Ministero per i Beni e le Attività Culturali

Embedded Heritage: A Study of Venetian Church Floors

An Interdisciplinary Qualifying Project
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I. Abstract

This Interdisciplinary Qualifying Project is a continuation of previous studies on church floors in Venice, Italy completed in 2002 to 2004. Our group was able to study 14 churches throughout Venice and the Lagoon and survey the floors these churches, including 254 artifacts. Through our survey of the churches we were able to collect data and assess the floor and artifact damage. Our results were entered into the pre-existing database to complete the catalog of church floors from 2002 to 2005 of over 2000 artifacts and 84 churches.

II. Executive Summary

Venetians' religious faith has stood as a pillar to their existence since the founding of the city. In the fifth century Venice was formed as a group of small island communities, each island being built around a church and a campo, the square around the church. Over time the city has maintained this internal structure with the church as the center of the community. To preserve their heritage and culture Venetians began church burials of nobility and priests. Over time the practice of burials within church tombs became more commonplace and realistic to any member of the community with the proper resources or personal ties. With the combined staying power of churches and their importance to the local people, churches have become host to priceless artifacts and historical information.

As theses burials became more and more commonplace the number of artifacts within church floors increased steeply. Centuries of church burials have created different layers within the floors. Underneath the surface of many church floors lay hundreds of artifacts that have been lost over time. The built of layers under the surface leave a great potential for future excavation. In general, Venetian church floors have a very high archaeological potential.

The centrality of religion to Venetian culture hinders, as well as helps, the preservation of important historical information. The continuous usage of churches has led to wearing and damage to the floors and artifacts. To rectify this problem many churches have replaced the floors original to the church; however, in the process of resurfacing the artifacts are not always raised to the new level of the floors. Thus, when church floors are replaced the artifacts within the church are either lost beneath the new surface or just the headstone is relocated. Floor replacement and general usage have caused a significant loss of historical information.

The goal of our project was to contribute to the preservation of Venetian heritage by collecting and analyzing information from artifacts found in church floors. Our project is a continuation of projects done over the past three years, all with a common goal. The three previous church floor groups were able to complete the study of 70 churches in the six main *sestieri* of Venice. Their results included measurement of the elevation of the floors and determination of floor and artifact damage. Through examining their data, analyses have been made on the causes of damage to the floors and the archaeological potential of churches. Their papers and results, which were cataloged in a common database, served as an excellent resource for our project.

Our group continued the procedures of the other groups before ours, visiting 41 churches throughout Venice and the Venetian Lagoon to determine the accessibility. Our group finished the study of accessible churches in Venice and its Lagoon. Of the churches we visited we were able to study 14. Our study led us to churches in the *sestieri* of Cannaregio and San Marco and the islands of Torcello, Giudecca, Murano, Burano, Mazzorbo, and San Michele.

The most important action we took to study Venetian church floors was obtaining written letters of permission to gain access to the churches. These letters briefly explained the mission and goals of our project. We were able to survey the floors and quadrants of 14 churches, including 2543 artifacts and 181

floor quadrants. Through our survey of the floors we were able to collect data and assess the floor and artifact damage, which we then entered into our database.

To be able to enter the data we collected into our database, we first needed to make a standardized system of naming artifacts and grids within each church. Assessing damage to the floors became more manageable once we broke each church floor plan down into smaller quadrants. Quadrant by quadrant evaluations allowed us to concentrate on one part of the floor at a time. After establishing a system of grids within each church to identify artifacts by, we studied each artifact and, if it had one, its inscription extracted. The first step in extracting historical information was to record the artifacts themselves. Every artifact that our group recorded was entered into our database. Every entered artifact then appears in its own artifact form.

We continued using the system of measuring floor damage as established by previous WPI groups, particularly the 2004 group, and gathered information relating to the causes of damage. The assessment of floor elevation at given points is essential in determining the relevance of floor and artifact damage due to flooding. By using points of known elevation we were able to measure points of unknown height with a laser level.

In order to understand how much damage either a floor or an artifact has incurred, we utilized a rating scale to standardize the severity of the damage. Our group used the same 0-4 point scale developed by previous church floors groups. On this scale a rating of 0 signifies excellent condition, and a rating of 4 signifies the worst possible condition. For overall floor damage the scale was based on the combined scores of surface damage, tile cracks, gaps between tiles, and holes in the tiles.

After completing the data collection we entered the information and correlating pictures into the preexisting database. We then determined the damage to the floors and artifacts based on the standard 0 to 4 damage scale. Secondly, our group examined the inscriptions extracted from the artifacts embedded in the church. With the help of a linguist we were able to translate the inscription text to English. From the translations we were able to extract important information such as the name, date of birth, date of death, and profession of the deceased. The finalized database was our group's largest contribution to complete the study of church floors in Venice.

Using our finalized database our group was able to explore damaging factors to the floors and artifacts. Factors that were taken into consideration to contributing to floor damage were pew placement, flooding, and usage. Through our extensive study and analysis of the complete database we were able to assess the weights given to the damage scale and the contribution of each type of floor damage to overall quadrant damage. We mapped our results on damage and floor elevation in GIS layers in MapInfo. The completed databases and maps will serve as an extensive resource to future studies on church floors.

III. Authorship

Each of the group members contributed equally to the writing and editing of this document.

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1. Introduction

The protection and preservation of cultural and historical sites around the world is of exceptional value to humanity. Countless organizations have been established to protect these historical sites. One of the more well-known organizations is UNESCO, the United Nations Educational, Scientific and Cultural Organization. UNESCO has played an important role in raising funds for the preservation of historical sites, for example they approved a budget expenditure of approximately 2.8 million U.S. dollars for 2003.[1] Since its founding 33 years ago, UNESCO has developed a World Heritage list, a list of historical sites around the world that are culturally significant. Today, this branch of UNESCO is committed to the identification and protection of 788 sites worldwide.[2]

In 1987, Venice, Italy became the first city, as a whole, to be identified by UNESCO as a site of extreme cultural importance. Much of the attention Venice received was in response to the flooding of the city in 1966. Since then, over 50 private organizations have been established globally to gather and distribute contributions toward the restoration and preservation of Venice.[3] Between 1999 and 2002, these groups were able to contribute over 9 million US dollars through the Venetian offices of UNESCO towards the protection of Venice.[4] A large portion of the funds have been contributed to art restorations, including one hundred monuments and one thousand works of art.[5] The churches of Venice contain many frescos and sculptures that have been very carefully surveyed and preserved; however, the Venetian church floors have not been extensively studied or chronicled.

Prior to our group, Venetian church floors had been the subject of three previous interdisciplinary qualifying projects by students of Worcester Polytechnic Institute. In conjunction with the *Soprintendenza Archeologica,* WPI students had been able to study Venetian church floors through the Venice Project Center. The previous groups were focused mainly on surveying and cataloging the damage of the floors and the artifacts embedded in them.

