



# **The Edge Protection Federation Code of Practice for Climbing Screens**

**Revision 1  
September 2016**



# The Edge Protection Federation Code of Practice for Climbing Screens

Revision 1: April 2016

## Introduction

This document has been produced by the Edge-Protection Federation in order to clarify the rules that should apply to Climbing Screen products.

**In order to ensure that the information contained within this Code of Practice is as reliable as possible, the Edge Protection Federation (EPF) consulted with the principal manufacturers and suppliers of Climbing Screens throughout its development. The EPF wish to express our thanks to the principal manufacturers of these systems but readers should be aware that this Code of Practice is only endorsed by the EPF.**

As a relatively recent innovation, there is no current European or even British Standard specifically covering Climbing Screens, which fall outside of the scope of BS EN 13374 *Temporary edge protection systems. Product specification. Test methods* and BS EN 12811 *Temporary works equipment. Scaffolds* or any other specific industry guidance.

**Note:** BS EN 16508: 2015 *Temporary works equipment. Encapsulation constructions. Performance requirements and general design* has recently been published. See Section 6.0 – Legal and Standards Framework of this Code of Practice for our assessment.

The objective of this Code of Practice is to assist Contractors and Developers including Permanent and Temporary Works Designers to understand the particular factors that affect this specialised sector of the industry. There are often competing requirements between safety, cost and site productivity, so a better appreciation of the design factors that impact on permanent works, the materials, the logistics and management controls required should be beneficial.

Wind loading calculation guidance is not included within this document as each Manufacturer / Supplier will apply their own company policy to this aspect.

**This Code of Practice has been produced to provide helpful advice and information to those concerned with Climbing Screens but should not be used as a substitute for supplier guidance or legal advice. It remains the responsibility of the user to carry out risk assessments and follow safe procedures. The Edge Protection Federation accepts no liability in relation to any use or reliance made of any information in this publication.**

## 1.0 Scope

This document sets out guidelines for a number of important aspects of Climbing Screens, including:

- function
- types
- applications
- application features and obstacles
- design brief requirements
- installation issues
- supplier and Client responsibilities
- recommended user information

## 2.0 Description

Climbing Screens provide safe fall prevention for people and materials in accordance with and in excess of the Work at Height Regulations. They also provide significant weather protection for operatives as both a health and safety and productivity benefit.

Although not restricted to high rise applications, they are typically employed for structures with several storeys as they offer a superior protection solution for those projects.

Climbing Screens are large edge protection panels that typically give protection over several stories at the same time, providing protection for workers at casting, erecting and striking levels, as well as follow on trades. In addition to this they provide important prevention of falling objects for members of the public where the site is adjacent to pedestrian pavements / walkways. They require considerable design input, and remain a hybrid edge protection solution as they go well beyond the scope of any existing standards.

The screens are usually made of substantial steel sections, varying from supplier to supplier and can be faced with a variety of materials as outlined in this document. The configurations achieved require a good degree of planning and organisation as well as a high degree of design input.

Screens may be either crane lifted or hydraulically climbed and guided by the structure to position them in the required location.

Through this Code of Practice, we will explain the alternative options available to clients from the industry, the difficulties that may have to be overcome by Climbing Screens designers which arise from some architectural features and the duties and responsibilities that sit with the parties concerned.

## Examples of Different Manufacturers Climbing Screens



### 3.0 Terms and Definitions

For the purposes of this document, the following terms and definitions apply.

#### **Anchor**

Supporting component which is drilled, cast or inserted into concrete slab.

#### **Climbing Profiles**

The application-specific facing materials.

#### **Climbing Tracks**

Component for guiding the smooth vertical climbing of the Climbing Screen.

#### **Crane Lifting Bracket**

Load tested bracket which is secured to the Climbing Screens to enable lifting by crane.

#### **Debris Flaps**

Flexible elements designed to prevent the fall of small materials etc.

#### **Embedded Anchors**

Pre-installed anchor components.

#### **Guide Shoe**

Vertical component, fixed to the structure to enable smoother climbing.

#### **Hop Up Platform**

A term for an external working platform within the Climbing Screen.

#### **Hydraulic Power Pack**

The method of powering the hydraulic drive units.

#### **Lifting Point**

Load rated part of the Climbing Screen which complies with the requirements of the Lifting Operations and Lifting Equipment Regulations

#### **Loading Platforms**

Strengthened platform units for localised depositing of heavy materials.

