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# The façade-tower of Santa Maria delle Stelle church in Comiso. Historical events, vulnerability and conservation strategy

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# The façade-tower of Santa Maria delle Stelle Church in Comiso. Historical events, vulnerability and conservation strategy

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**Abstract**

After recalling the historical events of the construction of the façade-tower of Santa Maria delle Stelle Church in Comiso, begun in 1736 and finished two centuries later, the contribution focuses on the theme of the completion of its structure with the use of reinforced concrete, designed by the engineer Santoro Secolo. In more recent times, some sudden collapses have highlighted the theme of risk and the need to reintegrate the structure. Maintenance and conservation strategies are discussed in the final part of the text.

**La facciata-torre della chiesa di Santa Maria delle Stelle a Comiso. Vicende storiche, vulnerabilità e strategie per la conservazione**

Dopo avere richiamato l'estesa vicenda storica della costruzione della facciata-torre della chiesa Madre di Santa Maria delle Stelle a Comiso, iniziata nel 1736 e terminata due secoli dopo, il contributo è focalizzato sul tema del completamento della sua facciata con l'uso della struttura intelaiata di calcestruzzo di cemento armato, progettata dall'ingegnere Santoro Secolo. In tempi più recenti, alcuni dissesti improvvisi hanno posto in evidenza il tema del rischio e la necessità di interventi per risanare la struttura architettonica.

Keywords: Comiso, Façade-tower, Completion, Reinforced Concrete, Conservation.
Comiso, Facciata-torre, Completamento, Cemento Armato, Conservazione.

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## 1 | Introduction

The essay retraces the complex history of the construction of the façade-tower of Santa Maria delle Stelle Church in Comiso, begun in 1736 on a project by Rosario Gagliardi and completed with the construction of a bell tower in reinforced concrete two centuries later, marked by disputes and heated debates on the five different completion plans proposed over time.
The violent earthquake that struck the Val di Noto in 1693 determined the collapse of the former façade. In 1736, the Chapter of the Church decided to build a new one and commissioned Rosario Gagliardi to elaborate the project. The architect conceived a tower-façade, but he directed its construction only until the lower part was realized due to a sudden interruption. The work began again in 1880 on a new project by the engineer Giovanni Galeoto, who continued the façade until reaching the second order. The construction site stopped again, and it was necessary to wait until 1936 for the completion of the façade, with the conclusion of the third level designed by the engineer Santoro Secolo. He grafted a stone-clad reinforced concrete structure to the masonry structure, completing the tower with its belfry [Gatto 2007, 8-58].
The front of the mother church in Comiso turned out to be the highest among the churches of the Diocese of Ragusa (over 52 meters) and, in general, among the highest in Sicily. After the completion of the works, the façade appeared as a complex architectural body, one of the most significant examples of Sicilian façade-tower with a belfry in the last order.
After almost sixty years, it was necessary to intervene again to restore the serious damage caused by a collapse in 1994: a lightning struck the large stone sphere at the top of the tower. The globe broke away and fell down breaking the church's roof, the painted wooden ceiling and the pave-


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ment. A final reflection wants to underline the importance of monitoring, analysis of vulnerability and maintenance intended as fundamental conservation strategies.

## 2 | From the foundation of the church to the earthquake of 1693

From the 1420s, the history of the fiefdom of Comiso was linked to the presence of the Naselli family who, with the favor of King Alfonso of Aragon, stimulated urban growth with the arrival of new families and the assignment of titles and privileges. In 1724, the Marquises Trigona asked architect Rosario Gagliardi, a native of Noto, to design their residential Palace; later, he will be commissioned by the Chapter of the Mother church to elaborate a project for its unfinished façade. The growth of the urban center continued without interruption until the seventeenth century and, although the earthquake of 1693 had caused breakdowns and some victims, the community promptly reacted repairing the damages and erecting palaces and churches [Stanganelli 1977, 77].

The year of foundation of Santa Maria delle Stelle church is not known, but Santa Maria del Mulino church existed in that site since the Middle Ages and, according to some hypotheses, the new church may have been built in 1480 incorporating its remains [Lauretta 1998, 123; Lena 1976, 41-48]. The study of documents in the parish archives conducted by Giuseppe Berenato has added some proven annotations about the historical reconstruction, and has highlighted the registration of an enforceable canon (1557) and two deeds drawn up by the notary Meli (1581, 1600); moreover, the existence in 1596 of the Congregation of the SS. Sacrament has been attested in the mother church [Berenato 1999, 1; Stanganelli 1977, 172].

The first intervention to face the deterioration of the building and protect its artistic equipment was carried out in 1637 [Stanganelli 1977, 76] on the initiative of the parish priest Barbante who, together with the citizens, pledged to raise the funds: «i giurati dell'università deliberarono di concorrere alle intraprese riparazioni, con onze 100 per un solo triennio, imponendo a tal fine su gli abitanti una soprattassa di 8 piccoli, sopra ogni tumulo di frumento molito»[1]. From 1541, the local workers formed their guilds and were very involved in the reconstruction after the earthquake of 1693, which caused serious damage to the church and the collapse of the upper part of the façade [Gurrieri 1976, 83].