The past efforts of WPI students helped our study of Venetian church floors by surveying and analyzing a total of 70 churches and 1,977 artifacts. However, there still was much that needed to be done to conclude the analysis of Venetian church floors. The data was incomplete, missing 72 of 142 total churches in the *sestieri* of Venice. Of the remaining churches, 26 were deemed inaccessible by previous groups and 18 other churches were not studied based on their island locations with the Venetian Lagoon. Although 70 churches were completed, the database contained insufficient information on many of them.

The goal of our project was to finalize the database of information on church floors through the extraction of information from the remaining churches in Venice and its lagoon. Our team surveyed the conditions of the floors and the artifacts embedded in 14 churches that had yet to be surveyed. Our

[1] UNESCO whc.unesco.org/ab_fund.html
[2] UNESCO whc.unesco.org
[3] Venice in Peril www.veniceinperil.org
[4] UNESCO http://portal.unesco.org
[5] UNESCO http://portal.unesco.org

group was able to make a more complete database of information, building off of the resources of three prior WPI projects. Using this database we were able to record floor and artifact damage, floor heights, and historical information from the artifacts. Our collection of information allowed us to make an analysis of the inscriptions contained in church floor artifacts and to explore causes of damage to the floors. This project contributed to the preservation of Venetian heritage through the analysis of collected data from artifacts in the church floors.

2. Background

From the Venetians' humble beginnings as people seeking a place of protection, to their later acquired commercial and military dominance, religious faith has stood as a pillar to their existence. Throughout history, Venetians have built dozens of enduring churches to honor their great sense of faith and express their unique culture. Due to the staying power of these churches, their floors can be looked at as time capsules, recording the timeline of Venetian culture and history. To be able to more fully grasp the essence of Venetian heritage through its church floors, we need a basic understanding of the contents, purpose, function, and construction of the floors.

The construction of buildings in Venice, including churches, translates to building in the middle of a swamp in the Venetian Lagoon. The geography of the city has led to many building limitations; thus, throughout history, Venetians have developed unique forms of construction to cope with the environment. An important consideration in construction was choosing appropriate building materials, which in turn affected the construction techniques of the churches and their floors. Yet no matter how it was constructed, the layout of a church's floor still had to be arranged in a way to allow for the necessary functions of a Catholic Church. In carrying out the duties of the church, the conditions of the floors become more and more reflective of their usage.

Each part of a church floor plan has its own specific function, be it to display intricate artwork, serve as a place of congregation, or to store artifacts. The artifacts contained within church floors, specifically their inscriptions, are integral to gaining knowledge of Venetian heritage. Many of the artifacts are tombstones containing information on the lives of people and important figures in Venetian history. To be able to fully analyze these artifacts, it is important to understand their functions and historical value.

2.1 Church Construction

Geography and environment have an enormous effect on architecture and building construction. Located in the Venetian lagoon and comprised of 120 islands, the city of Venice has a building environment unlike any other. The clay base of the islands is slowly sinking into the swamp and becoming part of the lagoon. Thus, construction in Venice has been shaped greatly by the settlement that occurs when constructing heavy buildings on clay.

2.1.1 Building Construction

Building construction in Venice requires a minimalist approach in terms of the mass and the loads of buildings.[6] Minimizing the loads of buildings is necessary so that there is a lesser degree of settlement into the clay base. A general step that is taken to counteract support settlement is the use of

[6] Goy, Richard. Venice: The City and its Architecture. 49.

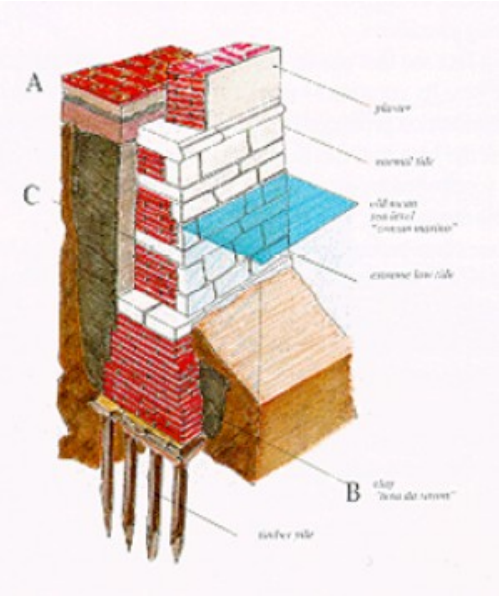


Figure 1: Materials and layers in construction

materials that are lighter in weight, such as timber, brick and stone, as opposed to a heavier material such as marble.[7] The foundations of Venetian buildings are often constructed of simple timber planks driven into the clay foundation, as shown in Figure 1. The rows of piles, ranging from ten to fifteen feet long, were driven into the ground using a wooden drop hammer.[8] Above the pilings a deck of wooden planks was constructed, from which the walls of the buildings were erected.[9]

Churches are constructed in the same way as other Venetian structures. However, in regard to church-specific architectural elements, there are more limitations. The building requirements of large churches are not realistic in Venice. Elements found in churches throughout Europe, such as flying buttresses or large domes on churches, are not feasible for construction on the Venetian Lagoon. The support systems for such architectural elements create concentrated, high stresses on the foundations of buildings. This factor, combined with the inevitable settlement of the building after completion, could ultimately result in the collapse of the structure.[10] Thus, elements such as flying buttresses do not exist in Venetian churches.[11]

2.1.2 Building Materials

Given the unique location of the city, the accessibility and selection of available materials are limited. One of the most important principles of construction in Venice is the use of ductile materials. However, with so many environmental regulations for construction and the lack of building materials in Venice, supplies had to be shipped into the city from other ports.[12]


Figure 2: Floor of San Giorgio Maggiore

The key materials of Venetian architecture are brick, wood and timber. Their light-weight properties and flexibility make them ideal for overcoming Venice's architectural obstacles. Yet as these materials were

