Natural stone - Maintenance outdoors

Introduction
Natural stone is a very durable material that requires minimal maintenance. However, to ensure that stonework retains its high quality over many years, it is advisable to carry out regular inspections. These inspections allow for the timely repair of minor damages, which, if neglected, could lead to more significant and costly repairs. With proper maintenance, the stone retains its value and ages gracefully.

Periodic maintenance
A schedule with time intervals for different maintenance actions should be established. See table 1 on next page.

During the first two years, recurring top-ups of joint filler and adjustments in paving, etc. are often necessary. Such actions can be included in the construction contract as part of a warranty commitment.

Paving:
The joints of newly laid stone surfaces are sensitive before they settle, as fine particles penetrate and compact the joint material. Therefore, mechanical sweeping with cleaning vehicles should be avoided during the first two years. If the joints are not properly filled, the paving will lack stability, causing stones to loosen and shift out of position. When using mechanical sweepers, care should be taken to ensure that the brushes do not angle down into the joints and remove the material.

Important! Vacuum sweepers must not be used on newly laid stone pavements with sand-filled joints.

Weeds can be controlled using various methods. Spraying with chemical herbicides causes significant environmental problems and should therefore be avoided. Heating with flames, steam, or infrared radiation are effective methods, but should be used carefully to avoid damaging the stone or surrounding surfaces. Mechanical methods are preferred; however, joints in newly laid paving may be damaged by brushing or high-pressure washing. Sandblasting can also give the stone a dull, unattractive surface.

Methods for weed control:
1. Mechanical methods, such as Brushing, Washing/rinsing, Manual removal, Sandblasting and Freezing.
2. Other methods, such as Spraying, Flame treatment, Steaming and Infrared radiation.

Below are suggested actions that should be included in the routine maintenance of various stone constructions in outdoor environments.

Cube stones
- Repair settlements, loose stones, and other damages.
- Replace missing stones. Use stones with the same colour and texture when replacing damaged paving.
- Control weeds by using mechanical methods.
- Trim edges along adjacent vegetated areas.
- Sweep the stone surface by hand.
- Do not use high-pressure washing, as this can wash out the joints.

Problems often occur on paved surfaces due to cleaning machines. Sweepers with steel brushes and powerful vacuums remove joint sand between the stones, causing stones to loosen and resulting in surface settlements.

To prevent this, the stones can be set in mortar and also jointed with mortar. Another method is to reinforce the joints with a binder.

Slabs
- Settlements, lose or cracked slabs, and other damages should be addressed as soon as possible to limit the spread of damage.
- Weeds should primarily be controlled by using mechanical methods.
- Trim edges along adjacent vegetated areas.
- Adjust manhole covers so they never sit higher than the surrounding paving.
- Snow and ice removal should be done mechanically. De-icing salts damage limestone and mortar joints.

Small cube stones/Granite setts
- Repair settlements, loose stones, and other damages.
- Replace missing stones.
- Control weeds by using mechanical methods.
- Trim edges along adjacent vegetated areas.

Stairs:
- Inspect stone stairs at least once a year.
- Repoint and adjust steps as required.
- Repair loose steps, undermining, or other damage that could pose a risk to pedestrians or compromise the durability of the stairs.
- Snow and ice removal should be carried out mechanically. De-icing salts damage limestone and mortar joints.
- Keep stairs and stairways free of weeds.

Walls:

Mortar walls
- Inspect mortar walls regularly, paying particular attention to the condition of the joints.
- Repair and adjust joints, settlements, and other damage as needed.
- Remove vegetation in joints mechanically.

Dry stone walls
- Inspect dry stone walls regularly. Small settlements may occur during the first few years.
- Adjust displaced stones as needed.

Repair and renovation
Natural stone is a timeless material with a very long lifespan. During repairs and renovations, additions of new stone of the same type as the existing stone can often be made. Initially, the new stone may be distinguishable, but fairly quickly it acquires the same patina as the existing stone and blends into the environment.