A report found in the parish archive confirms that on the day «undici di gennaro seconda inditione 1693 giorno di domenica ad hora ventuno e un quarto fece un terremoto fortissimo che in questa terra cascorno la maggior parte delli casi, cascò tutta la Matre Chiesa, S. Antonio, la Madonna del Carmine, la Catina, e restò in piedi la chiesa della SS. Annunziata, la chiesa del SS. Nome di Gesù, S. Biagio, S. Giuseppe, Monserrato, S. Lunario, Gratia, Immacolata, Monastero S. Maria Regina delli cieli grandemente lesionati che tutti si dovettero presto riparare»[2].

## 3 | The reconstruction of the church and the long history of its façade-tower

Immediately after the earthquake, Baldassarre IV Naselli sent a mandate to rehabilitate the church of Santa Maria delle Stelle and in December 1699 the Bishop of Syracuse consecrated and dedicated the church. A 1707 contract demonstrates the execution of maintenance and embellishment works[3], later also requested in 1736[5] [Amico 1855, 345; Gurrieri 1976, 84].

From the third decade of the eighteenth century, the focus was mainly on the completion of the church through the construction of its main front, and many versions were proposed: the projects of Rosario Gagliardi (1736-1739), Peralta, Giovan Battista Cascione Vaccarini (1773), and Giovanni Galeoto (1880-1884) who built the first two orders. Later, the façade was completed by the engineer Santoro Secolo, who built the third order in 1936. According to Marco Rosario

[1] Diocesi di Ragusa, Archivio Parrocchiale della chiesa di Santa Maria delle Stelle (APSMS), Acta Misc., ser. III f. 13/VIII f. 12.

[2] Diocesi di Ragusa, APSMS, *Diario della ex Chiesa del Gesù*, fol. 56.

[4] Modica, Archivio di Stato (ASM), Notaio Rascitti Mallia Paolo, 70, Vol. 19, cc. 62.

[5] ASM, Notaio Francesco Salvo, 72 (30), cc. 122-123.

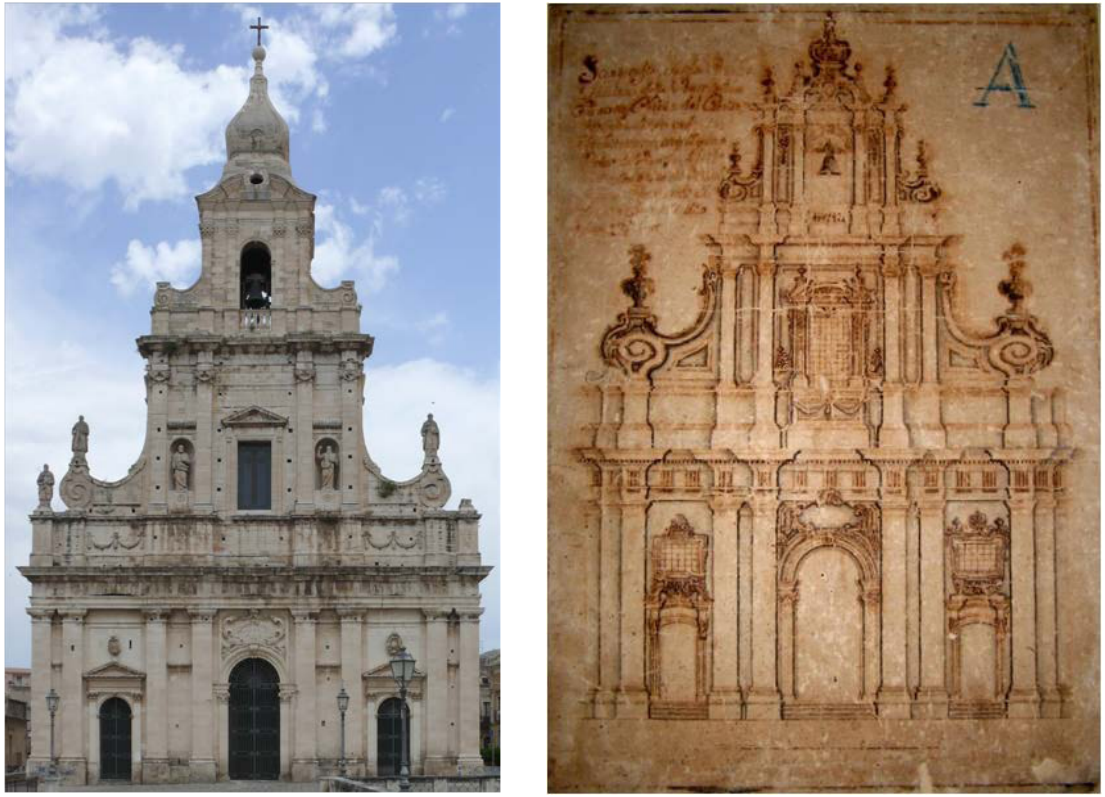

Fig. 1-2: Comiso (Ragusa), Santa Maria delle Stelle church, comparison between the photogrammetric image of the main façade [Gatto 2007] and the design by Rosario Gagliardi elaborated in 1736.

