 countries and more than 20,000 products, the Halfen Group is one of the most successful concrete anchoring and façade fixing systems suppliers in the world. We offer our customers the highest quality products for building precast concrete elements, commercial and residential construction, as well as civil engineering for transport and infrastructure buildings. Our brands 'Halfen', 'Deha', and 'Frimeda', are among the market leaders.

Since the company was founded in 1929, our aim has been to provide bespoke, innovative and cost-effective solutions. We do this with the passion and experience gained over many years, along with the highest levels in technology, quality and safety. Halfen innovations have been, and continue to be, revolutionary for the construction industry. We play an important part in shaping the future of our industry and that is why we invest strongly in research and development.

The high demands we make of ourselves are also reflected in our relationships with employees, customers and suppliers; our dealings at all levels are characterised by trust, respect and reliability. Our aim is to build upon our long-term international growth, which we will achieve by consistent cost management, professional operation and 'not least' by confirming the trust placed in us and our products.



As an international company, we are aware of our global, local and social responsibility. These are obligations that we take very seriously.

Today, the Halfen Group is an international company with a turnover of over 200 million Euro. In 16 countries, we support our customers through our Halfen subsidiaries and our products are sold in over 35 countries.

Conclusion

The use of quality components is of utmost importance. High manufacturing standards ensure that precasters can be confident that their components will not fail and endanger site workers or members of the public.

Halfen are committed to maintaining the high levels of precast concrete lifting safety through the provision of high quality components and unrivaled customer service.

Further information and useful links

www.halfen.co.uk

UK leaders in fixing, support and restraint, reinforcement and lifting solutions for over 30 years.

www.britishprecast.org

The British Precast Concrete Federation is the trade association of precast concrete manufacturers.

www.concretecentre.com

The concrete centre is a UK concrete development organisation, providing information and advice on the use of concrete.

www.hse.gov.uk

The Health and Safety Commission is responsible for health and safety regulation in Great Britain.

www.opsi.gov.uk

The Office of Public Sector Information is at the heart of national information policy, setting standards, delivering access and encouraging the re-use of public sector information.

While every effort has been made to verify the accuracy of this publication Halfen Ltd accepts no responsibility for information obtained from other sources.



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