Sacred Heart of Jesus, Fontana

Restoration Method Statement

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1.0 Aim of the project

The aim of the project is to conserve and restore that Fontana parish church, located in St Margarete Square, Fontana, Gozo. This study gives general information about its history and its condition assessment. Furthermore, the restoration method statement is further discussed. Through the conservation project; the functional, aesthetical and social value of the building will be enhanced.

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2.0 Historical information

The church dedicated to the Sacred Heart of Jesus was built to accommodate the citizens who lived in the outskirts of Rabat, Gozo. The church was initially designed by architect Pasquale Celleja and was later modified by architect Vincenzo Mercieca.The foundation stone of the church was laid on 29th January 1892. However, it took twelve years to completely build the church due to lack of funds and the project was finally completed in 1905. The church was established as a parish church on 27th March 1911 by Bishop Giovanni Maria Camilleri[1].

Although the church was constructed in the late nineteenth century, the church is baroque in style having a single bell tower which extends from the main doorway to the pinnacle and ionic columns are present. The church was constructed out of soft Globigerina Limestone.

Around ten years ago, the dome of the church was restored and the weak stone was replaced with new ones as seen in figures 2 and 3.

[1] Bezzina, J. (1986). "Storja ta' Ghawdex- Fontana u Grajjietna". Malta: Gozo Press.

Figure 3 View of the upper part of the dome showing some replaced stone.

3.0 Condition assessment

The church appears in a stable condition and has been documented through visual observation. In addition, the condition of the building was mapped out on the plans presented with the document and detailed photographic records were also taken to assist in the assessment of the building.

The following section describes the various deterioration phenomena affecting the structure.

3.1 Surface erosion

Surface erosion is a common deterioration factor which affects the soft Globigerina limestone when exposed to soluble salts and moisture. Most of the stone material of the church is stable however on certain areas of the church, powdering and flaking of the stone is present. Most probably this is due to the crystallisation of soluble salts close to the surface of the stone.

Soluble salts generally penetrate the stone in solution. In high temperature and relative humidity (RH), the moisture evaporates from the stone. If water evaporates slowly from the stone, the soluble salts are transported to the surface of the stone and crystallise to form salt efflorescence. This does not harm the stone but can be aesthetically unpleasing. However if the rate of evaporation is fast, the soluble salts do not reach the surface of the stone and crystallise beneath the surface of the stone, resulting in powdering and flaking of the stone as seen in the following figures. Soluble salts can penetrate the stone through rising damp, atmospheric pollution/sea aerosol or past intervention.

Surface erosion, flaking and powdering is mainly found on the lower part of the church as seen in figures4 till 6. In this case, moisture having soluble salts have penetrated the stone matrix through rising damp and thus the lower stone blocks were affected by surface erosion.

In addition, on certain structures found on the upper part of the church, surface erosion is also present. This most probably is due to the constant wetting and drying cycles as seen in Figure 7.

Figure 4 Alveolar deterioration present on the lower part of the facade.

Figure 5Powdering, and flaking of stone present on the lower part of the façade.

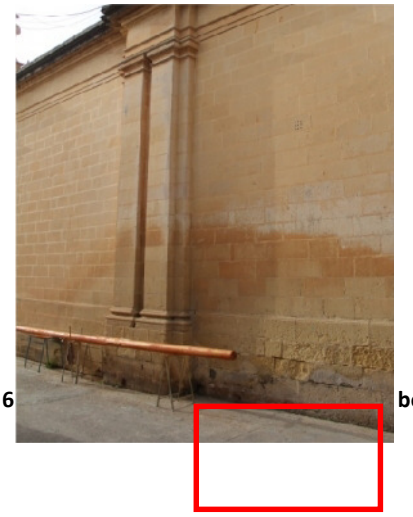

Figure 6 bottom

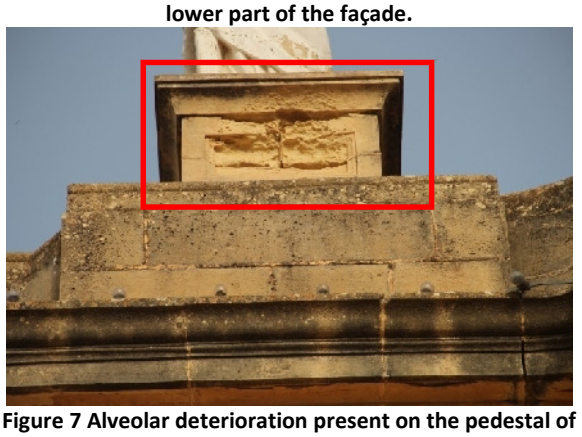

Figure 7 Alveolar deterioration present on the pedestal of the statue.