Nobile «non vi è dubbio che nel prospetto chiesastico delle chiese madri si concentrarono le aspettative e le ambizioni di vescovi, di parroci, di ricchi finanziatori e anche di intere comunità cittadine […]. È per questi motivi che anche in piccoli centri lo sforzo di pervenire a risultati moderni e all'avanguardia venne perseguito con tenacia. Le concordi volontà di magnificenza naturalmente non escludevano le dispute, la conflittualità delle posizion» [Nobile 2000, 13].
The construction of the façade began under the direction of Gagliardi, who raised it to the height of about five meters[4]. Giovan Battista Cascione Vaccarini, in a writing of 1773, notes that «si puol continuare a fabricare sulli pilastri e membretti del prim'ordine di detta facciata fatta sino all'altezza di palmi 20 sulle di loro basi formati con pezzi d'intaglio di pietra forte grossi palmo 1» [Nobile 2000, 78]. In the *Lexicon Topographicum Siculum* (1757), Vito Amico observed that «lungi di là spicca il tempio maggiore del titolo di S. Maria della Stella, di scultura elegante ed ampia […]. Finalmente ne è in costruzione un esimio prospetto, ma presenta oggidì la sola parte inferiore» [Amico 1855, 345].
The design of the façade-tower drawn by Gagliardi became a source of inspiration for the subsequent projects of Giovanni Galeoto (1880-1884) and Santoro Secolo (1933-1936), defining in its essence the character of the façade that can be observed today. The conformation has some traits in common with the façade of San Giorgio church in Ragusa Ibla, although with less plastic movements. The façade-tower has three overlapping and decreasing orders, connected by spirals; it culminates with the insertion of the bell tower and the bulb termination, which is

[4] ASM, Notaio Francesco Salvo, 72 (30), cc. 122-123.


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typical of the bell towers. In June 1754, Gagliardi was certainly in Ragusa to follow the laying of the cornice of the first order, so it is possible that he was also in Comiso to direct the construction of the façade too [Nobile 2000, 82, 90]. Giovan Battista Cascione Vaccarini elaborated the second proposal for the façade of the Mother Church, in two neoclassical orders not realized [Filangeri 1977, 137]. The first two orders of today's façade are the work of engineer Giovanni Galeoto from Comiso, who conceived them sensing the suggestions of Gagliardi's original proposal and completed them in 1884 making use of the local "Comiso stone". The works remained stationary for about fifty years and in the parish archive some drawings of intermediate completion proposals have been preserved, conceived by an anonymous designer (and without date); of these proposals only one entablature seems to have been made in 1907, based on a design by Francesco Giardina. In 1907, the "devotee Francesco Giardina" (as he used to sign) donated a volume, about 45x60 cm, made of 41 sheets, containing 76 drawings, with the pictorial reliefs of the church. On the cover, the author reports: *Collection of ancient painting in the Madrice Church of Comiso*. A proposal to complete the façade with the inclusion of a bell tower is part of the collection.
This testifies there was a wide debate on the subject of completion, which lasted some years until the concrete realization of a third proposal. In fact, the third order will then be designed and built between 1934 and 1936 by the engineer Santoro Secolo, closing the final completion of the facade tower with extensive use of structural elements in reinforced concrete. The reinforced concrete structure consists of a framed system with a constant section, including four levels of horizontal beams connected by inclined pillars in order to follow the progression of the bulb termination. The engineer Secolo was a diligent professional who directed various interventions in the city; among the first to try the use of reinforced concrete even in the context of historic monumental buildings. The information on Santoro Secolo's biographical profile is limited but it is known that he obtained a degree in Ingegneria Civile at the Regia Scuola di Applicazione per gli Ingegneri di Torino, in the same cultural climate where Francesco Bongioannini had studied shortly before. The engineer Bongioannini inspired the first Italian ministerial decree "Sui Restauri degli edifizi monumentali" and Circolare 683 bis entitled "Disposizioni relative ai restauri degli edifizi monumentali" issued in 1882. After elaborating a meticulous metric survey of the church, he proposed a project characterized by the bulb termination with a sphere and a cross in order to give greater impetus to the bell tower. For the termination of the façade, Secolo conceived an internal skeleton made of reinforced concrete elements, intermediate floors and an iron staircase connecting to the bell tower above [Gatto 2007, 43].
After the insertion of the third order, the façade reached a marked verticality (for its height of about fifty-two meters), sought by the engineer to satisfy the request of the Diocese to have one of the highest church façades in Sicily, surpassing in height the front of the nearby church of the Annunciation. This record refers to the year 1936; later the construction of other sacred buildings exceeded this height. Secolo personally directed the works on site, and through his bell cell he ended the long construction process of the façade-tower in the mother church of Comiso, which began with Gagliardi [Lauretta 1998, 125].