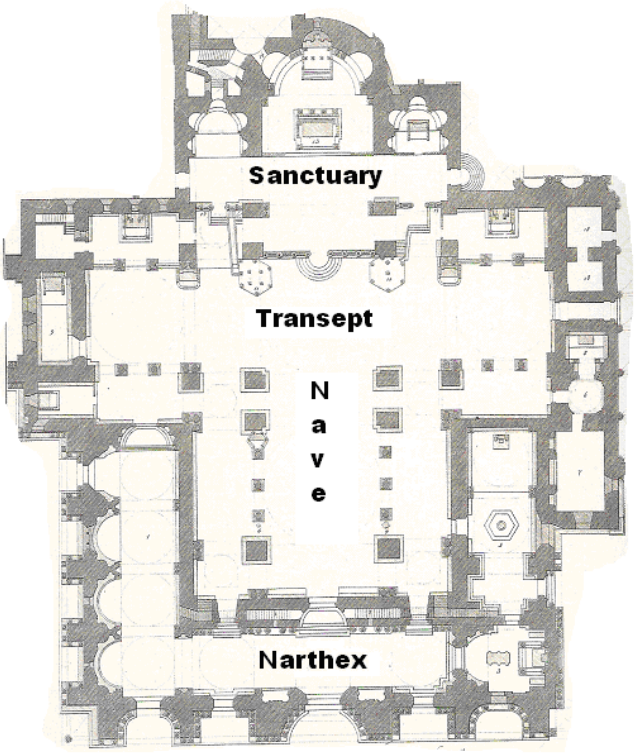
[7] *Ibid.* 50.
[8] *Ibid.* 48.
[9] *Ibid.* 48.
[10] *Ibid.* 51
[11] *Ibid.* 51
[12] *Ibid.* 49

highly abundant, others were still used. One such material is Istrian stone, although not local to Venice, it can be found in buildings throughout the city. Though it is not overly abundant because of its weight, it was often used for buildings with a higher degree of architectural importance, such as funerary chapels and monuments.[13]

Church floors must be built to withstand general wear, resist water damage, and also to last over time. Thus, church floors are often built of stone and other durable materials. One of the most extensively used materials was the orange-red *broccatello* from Verona, a Venetian city.[14] The warm hue of the stone contrasted well with other widely used materials such as Istrian limestone.[15] This material was particularly used in the chessboard pattern on the floors of churches, such as the floors in San Giorgio Maggiore shown in Figure 2. As can be seen, in construction proper material selection is very important.

2.2 Church Floors Layout and Usage

The two main functions of a church floor are to enrich the interior with decorative pavements and to commemorate the deceased with floor memorials.[16] Each Venetian Church has its own specific layout to facilitate its necessary purposes, which are to serve as a place of worship, congregation, and at many times acting as a warehouse to store artifacts and tombs. Nevertheless, most Roman Catholic churches have the same general layout based on a historic floor plan. It is broken up into three main sections which form the shape of a Cross. As you first enter the church you will be passing through the narthex, or entrance, in which the flooring is at a high risk of damage due to foot traffic. The largest sections of the church, the nave and the transepts, are used as a place to sit and kneel during mass.[17] The transept forms the horizontal piece of the cross and the nave the lower vertical piece. The accessibility to the general public and placement of pews cause the pavement in this area to be very susceptible to damage.



The nave and transept were paved, sometimes tiled, with contrasting colors forming geometric patterns. Mosaic pavements were used to decorate the most significant areas usually

[13] *Ibid*. 53
[14] *Ibid.* 52
[15] *Ibid.* 50
[16] Norwich, John. Decorative Floors of Venice
[17] Interior of a church. www.kencollins.com

the sanctuary, also known as the chancel. The sanctuary is where the priest conducts the service and is considered to be the most holy part of the church. It is located at the front of the church and is usually elevated a few steps above the nave. The sanctuary contains the highest density of artifacts, inscriptions and tombstones. It is also less accessible to the public, reducing damage to the floor. An example of the floor layout of San Marco can be seen in Figure 3.

2.2.1 Floor materials

Originally, Venetian church floors were constructed with cheap lightweight materials such as wood and brick. These materials proved to be unreliable and could not withstand the constant flooding of the lagoon. As Venice grew in wealth and power, the Venetians were able to afford to import the more visually stunning, and longer lasting, polychrome marble. This material also kept the Venetians cool in the hot summer months.[18] Venetian floors also contained many mosaics of intricate depictions embedded in the floors created with small pieces of marble or glass placed on a bed of cement. The stones are ground down to give the floor a glossy finish.

2.3 Floor Artifacts

Our group has defined an artifact as any historically relevant object containing information that is found embedded in the church floors. These objects may include tombstones (ledgers), plaques, and inscriptions. The most commonly found artifact is a ledger stone which is a slab covering a grave. Early ledger stones date back to the eleventh century and were only used to cover the tombs of people who were of high importance to the church. The ledger stone served three main purposes: to provide easy access to the grave, to record inscriptions, and to commemorate the family. Ledger stones typically contain information on the age, occupation, and time of death of its concealed occupant.[19] The common materials used were white, black, or variegated marble and, occasionally, the inscriptions were made of brass. An example of this can be seen in the Venetian Ledger in Figure 4.

Figure 4: Example of tombstone in church floor

2.4 Burial Practices in Churches

Most early Christians were buried in family vaults that were erected on private property. The burials in churches were reserved only for martyrs, saints, and any other person thought to be of extreme importance to the faith. The attitude of burial within the church walls began to change with the entombment of Roman emperors in churches. This eventually led to burials within the church of less

[18] Norwich, John. Decorative Floors of Venice
[19] Fawcett, Jane. Historic Floors: Their History and Conservation

distinguished people, such as clergy members and those of wealth and power.[20] Tombstones in Venetian churches were sometimes bought by a specific guild and later used by members of that guild.

Due to the lack of burial space in churches, after the 14th century the Venetian government ordered the removal of the sealant from the bottom of tombs. The sealant was often replaced with wooden planks spaced 3 centimeters apart; however, in some cases the layout of the bricks in the tomb was altered or mortar was not used between layers. Using either new method of brick laying, space was left to allow the passage of water between the layers. This spacing allowed the remains within the graves to be flushed out by the incoming tides. Therefore, more space was created within the graves for future occupants. Unfortunately this practice caused prolific damage to the floors. Due to the frequency of church burials in the 13th century, floors had to be constantly dug up, introducing instability, surface irregularities, and added patch work to the floors.[21]

This practice was eventually outlawed by Napoleon Bonaparte around 1800 in order to prevent the spread of disease in the warm summer months. He declared that it "would no longer be permissible to inter bodies in churches or cemeteries within the city". All burials from then on were moved to the island of San Cristoforo, in the northern lagoon opposite to Murano.[22] This island was later joined to the nearby island of San Michele, which remains as Venice's main cemetery today.

[20] http://newadvent.org/cathen/03504a.htm
[21] Fawcett, Jane. Historic Floors: Their History and Conservation
[22] Plant, Margaret. Venice: Fragile City.

3. Methodology

The ultimate goal of this project was to contribute to the preservation of Venetian heritage by collecting and analyzing information from artifacts found in the church floors. To complete this goal we extracted information about the artifacts and surveyed the condition of the floors through observation. From the data we collected we were able to explore the damaging factors to the floors and the artifacts contained in the floors. We added our data collection with the databases of previous groups which gave us a more complete catalog from which to analyze the historical content of the artifacts.

