

# RESIN INJECTION

## FOR SLAB LIFTING AND GROUND IMPROVEMENT

Fast & effective solution for strengthening,  
lifting & improving ground conditions  
including bearing pressure



Structural Engineering since 1989

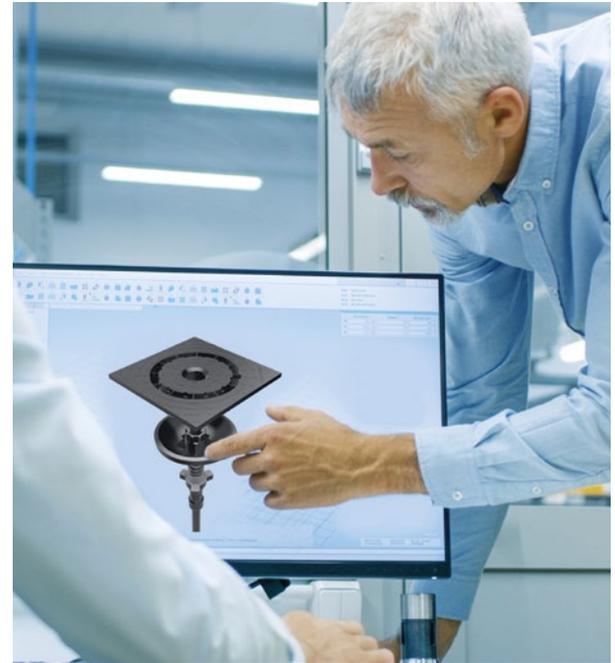
With over 30 years of Civil & Structural Engineering expertise, we ensure every service is thoroughly researched and developed before launch. Engineering Innovation is at the heart of our approach to structural engineering. Shire were formed in the belief that many clients were dissatisfied with the traditional reactive response of some Engineers. Shire aim to have an active involvement in projects, making recommendations where we see more effective solutions. We have gained a reputation for being 'Thinking Engineers' which has led to varied workload in the Civil, Structural, Highways, Aerospace, Education and Rail sectors.

Over time, we have expanded our services to include Geotechnical investigations, telecommunications design services, structural repair services (including piling, jacking, root barriers), product innovations and foundation systems to name a few. We work on projects large and small – to date we've completed individual commissions up to a value of £20M.

**The Shire Values are the same today as they've always been.** It's how we've built our business:

- » Working with **integrity** and finding the right solutions
- » Inspiring **confidence** in the people we work with
- » Proven **credibility** through our track record
- » Valuing **connections** among our **teams** and with our **customers**
- » **Enterprising** in our approach to problem-solving, with a fresh outlook
- » Valuing a **challenge, listening** and finding a **realistic** solution

At Shire we approach things differently. We focus on reviewing the challenge and finding the right solution for the client's requirements, budget & timings. With a wide variety of structural repair options at our fingertips, we're sure we can find the right solution each time.



## Our other Services

- » Consulting Civil & Structural Engineers
- » Geotechnical Investigations
- » Structural Inspections
- » Structural Repairs inc root barriers, piling, jacking, underpinning, masonry reinforcement, retaining walls

# About Resin Injection from Shire

Our experienced, specialist team operate all over the UK on projects ranging from domestic properties, commercial properties, retail outlets to name a few. Our range of resin injection options are selected based on the challenge and the requirement depending on the soil type and the cause of the problem.

We have specialist applications for:

- » **Ground Improvement** To improve ground bearing capacity
- » **Structures** Improving the foundation of structures without impacting the structure itself & strengthening the foundations for increased load
- » **Ground Stabilisation** To bind materials together and avoid slippage eg, embankments
- » **Void Filling** For example redundant drains
- » **Slab Lifting** For example re-levelling concrete floor slabs that have sunk or dropped, slab lifting, ground improvement, ground stabilisation & increasing the bearing capacity of existing ground.

First of all, we review the project in question and advise whether resin injection is an appropriate course of action, or whether a more cost effective or effective alternative would be more suitable.

Our team react rapidly to all enquiries and can be on site in as little as 2 weeks. We have been known to start on site the following day for an emergency or unstable property.

## Benefits of resin injection

- » Rapid setting time - time can be controlled by mix design
- » Cost saving - due to speed versus other options (eg concrete), Resin offers a significant labour saving
- » Minimal disruption - no need to decamp residents or workforces due to the flexible, safe installation process
- » Virtually no waste / disposal costs compared to reinstatement of a concrete slab
- » Resins are a method achieved solution - the results can be demonstrated live on site
- » Stabilises / improves ground in harmony with surrounding soil - creates equilibrium with no hard spots
- » Long life span - life spans of resin equal those of concrete. This has been predicted via accelerated testing both in the UK and Germany at accredited laboratories
- » Reduced Carbon Footprint - significant saving in CO<sub>2</sub> versus concrete & no disposal needed
- » Environmentally stable



## Benefits of resin injection from Shire

- » Focus on Engineering Innovation
- » In-house R&D
- » Fully researched and investigated by Structural Engineers
- » Using accredited chemical manufacturers
- » Our current solutions:
  - Slab Lifting
  - Ground Improvement (soft ground)
  - Ground Stabilisation (granular materials)
  - Filling Small Voids
- » UK-wide service
- » CCTV / monitoring available
- » Own Waste Carrier License

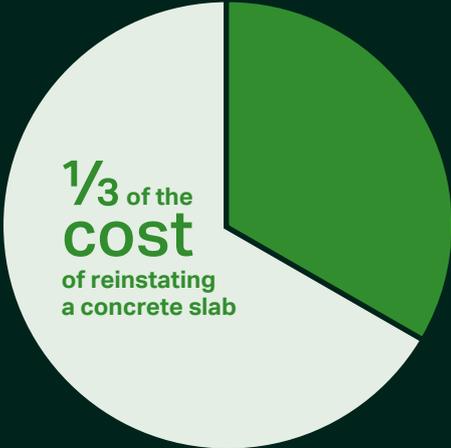
# Slab & Floor Lifting

Settlement can be caused by many factors including escape of water that washes away soil fines. As a ground floor slab is initially designed to certain ground conditions, when those ground conditions change, settlement can occur. Shire's method has been designed to act directly onto the ground beneath, to lift the slabs & floor.