## 4 | Reinforced concrete and monuments at the beginning of the twentieth century

At the end of the nineteenth century, reinforced concrete began to be widely used both in new buildings and in existing ones and, during the first decades of the twentieth century, enthusiasm for new material also involved the disciplinary field of restoration, but without adequate prelim-

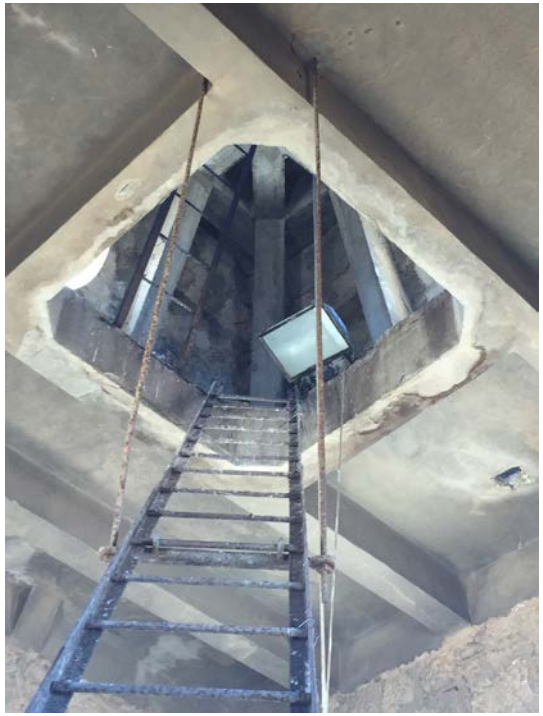

Fig. 3: Santoro Secolo, project of the last order of the façade-tower with the bell cell, Diocesi di Ragusa, APSMS.

Fig. 4: Interior of the belfry in the upper part of the façade-tower; the structural frame of reinforced concrete is highlighted, 2018 (photo by the authors).

Fig. 5: Santa Maria delle Stelle church with its façade raised up to the level of the second order; the construction site has been interrupted since 1884, Diocesi di Ragusa, APSMS, f. Globo II.

Fig. 6: Building site for the completion of the third and last level of the façade-tower; the bell-cell can be observed under construction, Diocesi di Ragusa, APSMS, f. Globo II.



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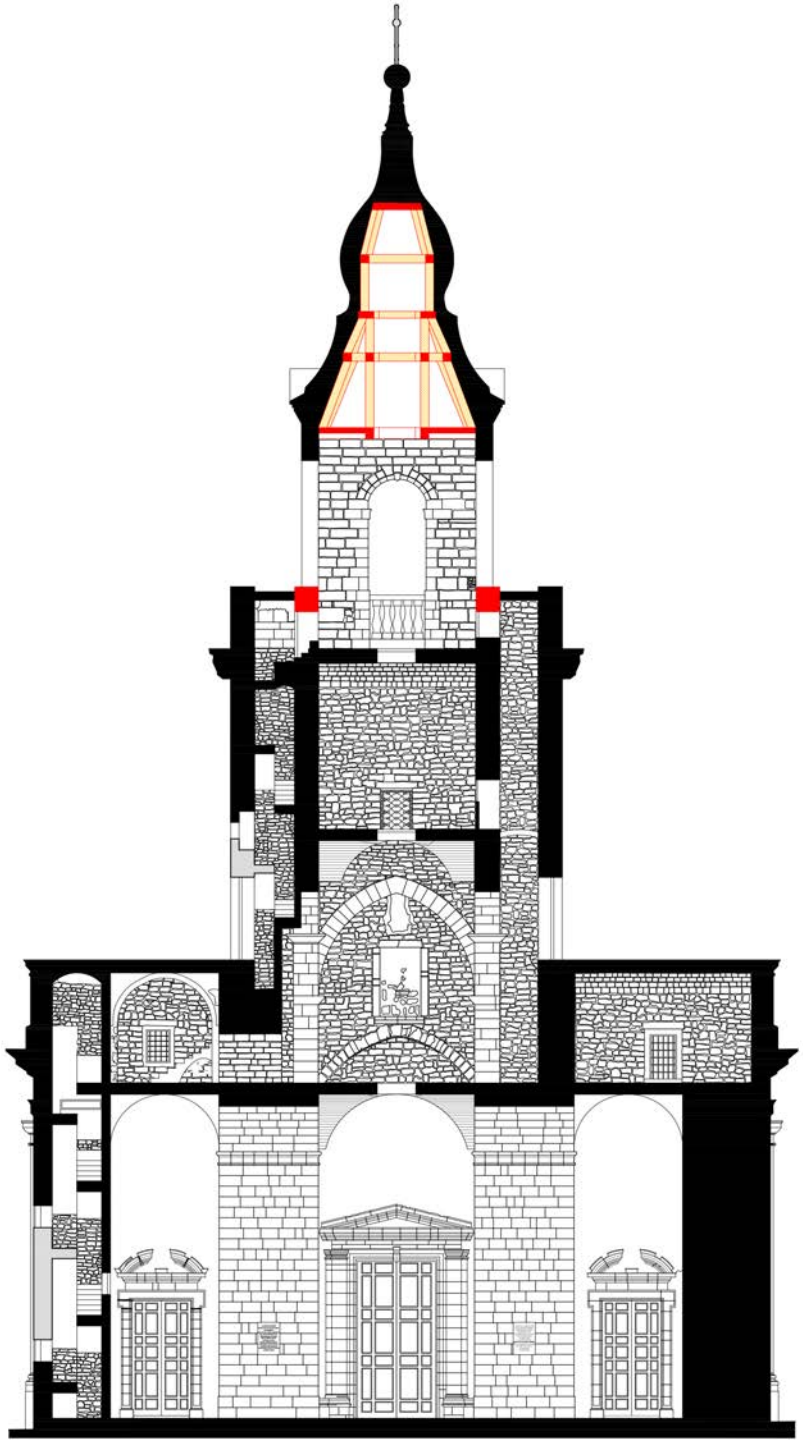