We completed our mission through the following objectives:

- To extract information contained in the artifacts.
- To survey the condition of the artifacts and the floors.
- To explore the causes of damage to the floors and artifacts.
- To analyze the informational content of the artifacts.

The rest of this chapter will be devoted to the following, and divided in the following manner:

Section 3.1 Preliminary Work

Section 3.2 Extracting information contained in the artifacts

Section 3.3 Surveying the condition of the artifacts and the floors

Section 3.4 Exploring the causes of damage to the floors and artifacts

Section 3.5 Analyzing the informational content of the artifacts

3.1 Preliminary Work

The work discussed below was relevant and necessary to complete all of the objectives of our project; therefore, it could not be categorized under any single objective. The Domain of Inquiry section defines the terms that will be used throughout our paper and is necessary to outlining the limits of our project. The subsequent, Area of Study section, expands on the aforementioned by establishing the specific locations of the study of our project. After defining the scope of our project we needed to obtain letters of permission to be able to access and study church floors.

3.1.1 Domain of Inquiry and Definitions

Through the survey of floors and artifacts we were able to explore the damage they have incurred and make a historical analysis of the information. Our analysis was based solely on information that could be gathered through visual means, no excavations were made.

The following terms define the scope of our project:

Church: Any Roman Catholic Church in Venice, Italy.

Floor: The nave, the sanctuary and any chapels that may have been located to the side of the church and directly accessible from the main floor.

Nave: The architectural term for where the congregation gathers.

Sanctuary: The front part of the church where service is conducted and is usually elevated.

Chapels: An alcove within the church which contains an altar. The chapel performs the same function as the church, but in a smaller scale.

Artifact: Any historically relevant object containing information that is found embedded in the church floors. These objects may include tombstones, plaques, and inscriptions.

3.1.2 Area of Study

The three previous Church Floors Projects collected data from 70 of the 142 Roman Catholic Churches on the six *sestieri* of Venice. Of the 72 churches that remained, 26 were previously deemed inaccessible and 18 were churches located on islands not directly in Venice. Our group focused our attention on the most accessible of the 28 unstudied churches in Venice. The accessibility of each church was determined by visiting each site and noting any ongoing restoration work or closures due to disuse.

Due to the ease of access, our group first chose to study churches located on the main islands of Venice. Churches located on islands in the Venetian Lagoon were listed subsequent due to the time travel involved in getting to the islands. We made a visit to each accessible church taking note of the name of the priest and the times that each church was open to the public. From there we developed a priority list of churches based on geography, cultural significance, and opening hours.

