


 Alteration of stone
this symbol indicates the
presence of loss of original
surface, fragmentation and
mortar joint leakage

STRUCTURAL FAILURES


Main items:




Crack: Minor crack with a width of about 0.1 mm

Deep crack: Crack that crosses completely the stone piece



Detachment of the facing stones



Swelling

Tangential sandblasting (with IOS or IBX type system) operating with compressed air, with adjustable operating pressure, variable nozzle mounted on pen or gun. Sandblaster and abrasive of selected type and grain size. Including set-up, adjustment, confinement and sampling charges, all the equipment necessary for the correct application of the precision aero-abrasive system. On any surface even in masonry. Completion through removal of incoherent surface deposits (dust, soil, etc.) by means of vacuum cleaners and brushes.

Estimated on 25% of stone surfaces, only when and where necessary:

- Consolidation of stone artefacts in the presence of diffusive phenomena of decohesion, by impregnation up to waste with ethyl silicate applied with brushes, syringes, pipettes. Operation to be performed following or during the cleaning operations on limestone.
- Completion through injections of lime fluid mortar: re-establishment of cohesion in cases of mortar disintegration or lodging of stone masonry in consequence of the creation of continuity solutions between the tectonic elements, through injections of lime fluid mortar; including the execution of the holes and the eventual preventive sealing of the holes clefts.

Restoration of the joints: the stripping of old mortars (if irrecoverable) with the burden of salvaging the sections where conservative intervention is possible; the elimination of all cement mortars, grouting of the connections and joints with lime mortar and suitable aggregates, including the changes relating to the composition of mortars suitable for coloring and grain size, its surface treatment, the clearing of any residues from the joints and the surrounding surfaces. Including the re-embedding of the old mortars, the application of a protective lime mortar and filling material (or a leveling layer) and mortar for finishing to be evaluated on the surface actually treated; on a limestone facing.

Reconstruction of the wall facing and battlements by analogy: reconstruction of portions of lost or unrecoverable masonry walls, carried out after consolidation of the residual mortars with subsequent reconstruction of the missing part with the use of materials and techniques compliant with the original construction. Including the elaborate bonding to the existing masonry relating to the subsequent mortar to be interpreted and cleaned of any residues from the surrounding surfaces. Including the restoration of the cohesion of the mortars between the facing and the styling of the joints, calculated per square meter for a maximum thickness of 25 cm, with limestone elements with antiquing treatment.

Consolidation of structural cracks with preventive sealing of sublevel lesions with hydraulic lime mortar and aggregates, with insertion of the pipes necessary for injections and subsequent infiltration in depth of pre-mixed hydraulic mortars (superficial grout, volumetrically stable, packed with superfat filtered hydraulic binder, salt-resistant, cement-free, composed of lime and Eco-Pozzolana, ultra-fine natural sands and special additives such as Mape-Anticreep 1 from MAFI S.p.A. or similar), carried out gradually proceeding from the bottom to the top until saturation of the continuity isolations, including final grouting with finishing lime mortars.	IG.25.200.0130
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[illegible]

<p>or equivalent, cement-free, composed of lime and Eco-Pozzolana, ultra-fine natural sands and special additives such as Mape-Antique 1 from Mapei (S.p.A. or similar), carried out gradually proceeding from the bottom to the top until saturation of the continuity solution.</p> <p>The external stone facing must be restored using recycled slabs from the construction site or new slabs like the existing ones. The installation must be done with hydraulic lime mortars suitably tested on site, paying close attention to the connection with the existing facing. All joints must be grouted with hydraulic lime finishing mortar without cement.</p>	
<p>Reumption of the drawing-up of the crack through the scraping of the old cement mortars, then grouting with lime mortar and suitable aggregates.</p> <p>All restoration mortars must be tested to define their composition (suitable, for colouring and grading, to the historical one). All joints must be grouted with hydraulic lime finishing mortar without cement. All surfaces must be well cleaned of any residues.</p>	IC.25.200.0406.b

