ALLU
One Step Ahead

ALLU PMX & PF

Stabilisation System

New concept for soil improvement

Soil Stabilisation method

Stabilisation is a process to improve the strength and durability of soil.
This can be reached by mixing an appropriate amount of binder agent with the soil.

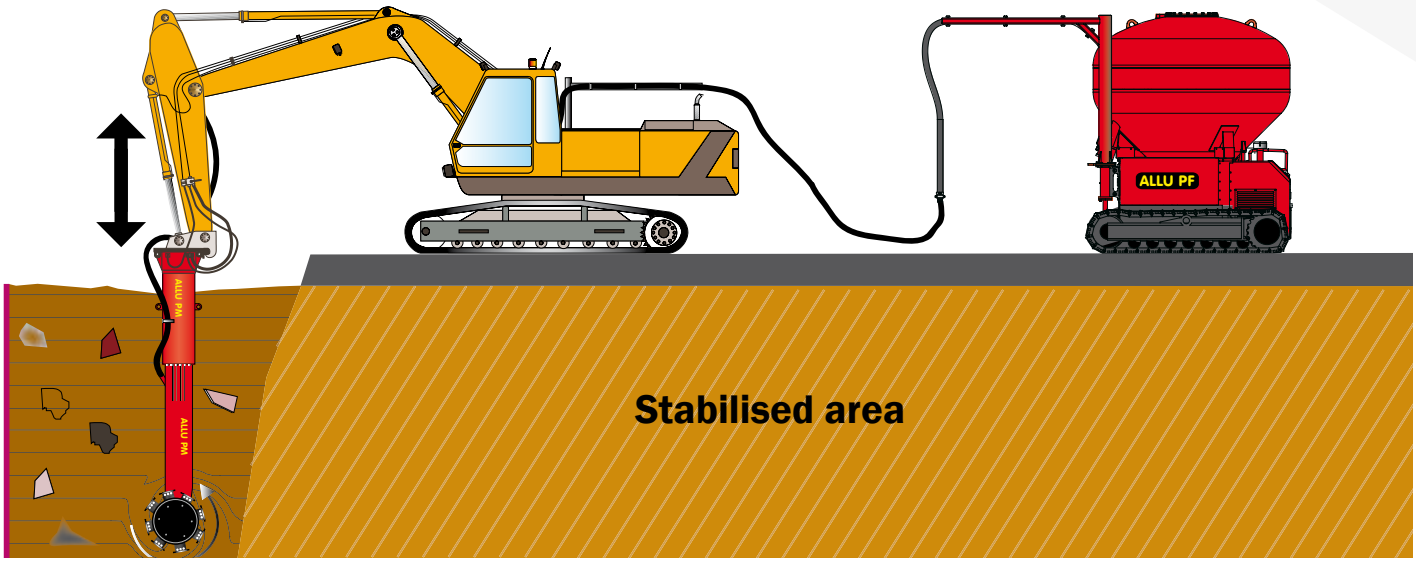
Mass Stabilisation Method

Mass Stabilisation is a method to stabilise soft soils by adding binders in order to reduce settlements and/or to improve the stability of the land. It can be a quick and cost effective solution compared to the traditional method of piling or mass change. For example different kinds of clay, peat, sludge, and soft soil can be transformed into solid layers by using the stabilisation method.

The ALLU Stabilisation System allows you to gain access to grounds like swamp where it is not possible to walk. The stabilisation method can also be used in treatment of contaminated lands, by encapsulating contaminants within the ground, and preventing leaching to the surrounding areas.

Benefits of soil stabilisation with ALLU

- Wet site conditions can be overcome
- Disposal of unsuitable soils is not required
- Imports of new material is greatly reduced
- Treated material can be placed under structures
- Site traffic and impact on the environment is reduced
- Low operating costs
- Mixture more homogenous than with other methods
- A wide variety of strengths are possible
- By-products from industry can be used as raw materials.



Applications for soil stabilisation

Stabilisation at road and ground constructions

- Foundations for industrial buildings and bridges
- Yards, parking places, sports grounds and storage construction sites
- Protection of adjacent structures
- Reduction of earth pressure
- Stabilisation of very soft soils for tunnel boring
- Road, street and railway construction sites
- Foundations for pools, landfill areas etc.
- Protection layers under the water
- Cable/pipe channel construction sites
- Noise embankments
- Ground water protection layers
- Slopes of the rivers, lakes, roads, etc.
- Erosion control
- Protection layers for permafrost and frost.