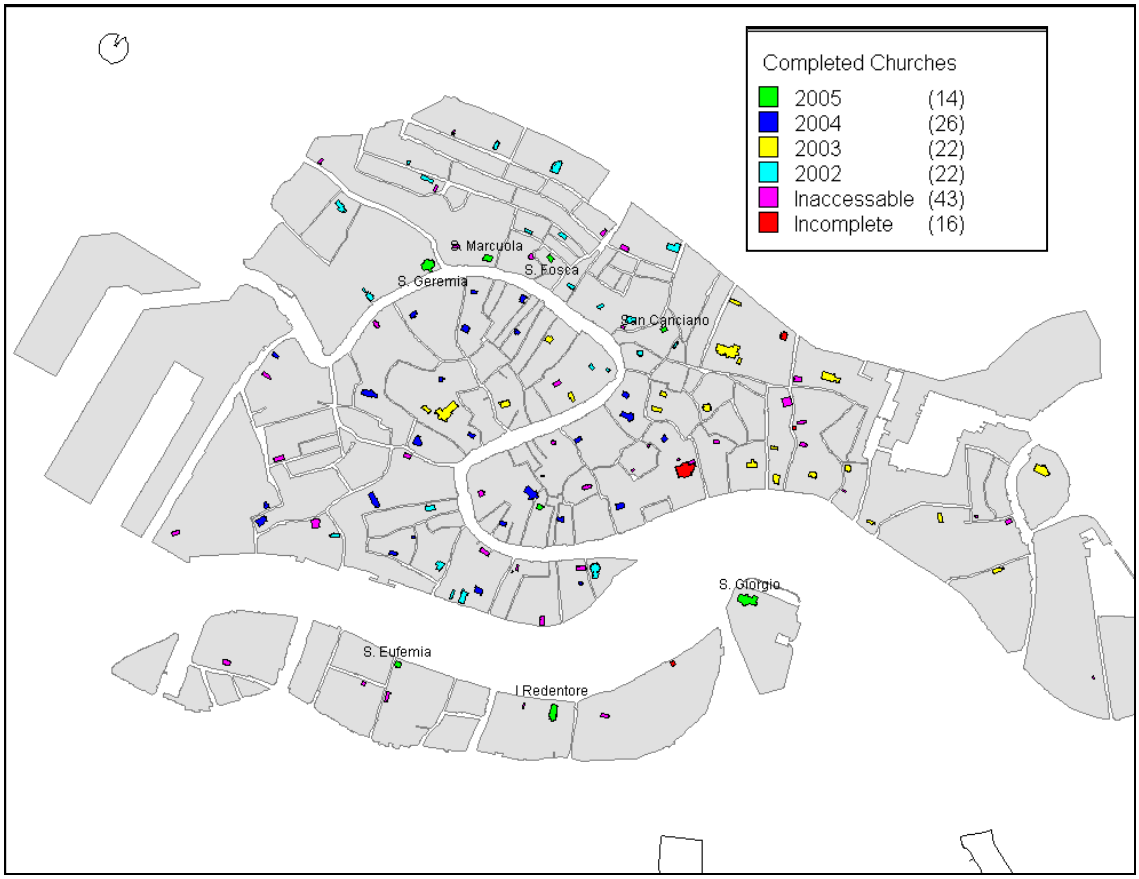


Figure 5: Area of Study in *sestieri* of Venice and Giudecca

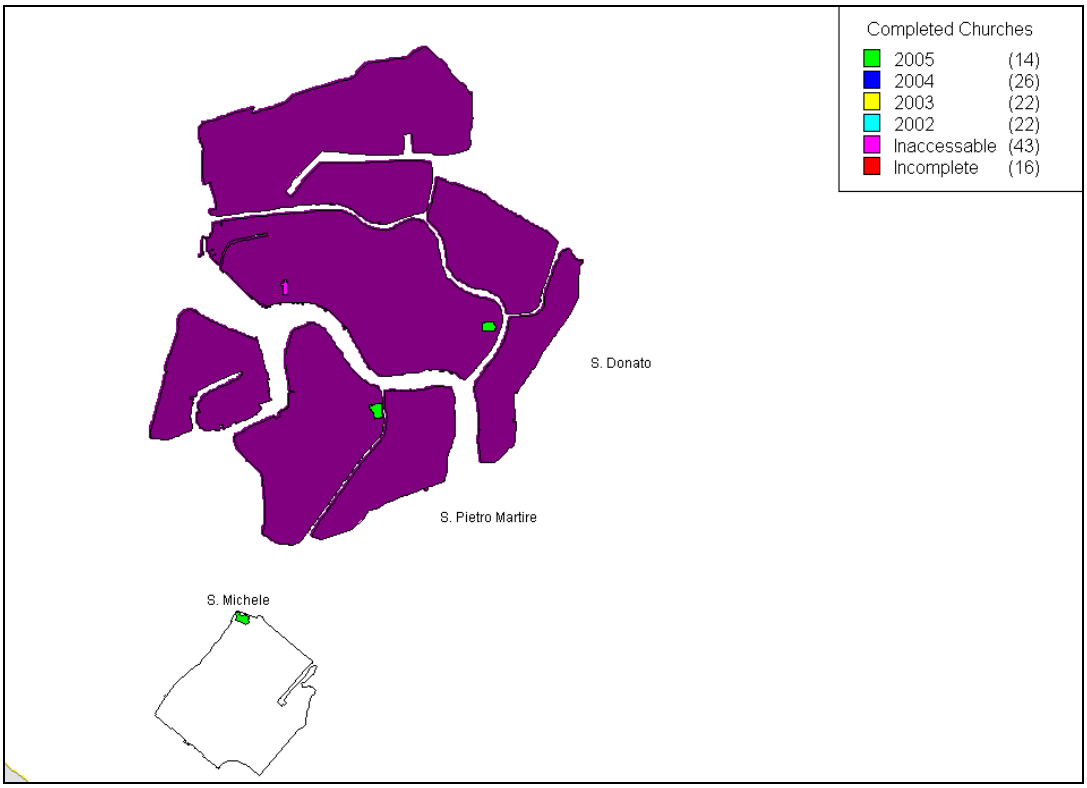


Figure 6: Area of Study: San Michele and Murano

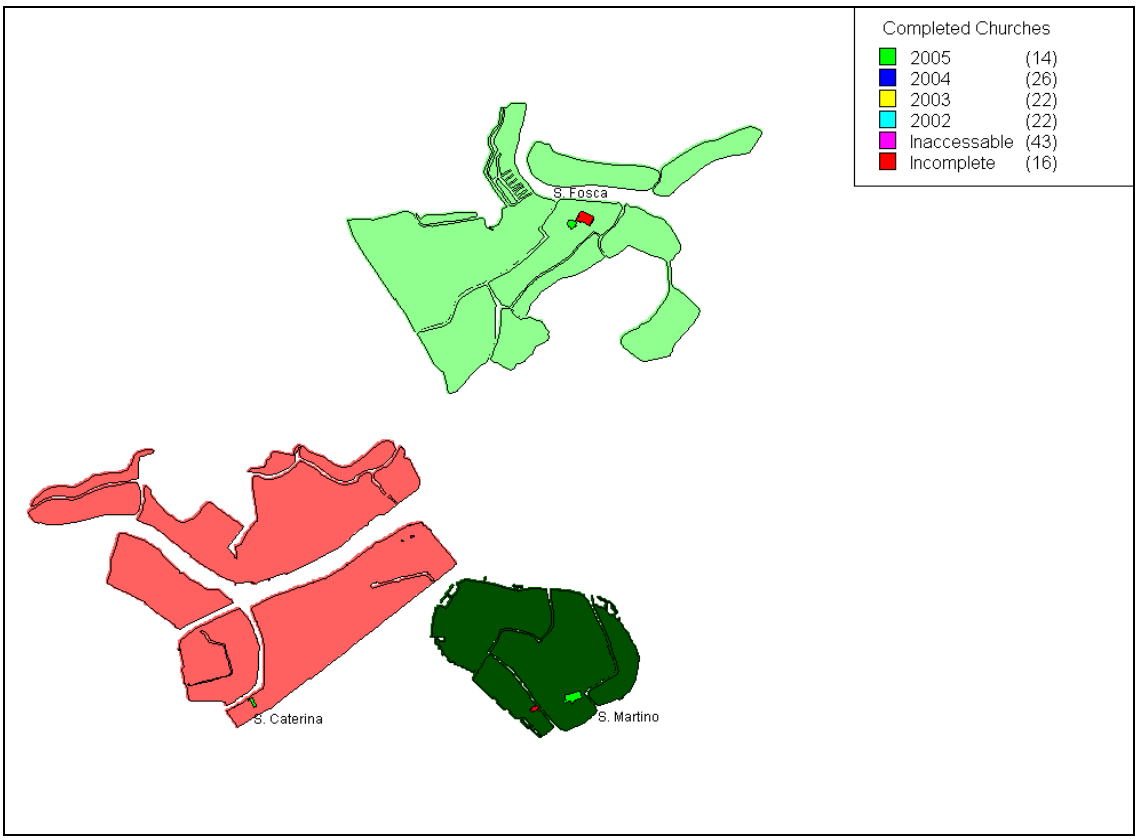


Figure 7: Area of Study: Mazzorbo, Burano, and Torcello

We were able to study fourteen churches, five of which are located directly in Venice. The remaining seven churches were located on the islands of Torcello, Giudecca, Murano, Burano, Mazzorbo and San Michele. Maps showing our area of study can be seen in Figure 5, Figure 6, and Figure 7. A complete list of the churches that we studied can be found in Appendix B: List of Churches. A map of the completed churches between all four church floors projects can be seen in Figure 8.