#### **Lost Anchors**

Non-recoverable anchor fixings.

#### **Main channels**

Primary supporting components.

#### **Needle Beams**

A horizontal component supporting a platform or part of the Climbing Screen.

#### **Post-Tensioning Platforms**

Working platforms external to the slab to allow post-tensioning tasks to be safely completed.

#### **Re-Usable Anchor Cones**

Specially shaped anchor components which can be re-used.

**Rubbing Strip**

Flexible element which travels with the Climbing Screen to reduce gaps.

**Screen**

The Climbing Screen structure, or the facing elements.

**Secondary Channel**

Section component acting as additional support or supporting working platform components.

**Sheeting Rail**

Screen support to enable smooth travelling of units.

**Storm Wind Brace**

Fixing component which provides additional secure fixings in high wind conditions.

**Support / Slab Shoe**

Primary supporting component which is anchored to the slab.

**Through Ties**

Fixing method that utilises structural elements rather than anchors.

**Underslung Channel**

Additional intermediate supporting channel sections.

**Wind Shield**

Screen profile material which provides weather protection.

**Working Platform**

Cantilevered section of the Climbing Screen designed to enable working outside of the façade,

## 4.0 Applications for Climbing Screens

Every construction project will be different, but one can summarise the most typical applications as the following:

- frame construction (residential and commercial)
- demolition
- cladding

## 5.0 Functions of Climbing Screens

The functions all relate to important safety issues:

- safeguarding operatives from falls from height
- protecting the general public from falling objects
- minimise the transfer of dust and noise pollution
- protecting adjacent properties
- providing a better working environment during construction
- improving productivity by providing a safer working environment with reduced weather impact



## 6.0 Legal and Standards Framework

- The Construction Design and Management Regulations 2015 (CDM)
- Health and Safety at Work etc. Act 1974
- The Work at Height Regulations 2005
- Lifting Operations and Lifting Equipment Regulations 1998 (LOLER)
- The Provision and Use of Work Equipment Regulations 1998 (PUWER)

**Note:** Climbing Screens are not classed as hoists within LOLER or BS EN 12158-1: 2000+A1: 2010 *Builders' hoists for goods – Hoists with accessible platforms* or BS EN 12159: 2012 *Builders hoists for persons and materials with vertically guided cages*. Some suppliers do however incorporate hoists within their Climbing Screen configuration and are thus able to integrate these otherwise contrasting types of equipment through an application-specific design process.

### Normative References

- **BS EN 12811-1: 2003** Temporary works equipment. Scaffolds. Performance requirements and general design.
- **BS EN 13374: 2013** Temporary edge protection systems. Product specification. Test methods.
- **BSEN 1991-1-4: 2005+A1: 2010** Eurocode 1. Actions on structures. General actions.
- **BS 5975: 2008+A1: 2011** Code of Practice for temporary works procedures and the permissible stress design of falsework
- **BS EN 12812: 2008** Falsework. Performance requirements and general design.
- **BS EN 16508: 2015** Temporary works equipment. Encapsulation constructions. Performance requirements and general design.

**Note:** BS EN 16508: 2015 features an illustration of a Climbing Screen, but does not include such equipment within its Scope. As the main applications and the objective of the Standard is the design of Temporary Roof Structures, in our analysis, the calculation and test requirements are not appropriate to Climbing Screens and should not be applied in design.

### Also recommended

Construct – A guide to the safe transportation of formwork and falsework equipment

As a general rule, client and contractors would look to an industry Standard for compliance guidance, but in the absence of a relevant document we would encourage the adoption of this Code of Practice as a suitable alternative.

## 7.0 Types of Climbing Screens

The types of Climbing Screen used will vary according to a number of factors, including materials, construction type, structure profile and whether it is to be built on site. It is for these reasons that Climbing Screens are currently individually designed and tailored to each specific building or application, as follows:

- Newbuild Concrete Frame  
Instu/ Precast  
Post-tensioned RC structures
- Newbuild Steel Frame  
Insitu/ Precast
- Cladding Installation
- Demolition
- Flat/ sloping profiles
- Telescopic or fixed width screens
- Platforms: with or without
- Crane lifted or hydraulic
- Pre-assembled or built on site

## 8.0 Face Materials

In addition to the above functional requirements, the material composition of the Climbing Screen will vary according to client or technical design requirements. The selection could be determined by:

- wind loading factors
- weather protection such as wind, rain or sun
- natural light requirements
- dust protection
- the desire for branding / signage
- commercial considerations such as sale or rental, i.e. re-use potential
- environmental preferences

The alternative materials selected could include:

- solid cladding such as steel or plywood
- perforated
- mesh steel or aluminium with or without secondary netting
- translucent, i.e. glass-reinforced plastic (GRP)
- reinforced plastic

## 9.0 The Design Brief

The requirements of BS 5975: 2008+A1: 2011 *Code of practice for temporary works procedures and the permissible stress design of falsework* provides clear guidelines on the content of construction Design Briefs, such as:

- drawings of permanent works
- significant risks / hazards
- relevant design features (see Section 8.0)
- construction programme
- design phased programme
- preferred Method of construction
- particular loading considerations
- equipment and materials



- moving and re-use of temporary works
- information on specific location, topography etc.
- third party considerations and statutory services
- Local Authority restrictions

#### **Key Design Considerations:**

- function
- re-use potential
- structure capability
- logistical implications
- limitations
- interaction with other equipment

The following elements should specifically be included within the Design Brief in order to cater for Climbing Screens, as they will affect the eventual design solution:

- function of the Climbing Screen
- intention to purchase or rent the equipment
- anticipated concrete strengths at time of loading
- load restrictions of the structure
- maximum allowable gaps between the Climbing Screen components and between the structure and the Climbing Screen.
- first installation level
- client wind studies
- crane capacity
- sequence of build
- proposed construction joints that may affect the configuring and construction of the Climbing Screens
- degree of protection
- lay-down area available
- transportation issues
- loading platform requirement
- falsework movement: i.e. use of hoists or loading platforms

## **10.0 Construction Features and Obstacles**

Every building is different and some design features may present particular problems for Climbing Screen installation, design and management. These design features should be an identified subject within the design brief and may include:

- load capacity
- balconies
- varying slab depths and strengths
- upstands, including profiled shapes
- channel sections in close proximity to screen fixings
- voids
- interacting sequence of works in advance or below the Climbing Screens
- interface between Climbing Screens and formwork systems
- changing profile of façade / steps
- floor height variations
- column variations

- cantilevered loading platforms / Cantidecks
- cores and shear walls
- post-tensioning cables
- adjacent buildings
- third party issues, such as rail
- crane ties
- the positioning of the crane
- hoist positions

The Tower Crane lifting capacity and height (for Climbing Screen dismantling) including access below the screen must also be considered.

**Each of these elements will be relevant to any temporary works equipment, but they could present specific design or installation issues for Climbing Screens which might not otherwise affect other individual types of equipment and therefore should be identified at the earliest opportunity within the design brief.**

## 11.0 Client Considerations

### 11.1 Design

There are several factors that will present issues to be considered during the initial and subsequent phases of a project. It is important that these decisions are fully understood at the appropriate time, as changes could have profound and serious safety implications if changed at a later stage. Examples of these include:

- typical anchor loads requiring consideration of the concrete strength requirements and the age of the concrete at the time of lifting the screens
- typical Climbing Screen widths requiring consideration when organising transportation
- module weights
- Climbing Screen loading platform capabilities
- changing from mesh to semi-solid or solid faces requiring permeability factor consideration

**The loads on Screens are related to the effect of the wind either passing through a structure or by pressures associated with flowing around a solid face. As the open area of a Climbing Screen is reduced, for example by the use of mesh, the drag coefficient can increase. This will have a major effect on the wind force pressure on the Climbing Screen and the require a review of the components, the anchoring and the impact on the building structure itself.**

**The effect of wind on Screens will be similar in principle to that encountered with other temporary works equipment such as scaffolding, falsework and cranes. It is essential to identify the specific effects on an individual application and its duration.**

Where greater than usual Climbing Screen heights are required due to situations such as floor heights, the increased cantilever height may impose such significant additional pressures that it may be necessary to design smaller width Climbing Screen units and / or to increase the anchor load requirements on structure.