Stabilisation of dredged sludge

- Utilising dredged sludge as a part of construction in harbour areas

Handling of contaminated soil

- Isolation of contaminated soils
- Neutralization of toxic waste

Mixing of different materials

- Recycling of the industrial side products
- Fixation of the liquid waste(s)

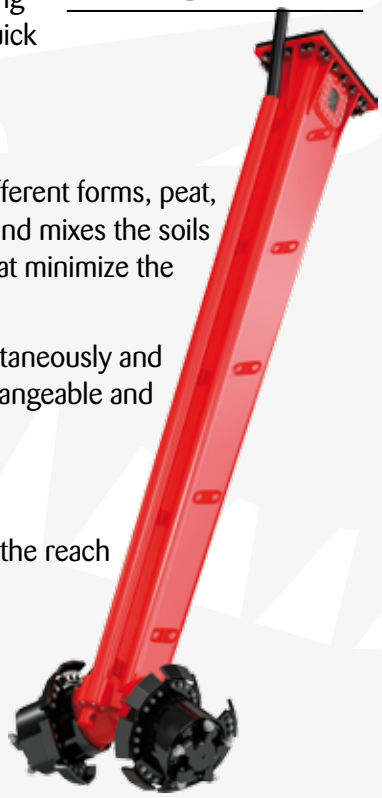
Soil Stabilisation enables wet or cohesive material to be treated and used for construction purpose.

ALLU Stabilisation System

ALLU Stabilisation products

ALLU PMX

ALLU PMX Power Mixer is a versatile hydraulic operated mixing unit for excavators. When it is attached to an excavator the combination converts to an easily movable and effective mixing plant. The ALLU PMX can easily be mounted on an excavator with pin mounting or with quick hitch adapter plate.



Intelligent construction

The ALLU Power Mixer is able to handle effectively various difficult materials like clay in different forms, peat, sludge, mud and contaminated soil. The ALLU PMX penetrates through hard crust layers and mixes the soils effectively. The mixing effectiveness is based on the intelligent positioning of the drums that minimize the dead area of the bottom frame.

The drums move and mix material in a controlled way in all three different directions simultaneously and the conical binder nozzle spreads binder efficiently. The blades on the mixing drum are changeable and straight one piece binder tube is maintenance friendly.

Material processing to a depth up to 7 meters

ALLU Power Mixer can process materials to a depth of 7 meters (22,9 feet) depending on the reach of the excavator and the quality of the material.

Designed for durability

The ALLU Power Mix has a strong, streamlined and lightweight frame made of wear resistant steel that ensures easy penetration to the material without any stress concentration. Also there are no hatches at the lower part of the frame.

Hydraulic final drives get power from the excavator's hydraulic system. The final drives rotate the mixing drums directly. ALLU PMX is equipped with automatic torque adjustment on the hydraulic motor, gear box temparature indicator and drum rotating speed indicator to ensure effective jobsite control.

ALLU PMX 300		ALLU PMX 500	
Working depth:	3 meters (9.8 ft)	Working depth:	5 meters (16.4 ft)
Hydraulic:	230 - 420 bar (3335,1 - 5076 psi), 200 - 300 l/min (52 - 79 gpm) 160 kW max power	Hydraulic:	230 - 420 bar (3335,1 - 5076 psi), 200 - 300 l/min (52 - 79 gpm) 160 kW max power
Weight:	2 095 kg (4 618,7 lbs) + adapter	Weight:	2 445 kg (5 390,3 lbs) + adapter
Base machine:	25-40 ton (50 000 - 80 000 lbs)	Base machine:	25-40 ton (50 000 - 80 000 lbs)
Option:	2 m (6,6 ft) extension tube	Option:	2 m (6,6 ft) extension tube

ALLU DAC.

ALLU DAC. (Data Acquisition Control) system measures, controls and reports the feeding operation. The ALLU DAC. enables control of the whole Stabilisation System, making the system user friendly, and provides the facility to transfer data onto other computers. Thus the work done is properly documented for quality control purposes.

ALLU PF 7 & PF 7+7

The ALLU PF Pressure Feeder, using compressed air, inject through a feeding pipe the binding agent beneath the ground, directly to the middle of the mixing drums on the PM. The unit is mounted on a tracked chassis and is remotely controlled allowing the unit to follow behind the lead excavator onto the site.

Engine:	74,5 kW (99 Hp) diesel motor
Compressor:	
Working pressure	max 8 bar (116 Psi)
Capasity	6,5 m³ (229.54 ft³) / min
Tank:	
Maximum working pressure	8 bar (116 Psi)
Volume	approx 7 m³ (247.20 ft³), brut
Feeder:	
Feeding capacity, adjustable	up to 5 kg (11 lbs) / sec
Weight (empty):	
PF 7	7 900 kg (17 417 lbs)
PF 7+7	13 500 kg (29 762 lbs)

Option:
Bag filter for decrease dust filling procedure

ALLU PF 7

ALLU PF 7+7

ALLU PFM 10+10

The ALLU PFM (Pressure Feeder Mobile) for feeding dry binders is mounted on a trailer that enables the easy transportation from one place to another. This means lower mobilisation costs and enables cost-effective stabilisation projects also on smaller job sites.