3.2 Lacunae and losses

Small lacunae are present on the church. This loss was possibly caused through impact damage as seen in Figure 8. Furthermore, losses are also present on the back left corner of the church as seen in Figure 9. This was probably broken through impact damage caused due to negligence or vandalism. The missing stone affects the legibility and aesthetics of the stone building.

Figure 8 View of missing details present on the lower part of the ionic columns.

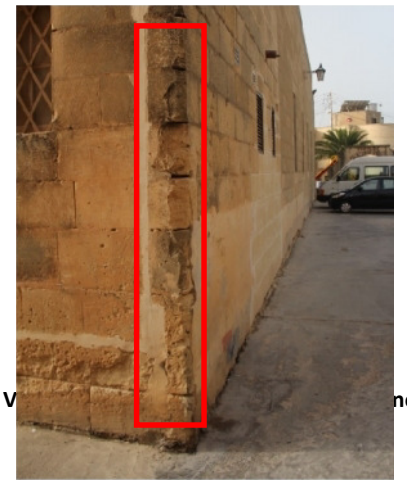

Figure 9 V ner of the

In certain areas, losses in the joints are present. This is probably caused due to weakening of the material due to soluble salts which penetrate the stone matrix through capillary action or due to stresses in the building resulting in separation between one stone and the other. The following figures show losses in the joints.

