



# ZENITH

## Access Solutions for Chimneys and Tall Structures

**Colin McCurdy MD**  
**Darren Smith MBA**  
Zenith Structural Access Solutions Limited.  
[www.zenithstructural.com](http://www.zenithstructural.com)

### Introduction

This paper is intended to provide a general overview of the progression of the specialist access industry in the United Kingdom from its conception to present day.

Particular attention will be focused on how ever increasing legislation has impacted upon the day to day working of the 'industry'.

### Historical Information / Background

Access of tall structures remains a specialist industry just as it has been for generations. Traditional forms of access have given way to today's engineered approach that meets the demands of the latest stringent Health & Safety legislation.

The birth of the specialist access industry was based on the requirement to construct, repair and maintain tall structures. The most common tall structures noted on the horizon were church steeples and towers.

The specialist riggers were known as steeplejacks. A dictionary gives the following definition;

steeplejack /sti:p(e)l-d3aek/ n. **One who builds or maintains very high structures, such as steeples.**

Initially access solutions were very basic. Techniques such as kites and balloons were deployed to install ropes and pulleys and wheels, which in turn were used to hoist personnel to height and carry out whatever activities were required.

Figure 1



Figure 1 illustrates the implementation of traditional steeplejack methods. This demonstrates the 'seat hoist' and the knotted rope' in which simple knots were tied at intervals of approximately 300mm which served not only as a ladder and as a means of holding fast, but also in which the steeplejack could support himself by means of 'climbing stirrups'. 'Climbing stirrups' consisted of two leg straps, which formed the stirrup underneath, and went up the sides of the leg, and which were fastened to the leg by means of two fastening straps. On the main strap another hook enabled the steeplejack to hang himself into the knot.

The Industrial Revolution brought further demand for steeplejacks as brick chimneys became a common sight, serving the new coal-fired boilers that provided power for the steam engine. These too needed the special skills of the steeplejack for maintenance and repair.

Access was achieved with the use of the traditional techniques of ropes and pulleys along with the provision of access ladders and scaffolding. In the United Kingdom, traditional timber access scaffolding was utilised as late as the 1970's.

As recent as the 1980's, the demolition of industrial chimneys was carried out using the 'off the head' piecemeal technique.

Steeplejacks would gain access to the termination point of the chimney, usually by means of temporary ladders, and would stand on top of the brickwork and using sledge hammers proceed to demolish the chimney allowing the resultant rubble to fall into the barrel – Photograph 1.

Photograph 1



The potential risks involved in this activity are transparent with no consideration to Health and Safety except the competency of the individual to operate in this unique and demanding environment.

## Progression

The past 20 years or so has seen remarkable progression within the industry due to the following factors;

- Natural Progression & Technical Advancement
- Health & Safety Awareness
- Modern Day Regulations & Considerations
- Introduction of Risk Assessment.

The increased awareness of Health & Safety issues, litigation and duty of care, has forced a different approach to all parties to a contract. Whilst it's true that the high risk nature of work at height remains, all parties must manage the RISK and so there is a need to satisfy clients and third parties that access and objectives can be achieved safely. Falls from height account for the single biggest cause of fatalities within the UK Construction Industry and therefore there must be total confidence in the contractor and also in the personnel deployed.

The severity and likelihood of an accident must be risk managed and reduced to the minimal level by assessing all tasks and procedures that impact upon the works undertaken.

## Modern Day Regulations & Considerations

Detailed below are regulations and codes of practice that govern the industry. A comprehensive working knowledge of these regulations and considerations is pre-requisite of a competent access specialist contractor.

- UK Legislation – Foundation to Modern Techniques
  - Factories Act – Various Revisions
  - Health & Safety at Work Act 1974
- Regulations / Accepted Codes of Practice (ACOP'S)
  - Management of Health & Safety at Work Regulations 1992 (Rev 1999)
  - Provision and Use of Work Equipment Regulations 1998
  - Construction (Design and Management) Regulations 1994
  - Construction (Health, Safety & Welfare) Regulations 1996
  - Lifting Operations and Lifting Equipment Regulations 1998
  - Work at Height Regulations 2005
- British Standards, European Norms and More
  - BS EN 12811-1:2003 Temporary works equipment. Scaffolds. Performance requirements and general design
  - BS EN 12811-2:2004 Temporary works equipment. Information on materials
  - BS ISO 4308-1:2003 Cranes and lifting appliances. Selection of wire ropes.
- Factories Act – 1961 & Subsequent Revisions
  - Provision of a safe place of work.
- Construction Regulations (1960's)
- Health & Safety at Work Act 1974
  - Further advancement in Safety at Work including responsibilities and duties of care.
- Management of Health & Safety at Work Regulations 1992 (Rev1999)
  - Risk assessment, Health surveillance, training
- Provision and Use of Work Equipment Regulations 1992
  - Control, Testing, Inspection, Equipment Integrity
- Construction (Design and Management) Regulations 1994.
  - Responsibility placed upon architects and designers to