Engine:	328 kW (439 Hp) diesel motor
Compressor:	
Working pressure	max 8 bar (116 Psi)
Capasity	15,6 m³ (550 ft³) / min
Tank:	
Maximum working pressure	8 bar (116 Psi)
Volume	approx 10 m³ (353.15 ft³), brut
Feeder:	
Feeding capacity, adjustable	up to 12 kg (26 lbs) / sec, fed simultaneously from both tanks
Weight (without binder & fuel):	16 000 kg (35 274 lbs) + 5 500 kg (12 125 lbs) semi trailer

Option:
Bag filter for decreasing dust filling procedure

ALLU PFM 10+10

PFM Silos and Engine

Projects using ALLU Stabilisation equipment

Industrial and Parking Area

Kivikko is situated in the eastern side of Helsinki, the capital of Finland. Approximately 12 hectares (29.65 acres) of the lots and streets in Kivikko are situated on soft swamp and are completely unsuitable for construction purposes. In this area two separate stabilisation tests were carried out, in the first area mass stabilisation only and in the second mass and column stabilisation.

In the first area mass stabilisation was applied to a depth of 3 meters (9.8 ft). The result was a solid platform 3 meters deep that will serve as the foundations for a parking area.

The swamp one week after stabilisation

The second area treated, using the column and mass stabilisation methods, will serve as a building area for industrial units. The required stability and carrying objectives were reached. The results provide a very good example of the possibilities that can be achieved with stabilisation.

Harbour Construction

The new harbour centre Vuosaari is located in Helsinki Finland. It consists of a freight station together with logistics area, traffic connections (road, railway and sea route) as well as business district, Meriportti, next to the harbour area.

The harbour area is in total 150 hectares and the stabilised area 90 hectares. The work started in 2003 and the harbour was opened in 2009.

This construction site was one of the biggest mass stabilisation projects in the world. Similar projects have been carried out before in Norway, Trondheim and in Valencia, Spain. In this Vuosaari project also sludge dredged from the sea was stabilised with mass stabilisation method in order to use the stabilised sludge in the harbour construction.

The original plan was to excavate and transport the dredged sludge away and replace it, but when TBT was found from the ground it made the dumping difficult. With stabilisation the contaminated soil was encapsulated into a solid slate preventing the pollution from dissolving in to the environment. One of the major advantages was also that it was possible to utilize the stabilised area by building approx. 10 hectares container storage area on top it.

High Speed Railroad Construction

One of the recent contracts where the ALLU Stabilisation System has been in operation is a high speed railway line construction site on soft peat in southern Finland.

The ALLU Stabilisation System is used to strengthen the soft peat creating a working platform for a 70 tonnes (140 000 lbs) piling rig. The binder agent provided by the ALLU PF is mixed using the ALLU PM (in-situ) to a depth of 5 m (16.4 ft).

Previously, it would have been necessary to excavate the entire area and fill the void with stone. This would create all sorts of problems for the contractor: finding a suitable area to deposit the excavated material and also sourcing the stone as fill. The second possibility would have been to build a bridge.

Road Foundation

The ALLU PM 500 mixing units were working in wetlands in Key Largo, Florida. The existing two-lane highway was widened to a four-lane highway. The ground on the job site was extremely wet and contains peat and a great deal of vegetation. One part of the new highway will be bridged over water.

First the customer prepared a test area of 6m x 6m (20 x 20 feet) and 3,6 m (12 feet) deep in the swamp. Initial tests were good and the targeted compaction was reached. Phase one of the construction site is 14,4 km (9 miles) long, 12-15 meters wide and the stabilisation area is 2-4 meters deep. Cement and furnace slag was used as binding agents. The specification for strength was 20.7 kPa (3 psi) but tests performed the next day showed that the result was 41.3 kPa (6 psi). Other methods call for replacing the existing soil with new aggregate, which is an expensive alternative. By using the ALLU PM for mass stabilization the customer was able to manage a time- and cost-effective operation.

By stabilising the area the costs are much lower than the cost of doing the work with the traditional methods like change of mass.

ALLU DOES IT ALL...

ALLU products for soil improvement

ALLU Screener Crusher
Screening, crushing, mixing, aerating, and loading in one step operation

ALLU Stabilisation System
Mixing soil and binding agent in mass stabilisation

ALLU Compacting Plate
High power compacting plates for demanding job sites

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Dealer

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For more information go to **www.allu.net**