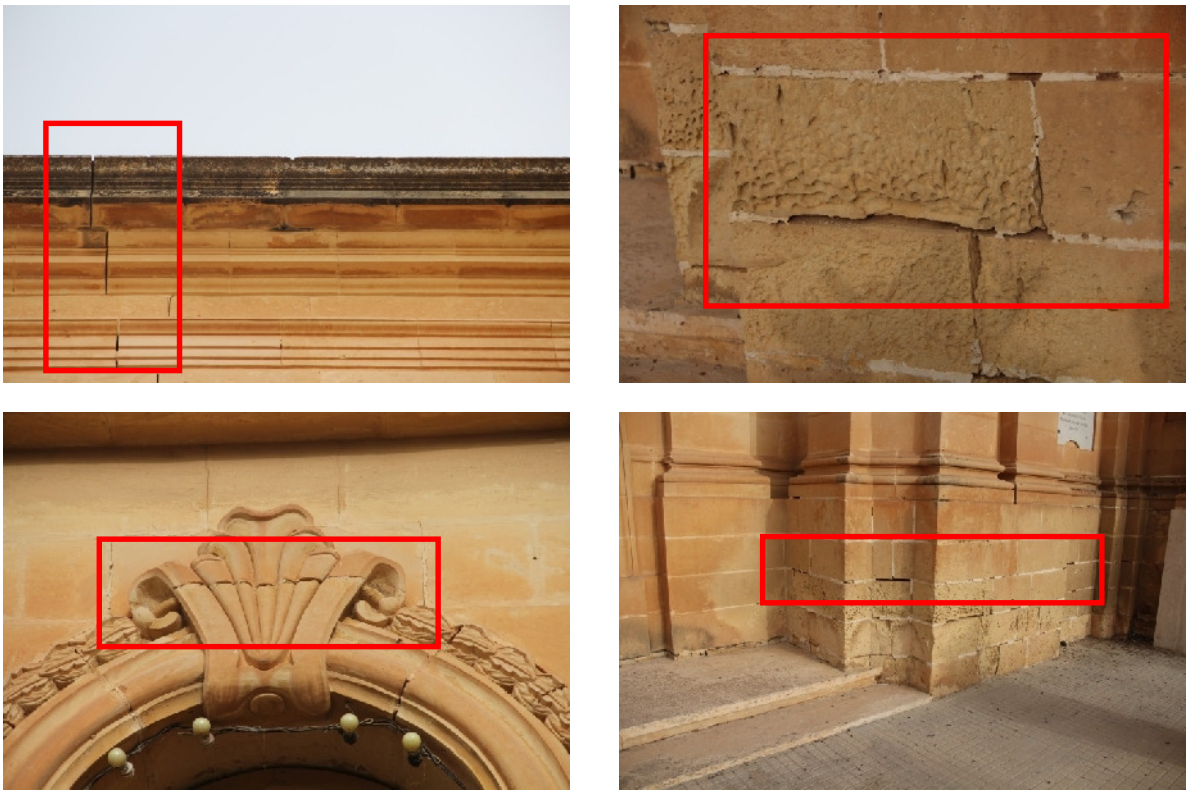

Figure 10 View of joint losses present around the church.

3.3 Black crust

Black crust is observed in sheltered areas mainly underneath cornices and bulging architectural featured seen in Figures 11 and 12. Black crust develops generally on areas protected against direct rainfall or water, in urban environments. It adheres firmly to the substrate and is composed mainly of particles from the atmosphere trapped into a gypsum ($CaSO_4.2H_2O$) matrix. This layer absorbs dust and particulates from atmospheric pollution (burning of fossil fuels) and results in a black layer of gypsum.

Figure 11 View of black crust formation present beneath the cornice.

Figure 12 View of black crust formation present beneath the cornice of the facade.

3.4 Cement rendering

Oil based paint and cement based rendering were both used in the past to cover losses in the stone. This is mainly found on the bottom part of the church (Refer to the figures below). The cement is considered 'stronger' than the Globigerina Limestone causing the original stone to deteriorate prior to the cement render.Furthermore, oil based paint does not allow the stone to 'breath'. This insoluble layer traps the soluble salts beneath the paint layer or in the stone matrix resulting in powdering and flaking of stone.

Figure 13 View of cement and oil paint present on the bottom areas of around the church.

3.5 Biological growth

Biological growth is present on the surface of the church. This mainly includes lichen and algae growth. The appearance of the biological growth is grey-green in colour and thus, affects the aesthetic appearance. The façade has less biological growth when compared to sides and back of the church. The biological growth present on the façade is only observed on the decorative features including the cornice.

Figure 14 Biological growth present on the side of the church.

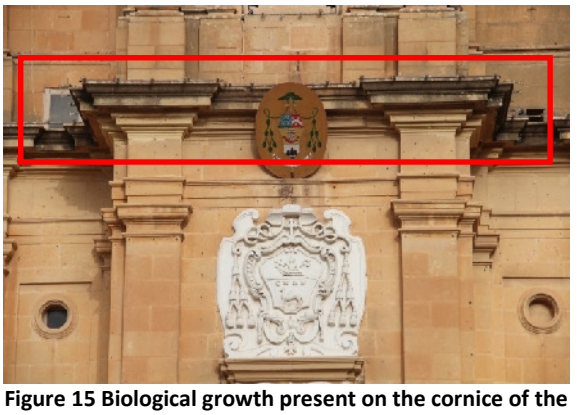

Figure 15 Biological growth present on the cornice of the facade.

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3.6 Bird deposit

Bird deposit is present on certain areas of the church. This affects both the aesthetics and the physical composition of the stone's surface. The bird droppings can induce pitting of the stone's surfaceas acids are released from their excrement.

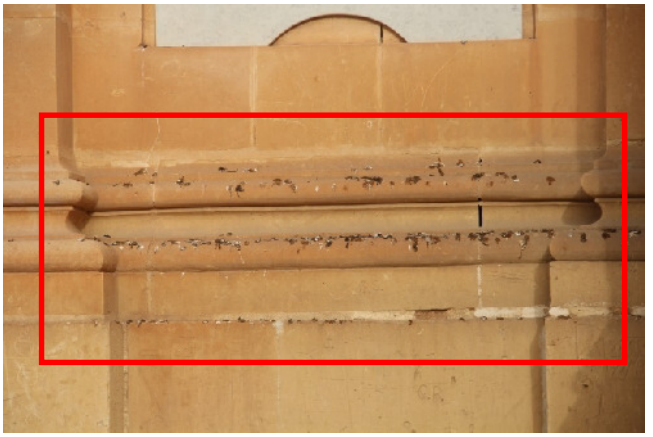

Figure 18 Detail of bird deposit present on the facade of the church.