To achieve the best possible integration between old and new, part of the existing paving can be dismantled and mixed with the new stone. This provides a smooth transition.

Natural stone can usually also be reused after dismantling. In many cases, for example with cobblestones, even used, worn, and patinated stones are considered more attractive than newly quarried ones.

Recently, the import of stone from distant countries has increased. In such cases, the stone's origin is not always easy to trace, and replacement material of the same type can be more difficult to obtain.

Stones in pavements that are reinstalled should be set approximately 10 mm higher than the surrounding level. During compaction and vibration, the reinstalled slabs or stones will sit slightly above the original paving, but after some time under traffic, the differences will even out.

Cleaning

Keeping stonework clean creates a neat appearance and discourages graffiti and vandalism. Include cleaning as an item in the maintenance plan.

Cleaning methods should be adapted to the type of stone, the nature of the dirt, and the construction of the stonework.

Points to consider when choosing a cleaning method:

- High-pressure washing can damage joints.
- Acidic cleaning agents can damage limestone.
- Aggressive sandblasting can dull the stone´s crystalline surfaces.

Stain removal

When removing stains, it is important to act quickly so that the staining substance does not penetrate the stone. As long as the stain remains on the surface, it is easier to remove.

Table 2, on next page, provides a brief guidance on which agents can be used to remove the most common types of stains.

The paste method

The paste method involves mixing the solvent with an absorbent powder, such as chalk, to form a thick, pasty mixture. This is applied to the stain and allowed to dry. Once dry, the powder is brushed off and the area is rinsed with water. The technique works by dissolving the stain with the solvent and drawing the solution up into the paste, which is then removed.

If the stain is deep or the solvent evaporates too quickly, the moist paste can be covered with plastic wrap for a period before removing the plastic and allowing the solvent to evaporate.

Organic solvents can be effective against various types of stains and do not negatively affect the stone.

Acidic agents etch and degrade carbonate stones, such as limestone, and should not be used on these types of stone.

Graffiti protection and removal

Walls and other vertical stone surfaces are often attractive to graffiti vandals. Such surfaces should therefore be protected with graffiti-resistant treatments. More information on graffiti protection and removal can be found in *Natural Stone – Graffiti protection*.

Table 1

Schedule with time intervals for different maintenance actions.

Suggested maintenance plan – park environment with paving, walls etc.						
Action	*Weekly*	*Monthly*	*Every 3 months*	*Annually*	*Every 2 years*	*As needed*
Sweeping/cleaning, including graffiti removal	•					
Inspection of loose stones (during the first 2 years)			•			
Removal of weeds in paving		•				•
Removal of weeds in walls			•			
Top-up of joint sand in paving			•			
Inspection of settlements/ displacements/mortar joints				•		
Deep cleaning, removal of chewing gum etc.				•		
Inspection/cleaning of salts, residues etc.				•		
Inspection of the facility/ installation					•	

Table 2
Stain removal on outdoor stone.

Stain	**Removal method**
Oil, grease	Gasoline, paste method
Cement, lime deposits	Mechanical removal, glycolic acid and stiff brush (not on limestone)
Felt-tip pens/red ink	Acetone/thinner, paste method
Oil-based/enamel paint	Thinner or turpentine applied with paper, then paste method, rinse afterwards with ammonia-/water solution
Plastic paint	Before curing; water, after curing; very difficult, mechanical removal (razor blade), then hot caustic soda solution
Wax/candle	Mechanical removal with knife/razor blade or freeze spray, then gasoline (engine, 95 octane), eventually using paste method
Chewing gum	Freeze spray
Urine	Dishwashing detergent or all-purpose cleaner
Rust	Granite/quartzite; oxalic acid, then rinse with all-purpose cleaner, Limestone; very difficult, oxalic acid etches fine surfaces and may bleach the stone
Tape (adhesive residues)	Thinner, eventually acetone

Consumer Information, January 2022

Swedish Stone Industries Federation "Sveriges Stenindustriförbund"

www.sten.se