The intervention surfaces must be suitable for hosting the restoration. They must be carefully cleaned with brushes and vacuum cleaners, any residue of fissure treatment, to be carried out where necessary by means of quarantine anaesthetic gels applied by spray or brush, must be eliminated. The cracks in the core must be filled with injection of free-flowing hydrophobic mortars (epoxy-based, polymerically stable, packed with nanofilled	16.25.200430 16.06.7201040

<p>Fluorinated hydrolytic binder, salt resistant, cement free, composed of linear α-D-glucopyranose, ultra-fine natural sand and special additives such as <i>Mape-Aquaplex</i> from Mapei S.p.A. or similar, carried out gradually proceeding from the bottom to the top until the position of the continuity solutions. The external stone facing must be restored using recycled stone from the construction site or new stones like to the existing ones. All unstable stones must be removed, cleaned, and replaced. The installation must be done with hydraulic lime mortars suitably tested on site, paying close attention to the connection with the existing facing. All joints must be grouted with hydraulic lime finishing mortar without cement.</p>	
<p>The intervention surfaces must be suitable for the restoration. They must be carefully cleaned with brushes and vacuum cleaners, any residue of biocide treatment, to be carried out where necessary by means of quaternary ammonium salts applied by spray or brush, must be eliminated.</p>	<p>IG.25.200.0430 IG.25.200.0405.a</p>

It will be necessary to guarantee again the adhesion between the wooden wall and the core behind through filling with injections of pre-mixed hydraulic mortars (superplasticized, volumetrically stable, packed with superplasticized filtered hydraulic binders, air-resistance, cement-free, composed of lime and Eco-Pondane), ultra fine natural sands and special additives such as Mape-Air (from Mapei S.p.A or similar), carried out gradually proceeding from the bottom to the top until satisfaction of the continuity solutions.

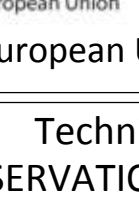
Restoration of the joints: the stripping of old mortar (if irrecoverable) with the burden of safeguarding the sections where consecutive intervention is possible; the elimination of all mortar joints; grouting of the connections and joints with lime mortar, the sealing of existing aggregations, including the changes relating to the joints for the composition of mortars suitable for coloring and grain size, its surface treatment, the watering of any residues from the surrounding surfaces. Excluding the re-estimation of the quantity of prepared mortars, including the depth layer of hydraulic mortar and filling material (for a leveling layer) and mortar for finishing: to be evaluated on the surface actually treated: on a limestone facing.

[illegible]

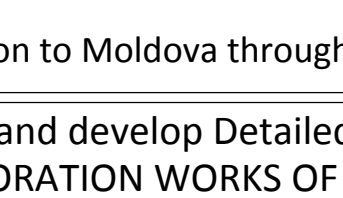
GENERAL INSTRUCTIONS

1 - The mappings are indicative of the main decay phenomena present on the surfaces. These surfaces indicate a realistic percentage of the area to be treated. **The price of the restoration work is however fixed at a flat rate.** After the installation of the scaffolding and before starting the restoration works, the contractor must carry out a survey of all the surfaces to verify and update the mappings.

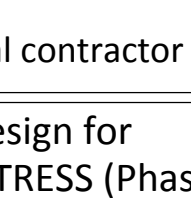
2 - **All the processes, all the materials and all the mortars must be tested on site**, before being used, and submitted for approval by the works manager and UNDP site manager.



This project is funded by the European Union




European Union Confidence Building Measures Programme
Programma dell'Unione Europea "Misura di Ricostruzione e di Assistenza"
"Programme Européenne de Confiance" "Mesure de renforcement des capacités"



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TITLE: RESTORATION INTERVENTIONS
Elevation | Water Tower-A

ASSIGN CODE	DOCUMENT CODE				
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C226	-	P	ER	009	-

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