3.7 Graffiti

Graffiti obtained from scratching the stone surface is present on the lower part of the walls as seen in the following figures. This can affect the aesthetics of the church.

Figure 19 Detail of engraving on the stone's surface.

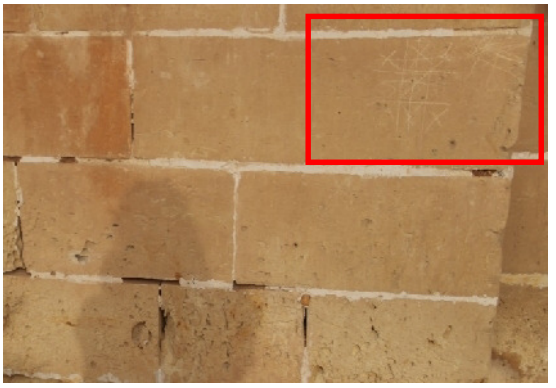

Figure 20 Detail of engraving on the stone's surface.

3.8 Rusting nails/hooks

Rusting nails/hooks are present on the church. These are generally used to hand decorative lighting around the church. Rusting of iron may result in cracking and staining of stone. Iron oxides are driven by water from the rusting nails causing a brown stain on the stone.

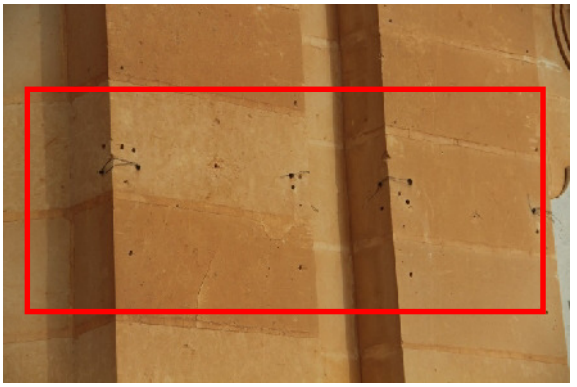

Figure 21 View of iron nails and hooks.

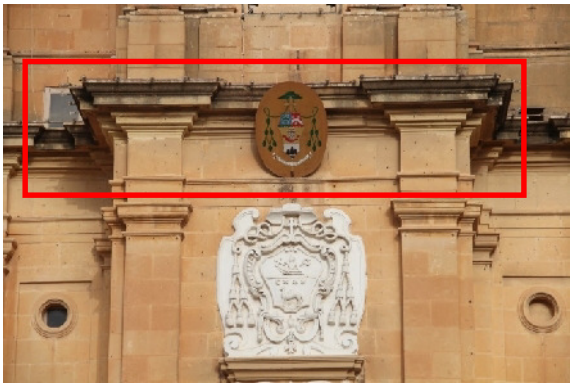

Figure 22 View of iron nails and hooks.

4.0 Restoration methods

The conservation-restoration treatments adopted for the building will depend on the deterioration present. Through the conservation-restoration treatments the function, aesthetic and visual appearance will be enhanced.

The following conservation-restoration treatments described below outline the possible treatments to be conducted in sequence. However, the definite proposal of treatment will only be adopted once a close observation and possible tests are conducted.

The possible treatments are:

- Written and photographic documentation
- Removal of cement repairs and flaking/defective paint renders
- Cleaning
- Re-application of missing architectural features and lacunae
- Re-application of mortar joints and finishing
- Re-application of finishes
- Cleaning and stabilisation of iron elements

4.1 Written and photographic documentation

A written document entailing the treatments will be conducted so as to hold record of treatments for further conservation-restoration treatment. Before, during and after photos will be taken so as to hold visual record of the process conducted. Through the deterioration phenomena observed in relation to their context, one can hypothetically propose various preventive and active conservation treatments.

4.2 Removal of cement repairs and flaking/defective paint renders

The cement repairs and defective paint renders will be entirely removed. This will be done with the use of hand held tools. The process will be done manually using appropriate hand tools and care will be taken when removing the cement/paint layers so as to decrease the chance of scratching the stone fabric. Tools such as hammers and chisels, scalpels and surgical knives can be used to remove cement and defective paint renders. To prevent further damage on the stone surface, no grit or sand blasting will be used.