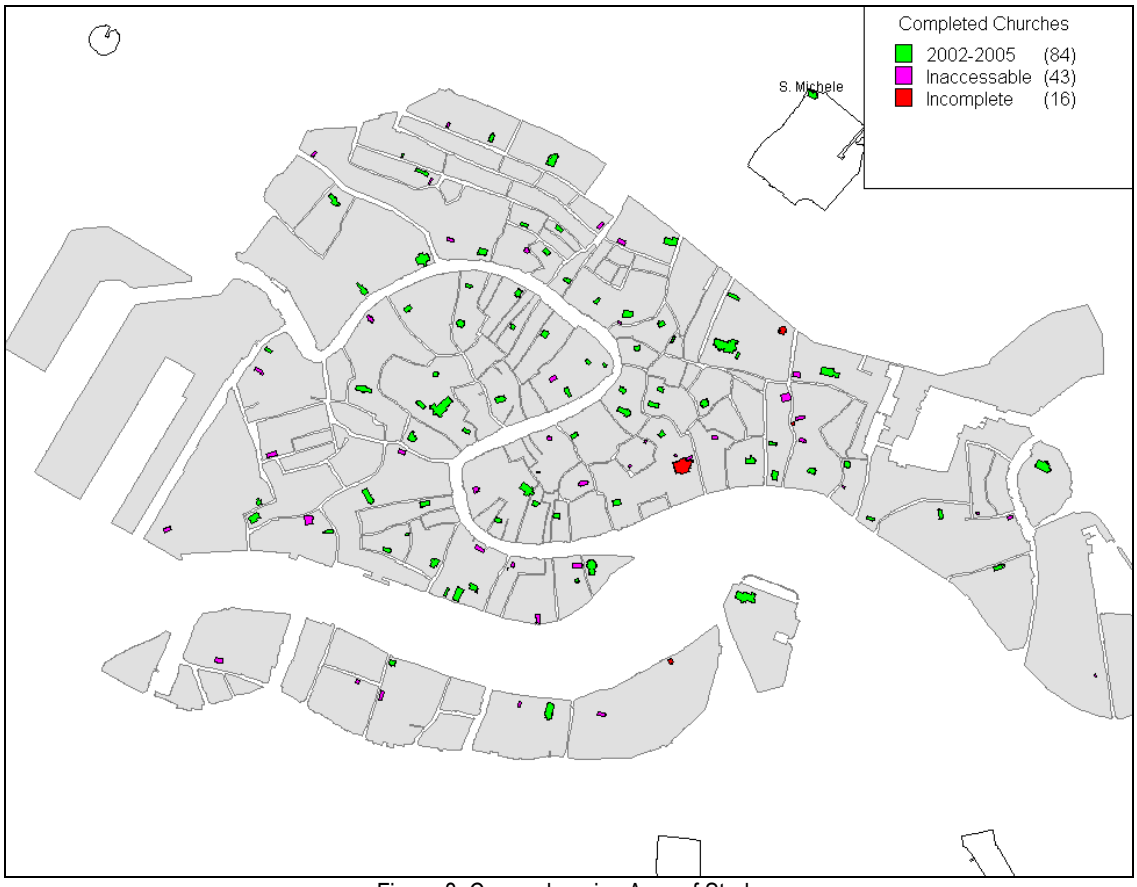


Figure 8: Comprehensive Area of Study

3.1.3 Gaining Access to Churches

The most important action we took to study Venetian church floors was obtaining written letters of permission to gain access to the churches. These letters briefly explained the mission and goals of our project. Our sponsor, Luigi Fozzati, wrote letters specific to each church explaining our project and asking the priests' permission to be granted access to their church, which can be seen in Appendix F: Letter from the Soprintendenza all'Archeologia. In the case that these letters were not sufficient to gain access, we also obtained a letter from Don Aldo Marongoni, a high ranking church official, to show to the church's priest, as seen in Appendix G: Letter from Don Aldo.

3.2 Extracting information contained in the artifacts

To be able to enter the data we collected into our database, we first needed to make a standardized system of naming artifacts and grids within each church. Assessing damage to the floors

became more manageable once we broke each church floor plan down into smaller quadrants. Quadrant by quadrant evaluations allowed us to concentrate on one part of the floor at a time. After establishing a system of grids within each church to identify artifacts by, we studied each artifact and, if it had one, its inscription.

3.2.1 Creating grids in the churches

Recording data from each church floor as a whole would be a difficult and inaccurate process. To tackle this problem our group used a standardized system to make data collection for the floors and artifacts more manageable. We were able to obtain the floor plans of the churches we studied from the *piani tipi*. These maps, as shown in Figure 9 were created by the Ministry of Public Works in Venice. Using the *piani tipi* we were able to see the interior of the church and any major structural components in it, such as walls and columns. In order to utilize this information we manually converted the layouts of the churches into a GIS layer using MapInfo, as shown in Figure 10.

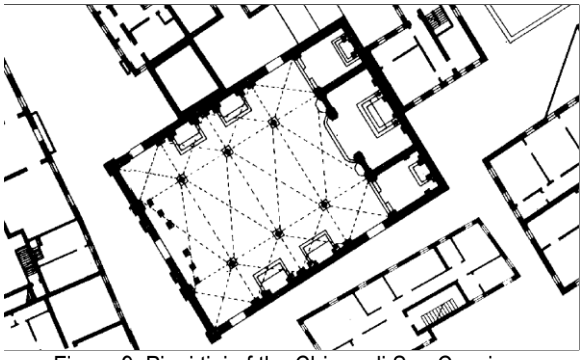


Figure 9: Piani tipi of the Chiesa di San Canciano

From this layer we were further able to divide each church's floor plan into quadrants. In doing so we based the quadrants on the positioning of the walls and other major immovable objects in the church. The quadrants allowed us to focus on smaller portions of the floor increasing the accuracy of our measurements and final analysis. The number of quadrants varied depending on the size of the church and the frequency of artifacts. Typically the nave of the church was broken up into rectangular quadrants while other areas of the church, such as side chapels or the sanctuary, were given their own quadrants.

Figure 10: Floor Plans of the Chiesa di San Canciano

Once the size, shape, and position of the quadrants had been established, each was named according to the following system. The quadrants were labeled in alphabetical order from left to right and then back to front, starting with the quadrant in the back left corner of the Church. After each quadrant was assigned a letter, or *Codice Quadrante,* it was then given a quadrant code. The quadrant code, known as the *Codice Pavimenti,* is

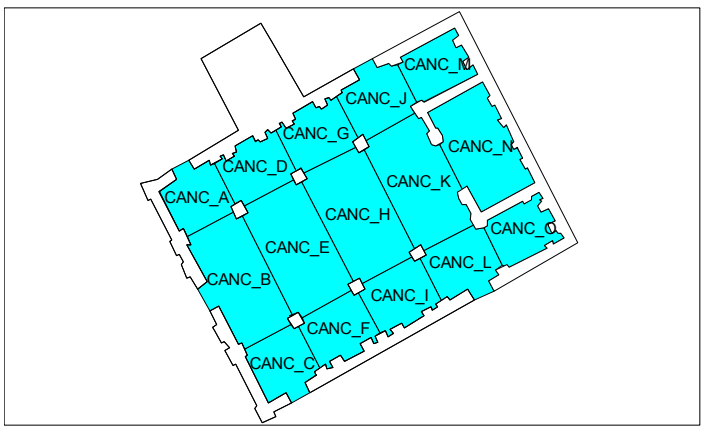


Figure 11: Quadrant Arrangement of Chiesa di San Canciano

composed of the church code followed by the quadrant letter. For example in the church of San Canciano, whose church code is CANC, the first quadrant was given the code CANC_A, the second CANC_B, and so forth, which can be seen in Figure 11.

