

Conservation Concept for the Relief of the Eastern Giant Buddha and the Back Wall

The following conservation concept, in individual parts already successfully realised in 2008, should be continued in 2009 and completed until the end of the year.

The practical, on-site conservation work on the Eastern Buddha includes various tasks:

- Stabilization of the multi-layered clay plaster dating from the time of construction, with often surviving remnants of the original polychromy;
- Stabilization of Eastern rock slabs (c. 1–10 cm thick) which are sheering off parallel to the cliff surface;
- Stabilization of larger rock slabs with a thickness of more than 3 and up to c. 30 cm, sometimes a square meter or more in surface area;
- Stabilization of the large-format rock fragments salvaged from the rubble which have traces of workmanship from the time of construction (“dowel holes”) or surviving remnants of the clay plaster.

The adhesion problems of the clay plaster, which is endangered almost everywhere, involve not only adhesion of the three plaster layers to one another but also adhesion of the plaster to the rock. Irrespective of the size and extent of damages, stabilization is only possible if suitable adhesives are used. In numerous cases additional mechanical stabilization measures must also be undertaken because of the substantial weight of the centimetre-thick plaster layers. Since all the plaster layers (as well as the stone!) react extremely quickly to moisture, optimal adhesives are those that can be applied using as little moisture as possible. The viscosity of the adhesive is adjusted to the size of the cavity between the individual plaster layers. The method of application (using tubes, syringes, spatulas or other suitable aids) is also determined by the size and/or geometry of the damaged site.

In order to further stabilize the original clay plaster layers (that is, the actual artistically formed surfaces) it is necessary to secure their edges by using sloping in-fills between the background stone and the consolidated surfaces; this is done with the same adhesive, which has to adhere not only to the stone but also to and on the plaster layers.

Depending on the size of the clay plaster surface, mechanical consolidation in the form of stabilizing dowels can also be necessary. Glass fibre dowels with a diameter of 1–3 or 5–30 mm or, for larger blocks, stainless steel dowels of appropriate length and thickness are used. To improve anchoring the glass fibre dowels are coated with sand using an acrylic adhesive.

The adhesive has to adhere to and between the clay plaster layers, and it also has to be possible to apply it to the stone. Following comprehensive testing, the product Ledan (developed in the heritage conservation field in Italy) was determined to be suitable; it can be modified as needed using properly prepared clay or sand from pits in the Bamiyan valley. Experience so far has proven that there is a sufficiently stable adhesion of all surfaces without the danger of saturating the clay plasters. All the other

adhesives tested either lacked the appropriate properties or were unsuitable because of application problems on site. Adhesives of modified lime without additives are ruled out because of the working conditions at the site (high temperatures, low humidity, minimization of water content). The use of adhesives based on synthetic resins was rejected on principle.

The use of a considerable portion of clay or sand with the adhesive ensures compatibility and durability, and also means it is possible to work according to the principles of the Venice Charter. If necessary hair, straw or even synthetic fibres (Dralon) can be added to the adhesive.

Mechanical stabilization (stainless steel dowels) is also always necessary for the safeguarding of larger pieces of stone. Adhesion alone would be irresponsible because of the potential dangers of earthquakes.

All the necessary drilling for placement of the dowels is planned so that no historic surfaces will be damaged (drilling will be on surfaces that are already weathered). Nevertheless, drilling is problematic because the “cliff” is a sedimentary rock with inhomogeneous materials of differing strengths. Vibrations, also from hand-held drills, are extremely dangerous to the fragile surfaces. The stabilization work often has to proceed in stages: first consolidation of the endangered Eastern-scale remnants of clay plaster, followed by the necessary drilling work and finally consolidation of larger components.

This process also involves making the plaster layers plastic enough to be pressed back to their original position. They have to be supported while the adhesive sets.

This procedure can also be used to stabilize cracks, fissures and (depending on the thickness of the plaster remnants) stone slabs up to about 2–3 m² which are sheering off parallel to the rock surface. Suitable dowels can be installed up to a depth of c. 1 m. using hand-held drills.

More extensive mechanical stabilization measures which can only be carried out with suitable mounted drills are also necessary at quite a few locations.

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