Fig. 7: Comiso, Santa Maria delle Stelle church, architectural survey of the façade-tower, section of its structure. The reinforced concrete elements are highlighted in red [Gatto 2018].

inary experimentation on its durability over time [*Architetture in cemento armato* 2008]. The use of reinforced concrete took place above all through elements to be inserted into the ancient wall structure, reduced to a mere covering. The problems of conservation of concrete structures of reinforced concrete placed in direct contact with the construction materials of ancient monuments have become very current, in recent times [Spinosa 2011, 55-57].
A clear example of this new trend is just the completion of the façade-bell tower of the mother church of Comiso according to the project of Santoro Secolo, concluded at the end of the 30s of the twentieth century. At that time, the scientific legitimacy of the use of reinforced concrete in the context of monuments had already been confirmed during the international Conference held in Athens in 1931; on that occasion «gli esperti hanno inteso varie comunicazioni relative all'impiego di materiali moderni per il consolidamento degli antichi edifici; ed approvano l'impiego giudizioso di tutte le risorse della tecnica moderna, e più specialmente del cemento armato. Essi esprimono il parere che ordinariamente questi mezzi di rinforzo debbano essere dissimulati per non alterare l'aspetto ed il carattere dell'edificio da restaurare»[10].
In the same year, a similar address was also reconfirmed in Italy by the Consiglio Superiore per le Antichità e Belle Arti, since «allo scopo di rinforzare la compagine stanca di un monumento e di reintegrare la massa, tutti i mezzi costruttivi modernissimi possono recare ausili preziosi e sia opportuno valersene quando l'adozione di mezzi costruttivi analoghi agli antichi non raggiunga lo scopo; […] egualmente i sussidi sperimentali delle varie scienze debbano essere chiamati a contributo per tutti gli altri temi minuti e complessi di conservazione delle strutture fatiscenti, nei quali ormai procedimenti empirici debbono cedere il campo a quelli rigidamente scientifici»[11].
Among the structural reinforcement experiences that contributed to the general affirmation of this trend in the restoration field are those carried out by Gino Chierici in Naples and the province, repeatedly mentioned by Gustavo Giovannoni as specimens, and by Piero Sanpaolesi in the Tuscan area inspired by the principle of "concealed scheme", or rather with stone covering elements lacking of a supporting function, the same used by Santoro Secolo to complete the façade-tower of the mother church in Comiso [Spinosa 2011, 55-57].
As with Camillo Boito, Luca Beltrami and Gustavo Giovannoni, the architect Carlo Ignazio Gavini (1867-1936) was also among the first to spread the use of reinforced concrete in the restoration site; in fact, he used it in the chaining of the last level of the bell tower in Santa Maria Church (Antrodoco, Rieti) and in the connection of the façade to the nave of Santa Maria di Collemaggio church (L'Aquila). In his work at the Abbey of San Clemente in Castiglione a Casauria (Pescara), in contrast with the practice of concealment he leaves the reinforced concrete structure connecting the aisles with the transept in sight, becoming an innovator; this attitude however caused disputes between the sector's specialists [Sette 2001, 152-154].
Even the anticipatory experience of the reconstruction of the Duomo of Messina after the earthquake of 1908, which saw the young Francesco Valenti engaged in the first experiences of consolidation and reintegration by placing the reinforced system in its remains, certainly had a decisive influence on the restorers of the time [Genovese 2010, 110-123]; as the affinities with the completion works of Santa Maria delle Stelle Church in Comiso are undeniable.
Regarding the reconstruction of Messina cathedral, Francesco Valenti was commissioned in 1923 for the architectural project and Aristide Giannelli designed the structures in 1928. The project involved the demolition of the surviving masonry, except for the apse and its valuable architectural elements; the construction of a reinforced concrete structure was concealed inside the walls and organized in closed frames according to the seismic norms issued in 1909 [Sette 2001, 142].

[10] Carta di Atene (1931), article V.