4.3 Cleaning

Cleaning tests will be carried out on the building prior to starting cleaning. This will be done to identify the extent of cleaning needed, to recognise the mechanical stability of the stone fabric and to identify the best cleaning method and the least harmful for the stone fabric and the conservator. Cleaning will be carried out in a way which ensures that the stone patina is well conserved.

4.31 Cleaning of biological growth

Biological growth present on the stone surface will be removed with the use of deionised water and a bristle brush after which the application of a suitable agent such as a biocide can be further introduced. After the use of agents, the stone will be washed thoroughly to remove any chemical residues to prevent further damage to the stone. No grit and sand blasting will be used to prevent harming the stone surface.

4.32 Cleaning of black crust

Any presence of black crust will be further removed/ reduced with the use of poultices made from paper pulp dipped in a low concentration of a suitable agent such as EDTA. After such application, the stone area will be further washed to remove the chemical residues.

4.4 Reconstruction of missing architectural features and lacunae

Where possible, the reconstruction of missing architectural features and lacunae, will be modelled with the use of a mortar which is compatible to the local Globigerina Limestone. This treatment is commonly known as plastic repair. In this case, a lime-based mortar will be used. The mortar will be composed of hydraulic lime which is used as a binder and Coralline Limestone powder (*ramel*) together with Globigerina Limestone powder (*xahx*) will be used as aggregates. A ratio of 1:3 will be used, therefore for one part binder, three parts aggregates will be added.

When the reconstruction using mortar is not considered stable enough, a replica in Globigerina limestone will be used. This will be attached to the building with the use of a dowel (carbon fibre dowel or stainless steel dowel) and an adhesive (two-part epoxy resin). When conducting a reconstruction, the same technique used to build the original building will be adopted.

4.5 Re-application of mortar joints and finishing

After the removal of cement and paint renders and conducting any cleaning, any missing joints will be sealed with the use of a lime based mortar. The composition of the mortar is described in section 4.4. Trials of mortar pointing will first be carried out both without and with the addition of Pozzolana to decide on which colour of the mortar best complements the stone patina.

4.6 Re-application of finishes

A lime wash will be applied on the surface of the stone (mainly applied on the upper part of the church, statues and decorative features where the previous white old rendering was present). The lime wash will be prepared by mixing hydraulic lime with water and inert colour additives until a dilute consistency is formed. The inert colour additives will be added so as to match the colour of the original stone or original painted areas. Three coatings of lime wash will be applied to provide maximum protection against the harsh environmental conditions.

This composition is used to create a porous layer which will then act as a sacrificial layer. It will also enhance the aesthetics and legibility of the church but also allows the stone to "breath". Therefore the lime wash absorbs moisture from the stone and any soluble salts present will crystallise within it and not within the stone or the plastic repair. The lime wash is reversible and it prevents the formation of black crust (the lime wash will also cover any black crust present on the stone; hence it reduces the disfiguring effect of black crust).

4.7 Cleaning and stabilisation of iron elements

The pins and hooks which are not used, should be removed to avoid harming the stone. Furthermore, tannin rust should be applied on the iron elements to protect the iron metal from rusting. In addition, pins and hooks which are in a bad condition should be replaced with new ones.

4.8Detailed observations

As observed in Figure 23, the façade appears to be in a stable condition. Plastic repair is needed on the lower part of the façade. Cleaning of biological growth is needed on the upper half of the façade. With regards to the back side of the church, cleaning heavily of biological growth is required. Furthermore, the removal of cement and paint render present on the bottom part of the back side of the church is required. In addition, missing blocks and features should be reconstructed with the use of plastic repair or stone blocks.

With regards to the left and right elevations (refer to Figures 25 and 26), cleaning of biological growth and removal of cement renders should be conducted followed by plastic repair and re-pointing of joints. The membrane present on the roof appears to be in a stable condition. I do not recommend replacing the membrane (refer to Figures 27 and 28). However, the dome and certain decorative features have cement renders which need to be removed. A lime wash can be further applied to serve as a protective coating as already explained previously.

Fig ch.

Figure 24 View of the back side of the church.

Figure 25 View of the left elevation of the church.

Figure 26 View of the right elevation of the church.

Figure 27 View of the roof.

Figure 28 View of the roof.

5.0 Detailed photographic images of the church.