

Geobear Capability Matrix



Grouting Activity/ Process	Particular Objectives	Domestic housing, public buildings, with non-piled foundations	Industrial / commercial units	Surface infrastructure - roads, rail, airport aprons, quaysides, loading/ storage areas	Bridges	Tunnels - existing	Deep excavations under construction	Embankments - roads, rail, canals, river, coastal	Dams and hydraulic structures	Utilities	Geobear Method	Soil Characteristics	LIMITATIONS (Achieved)	Verification method	Applicable Case Study
Structure related applications (surface, near-surface) X = Standard application O = Special application															
Re-levelling / Lifting- foundations, floors, structures, utilities	Correct structural defects - differential settlement and/or deflection	X	X	X	O					O	Re-levelling/ Stabilisation	Granular, Made ground, Silt, Clay, Peat organic material < 10%, WL < 60%	Lifting up to 400mm, max load 140t locomotive	Level monitoring	Dairy Crest / Kentish Town
Improve bearing capacity below existing structure to avoid / mitigate settlements - granular soils (sands, gravels)	Geopolymer permeation, expansion, compaction and densification	X	X	X	X	O	O	X	O	X	Ground Improvement	All granular (Made Ground, Sands and Gravels/Cobbles)	up to 350% improvement depending on initial density	Dynamic penetration testing (DP)/Standard Penetration testing (SPT)/Cone Penetration Testing (CPT)/plate load testing	Ilford / Wandsworth / Eel Pie Island
Improve bearing capacity below existing structure to avoid / mitigate settlements - cohesive soils (clays, silts)	Hydraulic fracturing, fracture permeation, geopolymer expansion, strengthening and stiffening	X	X	X	O	O		O	O	O	Ground Improvement	Cohesive soils (Made ground, Silt, Clay), organic content < 10%, WL < 60%, N-SPT Value > 1	up to 600% improvement depending on initial shear strength	Dynamic penetration testing (DP)/Standard Penetration testing (SPT)/Cone Penetration Testing (CPT)/Plate load testing/Triaxial Testing/ In-situ shear wave measurements	Ilford Depot / Marton West Beck
Improve bearing capacity of existing foundations to accommodate additional current or future loading	Localized geopolymer permeation, expansion, compaction and densification. Fracture permeation, strengthening and stiffening.	X	X	X	X	X	X	O	O	X	Ground Improvement	All granular (Made Ground, Sands and Gravels/Cobbles) and cohesive soils (Made ground, Silt, Clay), organic content < 10%, WL < 60%, N-SPT Value > 1	350% to 600% improvement depending on nature of ground	Dynamic penetration testing (DP)/Standard Penetration testing (SPT)/Cone Penetration Testing (CPT)/Plate load testing/Triaxial Testing	York Hospital / Valeo Foods
Structural underpinning	Localised structural support by injection pile to address stability issues	X	X	X	O	O			X	X	Structural Support	All soil types N-SPT Value 0-3	Max load 200kN/m, max depth 6m	Quantity, Level monitoring, Pile load testing	York Historic Building
Water exclusion (Groundwater permeation reduction vs. structure leaks)	Groundwater exclusion via structure fabric or joints / defects	X	X	X	O	X	X	X	X	X	Ground Improvement	Granular soils, Structures	100%	Permeability test	Krackow / Kilarney Hotel / Abbey Dale Museum /
Void filling - below foundations, floor slabs	Restore support, reduce risk of future settlement and/or void migration	X	X	X	X	X		O	O	X	Void Filling	All soils	100%	Quantity and visual/sampling/Dynamic penetration testing (DP)	Ylivieska / M11 / A6
Vibration reduction	Traffic dynamic loads, manufacturing machinery	X	X	X	X	O		O		X	Ground Improvement	Granular soils	70% reduction	Vibration monitoring	Factory Vibration
Structural infill to reduce volumetric change (Clay Shrinkage)	Geopolymer fracture permeation, expansion,	X	X	X	O			X		X	Ground Improvement	Shrink and swell Clay	Clay Modified PI < 60%	Level monitoring/soil sampling/Dynamic penetration testing (DP)	Oxford Flats / Ripon Davies
Geotechnical applications (sub-surface)															
Liquefaction mitigation	Stiffening / densification of soil mass to control vibration-induced soil mobility	X	X	X	X			O		X	Ground Improvement	Sand, Granular soils	Factor of safety > 1	Dynamic penetration testing (DP)/Standard Penetration testing (SPT)/Cone Penetration Testing (CPT)/Plate load testing/In-situ shear wave measurements	
Sink hole remediation	Fill open cavities and consolidate loose infill materials	X	X	X	X	O	O	X	X	X	Void Filling, Ground Improvement	All soils	100%	Quantity and visual/sampling/Dynamic penetration testing (DP)	
Filling / stabilisation of old coal/mineral workings	Fill open cavities and consolidate loose infill materials	X	X	X	X	X		O	O	X	Void Filling, Ground Improvement	Underground cavities	100%	Quantity and visual/sampling/Dynamic penetration testing (DP)	
Mitigate settlement from construction or tunnelling activity (compensation grouting)	Mitigate excavation-induced settlement by replacement of excavation volume loss	X	X	X	X	X	O	X	X	X	Geo RT, Ground Improvement	Settling soils	100%	Monitoring of structure	
Control internal erosion	Seal preferred seepage paths and reduce permeability to ensure long-term stability of embankments	X	X	X	O	X	X	X	X	X	Ground Improvement	Permeability tests	100%	Quantity and visual/sampling/GPR/Dynamic penetration testing (DP)	
Pile Load Capacity Improvement (Toe Injections)	Hydraulic fracturing, fracture permeation, strengthening and stiffening	X	X	X	O						Ground Improvement	Cohesive soils (Made ground, Silt, Clay), organic content < 10%, WL < 60%, N-SPT Value > 1	Upto 200% improvement depending on nature of ground	Pile Load Testing/Dynamic penetration testing (DP)/Standard Penetration testing (SPT)/Cone Penetration Testing (CPT)	
Hydraulic cut-off	Provide a hydraulic cut off barrier to reduce seepage rates and / or isolate an excavation or embedded structure structure	X	X	X	X	X	X	X	X	X	Ground Improvement	Granular soils, Structures	100%	Permeability tests	Kilarney