[11] Carta Italiana del Restauro (1932), article 9.

[12] Diocesi di Ragusa, Archivio Diocesano, Santa Maria delle Stelle (APDRI), Folio Globo I, telegram, August 1th, 1992.


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## 5 | The first failure of the crowning sphere of the façade

A few decades after the façade-tower was completed, the terminal part will prove less ready to stand the test of time, and during the nineties of the XX century it will be affected by a partial failure and a later collapse. On August 1, 1992, some fragments of the sphere at the top of the bell tower fell down on the underlying roofing structures. According to Giuseppe Berenato, a large fragment had detached from the lower part of the globe and, after bumping into a molding of the façade, was subdivided into fragments then falling towards the roof and the neighboring street[12].

The general static conditions of the church were not compromised, but in the report compiled following the inspection by the technicians of the Soprintendenza ai Beni Culturali e Ambientali and Genio Civile it was specified that «si evidenziano dei fenomeni di degrado della pietra di certi elementi architettonici che a causa dell'ossidazione degli elementi in ferro inseriti […] hanno determinato il distacco di elementi lapidei in corrispondenza del globo in calcare posto alla base della croce sommitale». In the same document, it was noted that «nella struttura in cemento armato sostenente la torre campanaria ubicata sul prospetto principale (che è stata realizzata negli anni '30 su progetto dell'ingegner Secolo) si notano le ossidazioni delle armature con relativo distacco del copriferro»[13].

The local press gave prominence to the collapse and the community followed with some apprehension the events, voicing the desire for the mother church to be reopened to the public as soon as possible. According to the description of the structural failure, «il pezzo precipitato è la quarta parte di una sfera di pietra, dal peso di quattrocento chili e dal diametro di un metro, posta a cinquantadue metri dal suolo, che cadendo ha sfondato il tetto della matrice e divelto alcune tavole del soffitto ligneo» [Rimmaudo, 1992; Brancato, 1992b].

The work to remedy the damage was prepared in an emergency and began on August 5 of the same year[14]. The technicians of the Genio Civile and Soprintendenza Department who directed the consolidation works judged that, in general, the structures of the church did not present worrying risk situations; however, it was remarked «nella torre campanaria […] mostra qualche ruga inquietante l'armatura in ferro che è in via d'ossidazione» [Brancato, 1992c]. Once the work was finished, the church was reopened for worship.

## 8 | The collapse of the globe at the top of the facade-tower

On February 13, 1994, at about nine o'clock in the morning, while a religious function was underway, a few moments after having heard the forceful noise of a thunder during an intense storm, the massive sphere placed on top of the façade-tower precipitated ruinously, causing serious damage to the church. In the rapid descent, the heavy globe, its metallic trellis of anchorage to the summit bulb and the three-meter-high iron cross fixed on it caused a large gash in the roofs corresponding to the main nave of the church, in the painted wooden planks which forms the ceiling and in the pictorial canvases applied to it. Reaching the ground inside the church, the heavy sphere caused a significant damage to the pavement [Strada 1994; Rimmaudo 1994].

During the inspection carried out the following day, the necessity of «interventi urgenti di consolidamento e restauro» was highlighted specifying that «bisognerà accertare se l'energia liberata dal fulmine non abbia compromesso la stabilità della parte terminale della facciata a partire dalla loggia campanaria; la copertura della navata centrale presenta uno squarcio di circa sette metri che ha interessato un solaio in cemento armato di laterizi e travetti poggiante sulle capriate lignee, due delle quali sono crollate completamente, altrettanto dicasi per il controsoffitto ligneo

[13] Ministero dell'Interno, Direzione Generale della Protezione Civile, Comando provinciale di Ragusa, report of the day 1 august 1992.

[14] APDRI, Phonogram n. 575.

[15] Regione Siciliana, Soprintendenza ai Beni Culturali di Siracusa, Sezione dei Beni Paesaggistici, Architettonici ed Urbanistici (SBCASA), Inspection report by Salvatore Mancini.

[16] Ibidem.

[17] Ibidem.

[18] Regione Siciliana, Soprintendenza ai Beni Culturali e Ambientali di Ragusa, Servizio per i Beni Storici, Artistici ed Etnoantropologici (SBCASS), Historical-artistic report by Rosa Carollo and expertise of April 2.