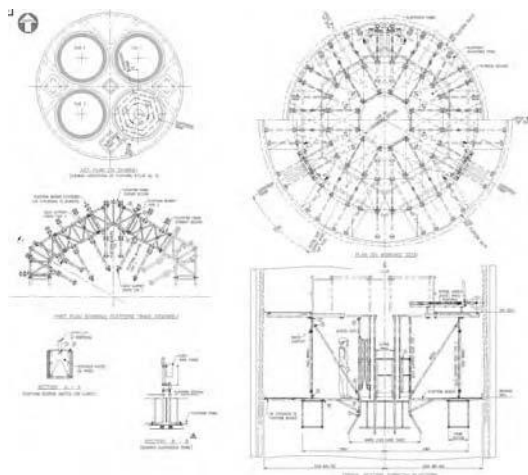
consider and solve future work on structures.

- Methodology, Risk Assessment
- Lifting Operations and Lifting Equipment Regulations 1998.
  - Lifting techniques, Lifting studies, Competent Persons,
- Work at Height Regulations 2005
  - Emergency Procedures, Recovery Plan

## Training, Apprenticeships & Competency

In the UK, a skills based portfolio is used to gauge the category of a modern steeplejack. An Advanced Steeplejack / Supervisor will have accumulated a minimum of six years experience within the industry. Not surprisingly, the most important attribute for a steeplejack is no fear of heights and one who is able to work in all weathers and has an awareness of safety issues –especially the safety of those around him and at ground level. His role calls for competency in many activities including Specialist Access Erection, Climbing, Complex Scaffolding, Heavy Lifting, Rigging & Lifting, Safety Awareness, Masonry, Erecting and using Block and Tackle & Boatswain's Chairs, use of Motorized Platforms and Demolition. The modern steeplejack is a unique and versatile asset to the construction industry.

Figure 2



Photograph 2

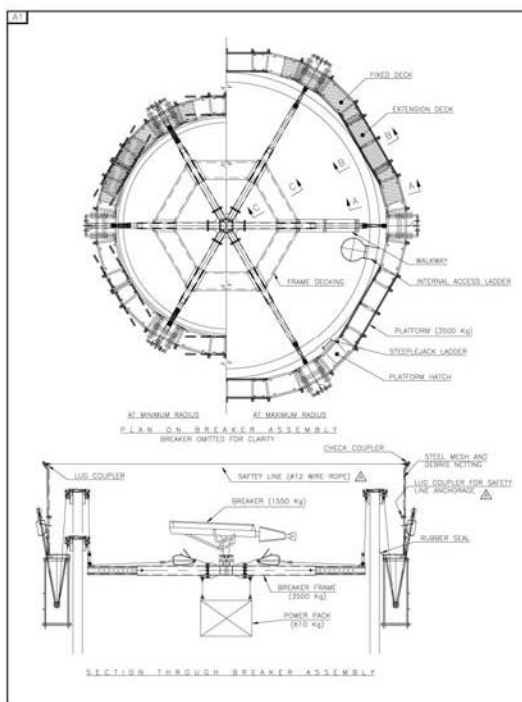


With the implementation of cutting edge access solutions, the modern steeplejack works closely with a temporary works designer. Calculations are prepared, schematic drawings are provided in order to overcome the most complicated of access issues – Figure 2 and photograph 2.

The one-time isolated work environment of the steeplejack has been replaced by a transparent, justifiable mode of operation, which compares favourably with similar highly skilled disciplines within the construction industry.

The demolition of industrial chimneys has progressed significantly. From the crude methods of the 1980's, where little consideration was given to Health and Safety, to the up to date remote controlled demolition rig, which addresses modern day codes of practice. - figures 3 and photograph 3.

Figure 3



Photograph 3



### Conclusion

From its' humble beginnings, the access industry continues to adapt and to pioneer new techniques in order to safely carry out work at height in line with stringent Health & Safety regulations. The skills that were developed whilst working on church steeples have progressed to take in all tall structures such as industrial chimneys, hyperbolic cooling towers, columns, vessels, masts, bridges and flare stacks.