# Resin v Concrete

Facts: costs & numbers



## Method (during works)

- » Existing floor levels checked using level monitoring equipment
- » Design created based on gathered information
- » Points injected under controlled conditions
- » Lifting commences & is monitored throughout
- » Drain CCTV is commonly used to ensure protection
- » Levels are checked in their final position

The resin is injected in a liquid state through holes of 15-20mm diameter, drilled through the slab. The volume of resin is controlled to fill the voids and expand to lift the flooring within specific timeframes while being monitored by laser level throughout.

## Completion (post works)

- » Minimal disruption – occupants of properties don't necessarily need to move out. In almost every case, slabs can be lifted and relevelled without the need to remove machinery or fixtures etc.
- » Instant load capacity
- » 10 year guarantee
- » Site can be put back to instant use

## Applications

- » The resin injection service from Shire can be used in a wide variety of scenarios where a ground bearing floor slab has become unlevel due to changes in the supporting ground conditions. This applies to the following properties:
- » Domestic properties
- » Commercial properties
- » Retail outlets
- » Warehouses / logistic hubs

## Benefits

- » Relevelled within 1 day
- » Non-invasive, minimal disruption
- » No need to breakout existing slab
- » Accurate & controllable to within +/-5mm
- » 10 year guarantee
- » Technique approved by insurers, engineers & local authorities
- » Inert material
- » Reduced carbon footprint

## Other uses

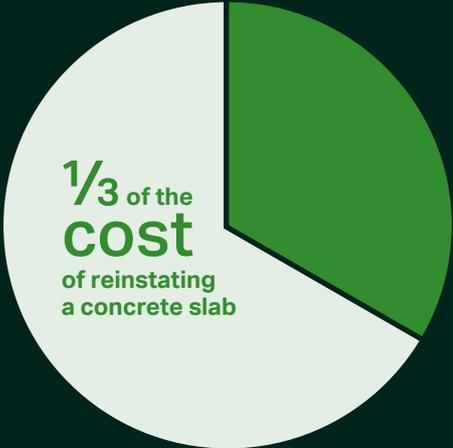
- » Improving bearing capacity
- » Stabilising ground
- » Filling small voids

# Ground Improvement & Stabilisation

Ground stabilisation is a method in which poor / un-compacted / loose soils underneath a structure, can be made into a stable medium with an increased bearing capacity that can be classed as better performing soil than the existing conditions. Shire's process removes the need to excavate materials out of the ground in order to reinstate a structure. Because materials remain where they are, costs of excavation and transportation are minimal. A perfect example of an extreme cost saving is on Brownfield sites where excavation & disposal of existing materials are costly. The key difference between slab lifting and ground stabilisation is the science behind establishing a reinstatement of ground conditions to give a good bearing capacity and stabilise the soil versus creating an environment where a structure is lifted from the ground. As the material is hydrophobic, it does not change its properties once cured. It is chemically inert and therefore poses no threat to ground water. The resin used in these cases is injected in a low viscosity liquid form, allowing it to penetrate into areas that would be inaccessible to cement-based grouts. In addition, the low pressure injection prevents the possibility of hydro-fracture of both the soils and adjoining structures.

## Resin v Concrete

Facts: costs & numbers



## Method (during works)

- » Levels / bearing pressure checked
- » Design created
- » Points injected under controlled conditions. Injection lances can usually be driven in by hand tools up to 2-3 metres. A drilling rig may also be required.
- » Bearing capacity monitored throughout
- » Drain CCTV where possible
- » Completed works

## Completion (post works)

- » Minimal disruption
- » Instant load capacity
- » 10 year guarantee
- » Site can be put back to instant use
- » Inert material has no effect on groundwater



## Applications

- » Brownfield sites
- » Basements
- » Stabilisation of walls
- » Pipe works
- » Culverts
- » Anywhere requiring stabilisation of soil structures

## Benefits

- » Ground does not need to be de-watered in advance or during the installation
- » Inert material
- » Installed within 1 day
- » Non-invasive, minimal disruption
- » No need to breakout existing structures
- » Accurate & controllable to within +/-5mm
- » 10 year guarantee
- » Technique approved by insurers, engineers & local authorities
- » Reduced carbon footprint

## Other uses

- » Improving bearing capacity
- » Stabilising ground
- » Filling small voids



For more information, including examples of projects,  
visit our website or get in touch

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## Our Services

- » Consulting Civil & Structural Engineers
- » Geotechnical Investigations
- » Structural Inspections
- » Structural Repairs inc root barriers, piling, jacking,  
underpinning, masonry reinforcement, retaining walls

*The Institution  
of Structural  
Engineers*

**ice**  
Institution of Civil Engineers



**CHAS**  
Approved