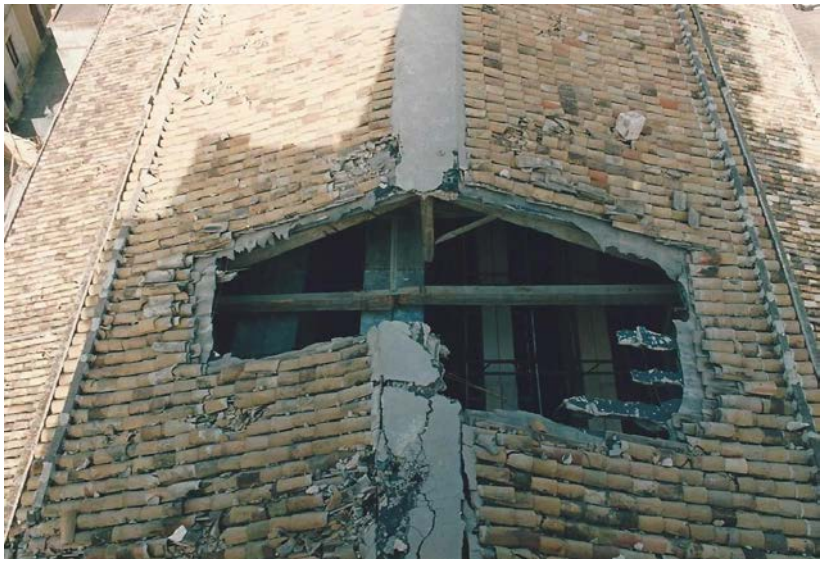

Fig. 8-10: Disconnection of the masonry following the detachment of the sphere; Hole in the cover caused by detachment and falling of the sphere; Stone globe with cross in the central nave after falling from the bell tower [Berenato 1994].



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del Barbalonga e per una grande tela che è rovinata al suolo»[16]. About the explanation of the structural collapse it was thought that «il fulmine possa essere stato attirato dalla grande massa ferrosa del traliccio di sostegno delle campane, traliccio reso solidale alla struttura in cemento armato che costituisce l'ossatura portante rivestita di calcare intagliato della cella campanaria. Quest'ultima parte della facciata fu finita infatti di costruire nel dopoguerra, su progetto dell'ingegnere Santoro Secolo e come si evince anche nella relazione redatta nell'agosto del '92 in occasione del crollo della sfera, il cemento armato dell'epoca presenta numerosi punti di discontinuità con molti ferri in vista»[17].

As already mentioned, the seventeenth century painted wooden ceiling, enriched by the canvas attributed to Antonio Barbalonga Aliberti, was partially broken down and suffered extensive damage[18].

The Church of Santa Maria delle Stelle was declared unusable once again and the regional councilor Giuseppe Drago went to Comiso in order to evaluate the conditions of the historical building. Shortly thereafter, a joint technical table was set up between the Regione Sicilia, the Soprintendenza di Siracusa and the Genio Civile. The positive opinion for the execution of the works did not delay being pronounced and the restoration site could start in 1994. The population immediately felt the need to relocate the sphere and the cross, launching a fundraiser and a "pro restoration committee". Regarding the restoration, the possibility of making the parts to be replaced with lighter and more durable materials was not taken into consideration; it was also omitted to consider the question of the distinctiveness of the new inserts as a new stone sphere (once again of Comiso stone) and an iron cross were replaced.

After the removal of the rubble and the installation of the scaffolding on the bell tower and inside the church, it was decided to continue with the removal of unstable stone elements, the execution of small repairs, and the relocation of the new sphere with a cross having the same dimensions and materials as the original ones. Furthermore, the interventions carried out included the dismantling of the damaged trusses and the broken latero-cement floor, the reintegration of the nave roofs with new trusses laid on reinforced concrete curbs and wooden planks, with waterproofing material and tiles[19]. The funds to finance the works amount to two hundred million lire; fifty million lire were allocated to intervene on the sphere in 1992.

The reintegration and consolidation of the painted wooden planks that make up the ceiling of the central nave of the church took place between 2005 and 2007. The two oil painted canvases torn apart after the breaking of the false ceiling were carefully restored but placed in their original location only during a later restoration site[20]. The archives of the Soprintendenza di Siracusa and Santa Maria delle Stelle keep the extensive documentation inherent in each phase of the interventions on the building and on the artistic works it contains. A vast and precious photographic documentation is included in the archive of Giuseppe Berenato. Indeed, the church has been affected by an extensive restoration work in 2015, preceded by a scientific investigation campaign prepared by the "Laboratorio di Indagini e Restauro dei Beni Architettonici "Salvatore Boscarino" (Università di Palermo, Dipartimento di Architettura). Non-destructive or minimally invasive diagnostic tests were carried out under the scientific coordination of prof. Francesco Tomaselli (Università degli Studi di Palermo). The performed surveys are radar prospections, thermography, ultrasound auscultations, measurements of humidity by electrodes and video-endoscopic observations. This argument also recalls two episodes in France at the beginning of the nineteenth century that highlight some similarities with the present case study: a lightning struck the spire of the cathedral of Rouen and the same fate later befell Saint-Denis abbey.

[19] SBCASA, notes 7427/1994 and 2996/1994.

[20] SBCASS, Report and evaluation by Carmela Vella.

Fig. 11: Comiso, Santa Maria delle Stelle church after the restoration, in 2014. View of the cover of the main nave with the wooden ceiling after the reintegration and relocation of the paintings (photo by Carlo Giunta).