3.2.2 Naming Artifacts

We used a system similar to the quadrant labeling system to label the artifacts within each quadrant. The artifact number was based on its location in the quadrant, starting with the artifact furthest from the altar and closest to the left wall. The artifacts were then numbered in ascending order from front to back then left to right. The artifact code, known as the *Codice Reperti* was based first on the quadrant the artifact is situated in then its artifact number. As shown in Figure 12, the first artifact in San Canciano was given the code CANC_A1. This code indicates that the artifact was the first found in quadrant A according to the labeling system. Following this system, the subsequent artifact was labeled CANC_A2.

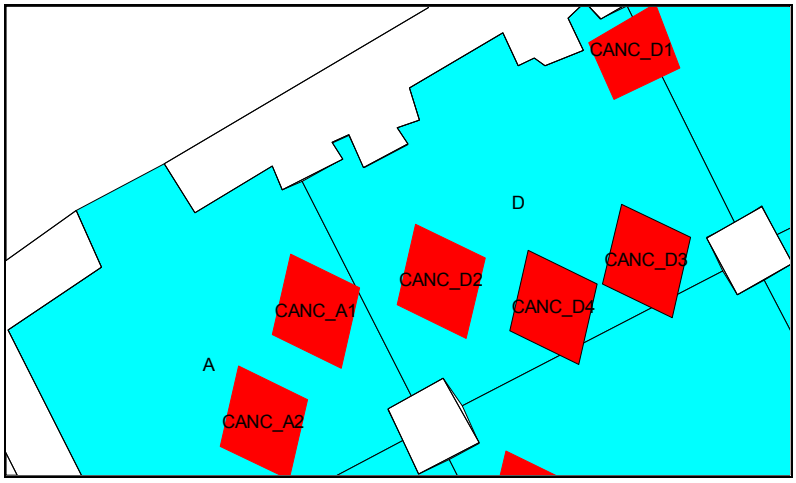


Figure 12: Artifact naming in quadrants A and D in Chiesa di San Canciano

3.2.3 Data extraction

With the help of the letters from our sponsor, our group was able to gain access into the churches and thoroughly examine the church floors and the artifacts embedded in them. The first step in extracting historical information was to record the artifacts themselves. Every artifact that our group recorded was entered into our database. Every entered artifact then appears in its own artifact form, as shown in Figure 13.

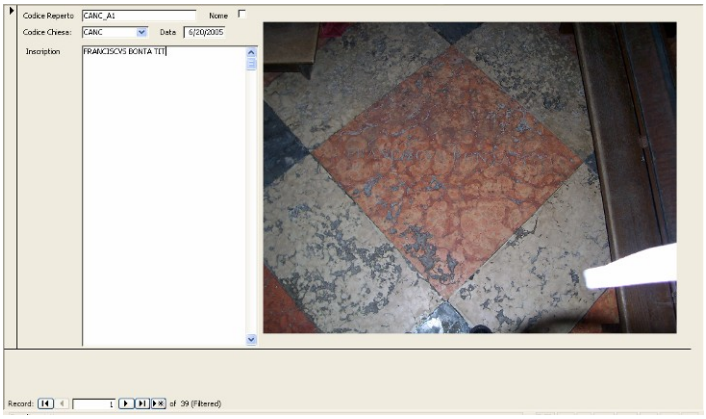


Figure 13: Artifact in Inscription Field Form

Using our Access tables we were able to create a separate form for artifacts with historical data. After gathering and entering the artifact information into the database we extracted important historical information from the artifacts. The form that this information is extracted into, the form *informazione storichi*, is shown in Figure 14. The key information that our group looked for while examining the artifacts included the names, date of death or birth, the age, and the profession of the deceased. Extracting the text from the full inscriptions aided in easing our analysis of the historical information.

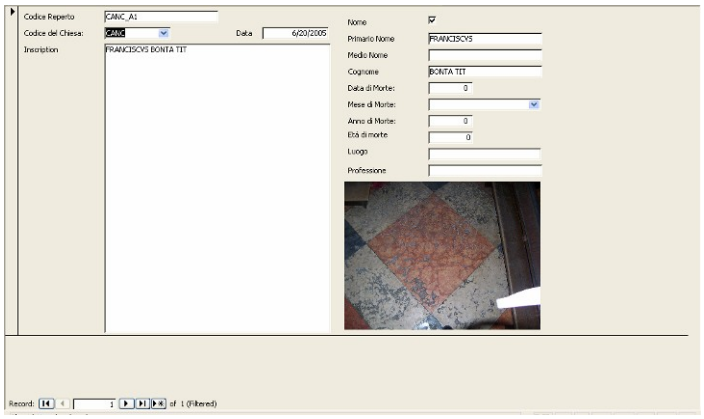


Figure 14: Artifact in Historical Inscription Access Form

3.3 Surveying the condition of the artifacts and the floors

We continued using the system of measuring floor damage as established by previous WPI groups, particularly the 2004 group, and gathered information relating to the causes of damage.

3.3.1 Measuring Elevation

The assessment of floor elevation at given points is essential in determining the relevance of floor and artifact damage due to flooding. By using points of known elevation we were able to measure points of unknown height with a laser level. To measure the height of the desired point, such as the front door of a church, we set up the laser level at a point visible to both the desired point of elevation and the point of known elevation, elevation K. Then, we aimed the laser level at a tape measure set up at point K. We recorded the height at which the laser beam hit on the measuring tape, height hL. To find the height of the other point we then swiveled the head of laser level at the desired location, point D. We then repeated the process of aiming the laser beam at the tape measure placed at the new location to get height hF. By using the formula "K + hL – hF" we were able to calculate the height of the desired point, as shown in Figure 15.

By measuring a church's door elevation you can continue the process of moving the laser level and aiming it to find new elevations at any desired point in the church. This system was useful for measuring the height of each quadrant. These measurements were useful later in determining the relationship between floor damage and elevation.

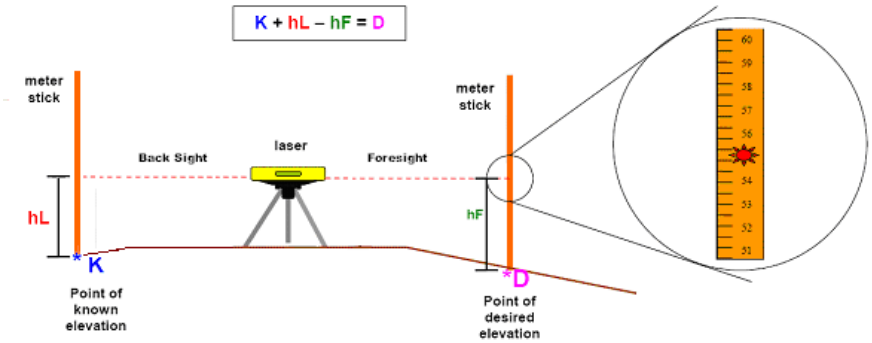


Figure 15: Measurement and calculation of the elevation of a floor quadrant

3.3.2 Assessing Damage to the Floors

In order to understand how much damage either a floor or an artifact has incurred, we utilized a rating scale to standardize the severity of the damage. Our group used the same 0-4 point scale developed by previous church floors groups. On this scale a rating of 0 signifies excellent condition, as shown in Figure 16. However, a rating of 4 signifies the worst possible condition, as shown in Figure 17. For overall floor damage the scale was based on the combined scores of surface damage, tile cracks, gaps between tiles, and holes in the tiles. The severity of these factors allowed us to scale them accordingly. The complete rubric for scoring damage can be seen in Appendix C: Damage Assessment Tables.

