



**TGN 02**

**ASUC***plus*

**recommended minimum standards  
for underpinning typical domestic  
1, 2 and 3 storey buildings**

**Stage 1:**

**Overview of the process**

## **INTRODUCTION**

These are minimum standards recommended by **ASUCplus** on all underpinning projects. They have been drawn from the knowledge and experience gained by the members and honorary members of the Association. These general standards will be supported at a later date by more detailed standards of each underpinning method.

## **OBJECTIVE**

The intention is to provide satisfaction to our clients who are insurers, householders and their agents. The Association member must therefore focus appropriate attention to ensure not only technical excellence but also client satisfaction.

A recent survey carried out by **ASUCplus** reveals that up to 10% of projects are technical failures i.e. projects requiring either additional or rework of one kind or another. If the recommendations in this document were followed then the number of failures would be reduced to 1% or less.

The largest problem however is the industry's failure to satisfy its clients who are ultimately householders and their insurers, if this figure were to be recorded it would be embarrassingly high! Significant improvement in client satisfaction would be achieved if the current process, which is often unnecessarily protracted, were shortened and the clients expectations were to be managed at the outset and at the pre-contract stage.

## **SITE INVESTIGATION**

An appropriate site investigation is paramount and should at least meet the minimum requirements laid down in the Association's paper entitled '**ASUCplus** recommended minimum site investigation for typical domestic 1, 2 and 3 storey buildings'. Before underpinning is commenced it is essential for the contractor or the specified consultant to:

1. Identify the existing construction and extent of subsidence/heave
2. Identify the cause of subsidence/heave
3. Be reasonably confident about the ground and water conditions in the areas of subsidence/heave
4. Identify suitable bearing stratum including the ground and water conditions within which the underpinning system will be constructed
5. Have designed an appropriate underpinning scheme based on the above
6. Ensure that the site management and operatives receive the above information 1-5 as is appropriate to their respective roles

## **DESIGN**

The purpose of the design is to provide the most cost-effective scheme that is appropriate to the project. This stage should include the consideration of several underpinning options each valued on its own merits and should address:

- Cost
- Potential for cost overrun
- Time on site
- External and internal disruption
- Access and
- Storage requirements

Settlements that occur with low-rise construction in the UK are small and usually do not cause distortion or damage, therefore designs are usually based on bearing capacity criteria. With respect to RC design, check that the beam acts compositely with the structure above and be aware of the effects of point loads generated by brickwork 'columns' between openings.

## **PRE-CONTRACT MEETING**

The pre-contract meeting is essential for the success of a project and as a minimum should include the involvement of all parties concerned, for example the engineer, the loss adjusters, the contractor, the householders, the site supervisor and/or foreman on larger projects and neighbours, if appropriate.

A pre agreed meeting format with a check sheet should include the following as a minimum:

1. Extent of working areas and storage areas
2. Extent of any other areas that may be used or encroached upon during normal working hours or unusual working hours
3. Extent of noise, disruption
4. Realistic programme timings and sequence of works particularly if 5-8 are required
5. Walk the job - preparation - explain exactly what will happen
6. Walk the job - underpinning - describe what will happen and the plant involved
7. Walk the job - reinstatement - explain how the completed job will look
8. Walk the job - repairs and decorations - explain how they will appear
9. Contractual matters, direct payment mandates, payment terms, etc.
10. Discuss and agree implementation of schedule of dilapidation of clients' and neighbours' property where appropriate, take record photographs
11. Statutory notices and applications: Party wall, Building, Planning
12. Discuss guarantees
13. Health and Safety, inc. CDM
14. Invite questions
15. Record all of the above, particularly items which may be contentious, copy all parties

## **START ON SITE**

All projects should be approached with the aim of providing total satisfaction. Time should be allowed to set up the site to operate safely and efficiently, for example: access routes marked, secured storage and working areas, protections to the property and overall consideration of site appearance are as important as the work itself.

**Verification of the site conditions is an essential and ongoing process, verification should include:**

1. The cause of subsidence/heave
2. The actual ground and water conditions as compared with those anticipated
3. The cause and extent of the subsidence problem. Many jobs go ahead without knowing the cause of subsidence in the first place and an increased number are constructed without verifying the cause.

**AS WORK PROGRESSES** verification should be continued and in this respect the site must be visited by qualified Engineers and by Supervisors with appropriate skills.

**ON COMPLETION** of all work, ensure that the client is satisfied before leaving site.

## **HEALTH AND SAFETY**

The industry as a whole is improving its approach towards Health and Safety and all underpinning operations should comply with current HSE Regulations with the following additional notes:

1. Any excavation that removes lateral support to the ground beneath a foundation reduces the support it provides. The designers and supervisors should satisfy themselves that the loads on the parts of the building being undermined by the excavation are being safely transferred elsewhere both temporarily and permanently.
2. Spoil should not be stock piled immediately adjacent to an excavation.
3. Ties between traditional underpinning bases should be carried out by either proprietary doweling systems or a cut away keys and the system should not under any circumstances involve dowels projecting into an area to be excavated.
4. Regular safety reviews should be carried out.

## **FAILURES**

Most technical failures occur due to one or more of the following:

1. Inadequate site investigation and consequent design
2. Failure to identify the cause of the problem
3. Limitations of the scheme e.g. partial underpinning when a full underpinning system should be specified
4. The underpinning scheme is inappropriate due to conditions which were not realised at the time of works
5. Inadequate anti heave precautions
6. Inadequate propping during construction
7. Inadequate/incorrect pile design
8. Inadequate depth of piles
9. Over extended working spaces
10. Excavation left too long before concreting thus creating clay softening and subsequent settlement.
11. Bad workmanship (unintended due to lack of training, etc.)
12. Fraudulent workmanship (bases missed out, short piles, etc.)