Jean-Antoine Alavoine (1776-1834) was commissioned in 1823 to rebuild the spire of the cathedral of Rouen. He proposed the reconstruction in cast iron according to the ancient forms since even the medieval builders would have preferred the use of cast iron instead of stone, as it is a light, homogeneous, economic and indestructible material. This material, however, had not yet been used for large-scale works.
The work received many acclaims, but it was still unfinished in 1848 when it recalled the firm opposition of Eugène Emmanuelle Viollet-le-Duc, who instead argued for the need to use the techniques and materials of the past, albeit with creativity. Furthermore, he stated that his cast iron shape should have imitated the architectural stone elements of medieval language. Finally, he questioned the combination of iron and stone as having different coefficients of expansion, oxidation processes and maintenance difficulties [Carbonara 1997, 114; Sette 2001, 132-137]. In fact, the different coefficient of expansion between stone and iron was probably one of the main causes of the collapse occurred in Comiso. The other episode concerns the flèche in Saint-Denis cathedral which had been rebuilt by Debret with heavy materials: it fell when struck by lightning. After the immediate demolition of the remaining part, in 1846 it was further cut to the base of the tower. Debret was removed and the new project was entrusted to Viollet-le-Duc who imagined creating two symmetrical spiers, but the work was never realized [Carbonara 1997, 114].

## 9 | Vulnerability, risk and scheduled maintenance

The "emerging" architectures in the urban landscape are the off-scale buildings that mark the character of the old towns with the recognisability of their identifying sign, but with the passage of time they can determine situations of risk for their significant height. A constant monitoring attitude and the necessary scheduled maintenance must be ensured for them mostly than other ancient buildings that, although historically relevant, have lower characteristics of vulnerability because they are less elevated and exposed to atmospheric stresses. Monitoring of seismic microtremors should be performed using scientific instruments working 24 hours a day in every monument classified as vulnerable; a group of specialized technicians should be present in the context of the operating units allocated to the municipal technical offices [Della Torre, 2014]. In the city of Noto, to recall an example, many bell towers have become accessible to the public and make the necessary resources to ensure their maintenance in the best conservation conditions. The façade-tower of Santa Maria delle Stelle church has got some rooms located at various levels that (made accessible in safety) can be used as exhibition spaces to display the façade projects, the artistic works and sacred objects of the church. The exhibition path could be concluded in the belfry about twenty-eight meters high, with an amazing view of the city and its territorial context [Ventimiglia, Gatto Vaccaro 2015, 1208-1215]. In the case in question, the grafting of reinforced concrete structures in the upper part of the façade requires a higher level of attention in monitoring the state of the metal reinforcements because of the detachment of the concrete cover. In the Mother church of Comiso, a tragedy was avoided only because the church was not crowded with devotees at the time of collapses. The failure of the bulb and the oxidation of reinforcing rods in areas that are not easily accessible caused the significant weakening of the structural components, and only the fall of a portion of the stone globe in 1992 turned on the alarm bell. In the inspection reports of 1992 and 1994 the presence of oxidized metal elements has been highlighted, but the indispensable program of periodic surveys to analyze the state of the reinforced concrete structures has not been prepared, although it is now clear that we should not wait until at the arrival of a new damaging signal from the building.

Fig. 12: Comiso, Santa Maria delle Stelle Church after the restoration. View of the church from piazza delle Erbe, 2016 (photo by Carlo Giunta).

## 10 | Conclusions

The initiatives undertaken to repair the damage caused to the church by the collapses that occurred at the top of the façade-tower have lasted for over twenty years, and have required a great effort by the Diocesi di Ragusa, the Soprintendenza ai Beni Culturali ed Ambientali di Siracusa[22], the Genio Civile of Ragusa and the technicians of the Municipality of Comiso. The local press highlighted the development of the complex and articulated affair, keeping alive an intense debate centered on the aspects connected to the responsibility of preserving the cultural heritage and to the issues of risk and environmental protection. As a direct consequence, a widespread social awareness raising action has taken place on the issues of monument maintenance and risk assessment, which also draw the attention of the government of Regione Sicilia. A parliamentary question was presented on 4 August 1992 by Mr Piro, Mele and Battaglia to the Regional Councilor for Cultural and Environmental Heritage and for Education, asking which measures would be undertaken «a tutela della chiesa Madre, del patrimonio artistico della città di Comiso e, più in generale, del cosiddetto 'Barocco siciliano'»[23]. In memory of the event, the recomposed fragments of the sphere ruined to the ground are now exhibited in the area of the narthex and, in 2016, after more than twenty years and three work sites, the restoration of the ancient wooden ceiling has come to an end with the relocation of the paintings. The year '1936', the name of the director of the completion work 'S. Secolo' and of the workers 'Elia e Turtula' are engraved on the stone sphere that fell from the tower.

[22] Soprintendenza per i Beni Culturali e Ambientali di Siracusa, Sezione Beni Paesaggistici, Architettoni e Urbanistici - Ragusa and Sezione Beni Storici, Artistici e Iconografici. The documentation relating to the territory of Ragusa can presently be consulted in the archive of the Soprintendenza ai Beni Culturali e Ambientali di Ragusa.

[23] Diocesi di Ragusa, APDRI.


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