### 11.2 Client Responsibilities

Section 12 OF THIS Code of Practice outlines the key responsibilities of Suppliers but there are also corresponding responsibilities on clients, such as:

- a good design brief in accordance with the CDM Regs. and BS 5975: 2008+A1: 2011
- an independent design check for Category 2 or 3 structures
- accurate and current construction information for the construction programme and drawings
- other relevant information at an early stage
- the checking of the structure to verify the slab capacity and the viability of the application
- building survey in accordance with supplied drawings
- determining back propping requirements
- checking for anchor capacity
- management of a formal Permit to Move system
- a safe system for the control of the movement of the Climbing Screens including regular inspections during course of use

Whilst Climbing Screens do not come within the usual definition of scaffolding which requires a Regulatory 7-day inspection regime, it is advisable to treat these systems in a similar way as the individual components and their anchor fixings may be subject to movement or to trade interference, as well as adverse weather conditions. It must also be remembered that the external positioning of Climbing Screens may be adjacent to public roadways or public services.

Recommended Procedures:

- site specific method statements
- ensuring that a suitably trained and competent workforce is involved
- follow BS5975 procedures
- safe vehicle unloading and loading

There are a number of types of temporary works activities that have no specific card certification system to prove the operatives competence. Climbing Screens have several different associated actions, such as the assembly of components, anchoring and hydraulics that require particular types of competency. Bearing in mind the risks involved, consideration should be given to ensuring that suitable and sufficient training is provided and that the selection of the operatives is appropriate to the tasks involved.

## **12.0 Supplier Responsibilities**

When specifying Climbing Screens, you should ensure that competent suppliers are appointed for the supply, delivery, design and safe installation of the system. They should have the appropriate information to verify the capability of their system and sufficient design resource to provide a solution tailored to your specific project.

This will involve the provision of the following services:

- proposal in accordance with the Client Design Brief
- design general assembly drawings considering the loadings on the structure, including the weight of the Climbing Screen units and their lifting requirements
- user Guides and Operating Guides as well as assembly instructions
- assembly drawings

- communication of residual risks
- toolbox talks to demonstrate assembly, installation, lifting and dismantling
- supply of fit for purpose equipment
- modifications to designs submitted, which may be subject to normal commercial conditions

## 13.0 Installation Issues

The installation of Climbing Screens will be covered by normal Risk Assessments and Method Statement (RAMS) considerations and we would highlight the following issues that should be included in order to cater for their particular planning requirements:

- lead time for off-site assembly
- leading edge protection – expectations of the screens, working platforms and residual edge protection once the screens have moved vertically on stage completion
- control of temporary gap requirements
- accuracy and tolerances for fixings and layouts
- delivery time programming
- crane slinging arrangements / lifting plan / road closures
- stacking of pre-built units prior to installation, temporary packing and height of stacks which may limit access to Climbing Screen lifting points
- laydown areas
- exclusion zones for unloading, screen movement and loading
- handling of wide / heavy loads and the requirement for banksmen
- final closure of gaps
- competency requirements
- power supply requirements for hydraulics and for artificial lighting
- manual handling
- in-situ Climbing Screen building
- operating procedures in windy conditions
- falsework, such as Climbing Screen gap interface and setting out, including column shutters
- controlling falls of tools and materials
- controlling tolerances, movement and deflection of taller Climbing Screens

## 14.0 Operation of Screens

The arrangements for the operation of the Climbing Screens should be established as a formal procedure and should include the following:

- method statements
- estimated timescales for lifting
- key stages
- spotters
- authorisation for operators of hydraulics
- lifting sequence and cycle in relation to concrete strength and falsework and column construction
- leading edge control
- access to lifting points
- regular inspection and supervision

- authorised persons
- communication methods during lifting
- emergency stop procedures

## 15.0 Design Document

Key issues that should be included within the Design Brief:

- wind factors
- reference documents, e.g. BS EN 1991-1:4, BSEN6399, BS5975 Formwork Guide, TG20, BSEN13374)
- designer's interpretation of probability factor
- concrete specification
- height of structure
- cast-in anchors
- materials
- allowable deflections
- loads
- factors of safety
- design checking (Category 3)
- effect of cantilevers, telescoping, profiling, solid, multi-lift variations
- residual risk
- hydraulics
- Limit State Design approach vs Permissive Stress

## Acknowledgements

The Edge Protection Federation wishes to express its appreciation to the following companies that have assisted in the production of this Code of Practice. As stated, this document is not necessarily endorsed by those parties.

Doka UK Formwork Technologies Limited  
Hunnebeck UK Formwork  
Ischebeck Titan Limited  
PERI Limited  
RMD Kwikform Limited