Figure 16: Example of a tile with a crack score of zero

Figure 17: Example of a tile with a crack score of four

The Worst Case Score, WCS, is the section of the quadrant with the most severe damage. For example in Figure 18, the worst case scenario for surface damage is 3. Once this rating was determined, we then ascertained the percentage of the quadrant with that severity of damage, X, or in our example, 15% or 0.15. The remaining parts of the quadrant had the mean damage score assessed, giving the remainder of quadrant an average score, S. In our figure the S score is 1, and the remaining percentage of the quadrant with that score is 0.85, or 1 – .15. This damage assessment procedure is continued for cracks, joints gaps, and holes in each quadrant. The sum of all four values gives the overall damage score of the quadrant on the 0 to 4 scale.

$$\left[\text{Surface Damage}\ (.5)\begin{pmatrix}(.15)\ (3)\\ +\\ (.85)\ (1)\end{pmatrix} + \text{Cracks}\ (.2)\begin{pmatrix}(X)(WCS)\\ +\\ (1-X)(S)\end{pmatrix} + \text{Joint Gaps}\ (.2)\begin{pmatrix}(X)(WCS)\\ +\\ (1-X)(S)\end{pmatrix} + \text{Holes}\ (.1)\begin{pmatrix}(X)(WCS)\\ +\\ (1-X)(S)\end{pmatrix}\right]$$

WCS = Worst Case Score
X = Percent of Worst Case
S = Average Score

Figure 18: The standard assessment formula used for the floor quadrants

The weight of each type of damage in the formula was developed by previous groups, specifically the 2004 church floors group. Surface damage is the most prominent source of damage to the floors; therefore, it was arbitrarily assigned a weight of 0.5 or 50%. The joint gaps and cracks in the floor were considered to be equally important to each other, but not as important as surface damage. Hence, both joint gaps and cracks receive a weight of 0.2, or 20%. Due to the rarity of holes in floor tiles, this damage category received a weight of only 0.1, or 10%. If given more weight, the uncommon presence of holes would make the total damage of the floor imprecise. The complete formula for the damage assessment of a floor quadrant is shown in Figure 18.

After considering the damage to each section of the floor separately we were able to determine the damage to the entire church floor. By combining the score of every quadrant we were able to make a more accurate assessment of the floor than we would have been by studying it as a whole. Furthermore, the standardized damage scale allowed us to compare the overall floor damage of one church to any other that has been studied.

3.3.3 Assessing Damage to the Artifacts

Damage assessment for the artifacts was scored in a different manner. The score of each artifact depended on the legibility of the text of its inscription(s). The first step in assessing the damage was to count the total number of letters in each inscription, for example in Figure 19 there were 38 letters in the inscription. Next, each letter of the inscription received a legibility score. Letters that looked perfect, as seen underlined in blue in Figure 19, received a score of 1. Letters that were slightly damaged, as seen underlined in yellow, received a score of 2. Those letters that we were unable to read, shown underlined in red, received a score of 3. In the shown figure there are 25 letters with a score of 1, 7 letters with a score of 2, and 6 letters with a score of 3.

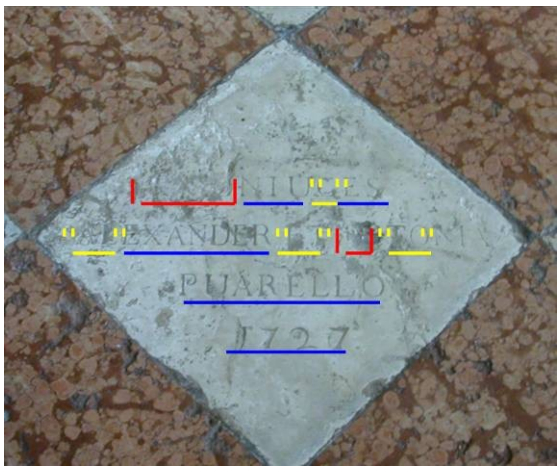


Figure 19: Readability example

The next step of determining the damage to the artifacts was the multiplication formula, which is shown in Figure 20. The final readability of the inscription was calculated by dividing the number of letters with each particular score by the total number of letters. After calculating that fraction, it was multiplied by the damage score that we gave it. For example, the 25 letters with a damage score of 1 were divided by the total number of letters, 38, and then multiplied by their damage score, 1. After that, the number, regardless of its damage score, is multiplied by 100. This would give our example a sub-total of 65.78. Once this was completed for all three categories, the three sub-totals were then be added together to give the artifact a total damage score. In this example the three sub-totals of 65.78, 36.8, and 47.37 were added to give a total readability score of 150. The possible scores range from a scale of 100 to 300.

When the damage score was closer to 100 it meant that the artifact had sustained very little damage. Scores ranging closer to 300 were basically illegible.

Multiply Percent Perfect by 1 **25/38 * 1 = 65.78**

Multiply Percent Damaged by 2 **7/38 * 2 = 36.8**

Multiply Percent Unreadable by 3 **6/38 * 3 = 47.37**

Add all three to get the readability score from 100 to 300

65.78 + 36.8 + 47.37 = 150

Figure 20: Calculating the readability score

After assessing the readability of each inscription on the 100 to 300 point scale, we normalized these numbers to the 0 to 4 point scale for consistency. The values of 100 to 300 were split into 40 point intervals to determine which damage score the inscription received. For example, an inscription with a readability score of between 100 and 140 received a score of 0, while an inscription with a readability score of 141 to 180 it received a damage rating of 1, and so on. The complete scale for normalizing the readability of an artifact to the standard damage scale is shown in Table 1. Standardizing the readability scores to the damage scales kept out results uniform with the rest of our scale. Thus, just as with the quadrant damage, a score of 0 signifies the lowest level of damage and highest readability, while a score of 4 signifies the highest level of damage and the lowest readability score.

Damage Score	Readability Score
0	100 – 140
1	141- 180
2	181- 220
3	221 – 260
4	261- 300

Table 1: Readability Conversion

3.4 Exploring the causes of damage to the floors and artifacts

Based on our survey of damage to the quadrants and the artifacts within them, our group was able to explore the causes of damage to the floors. We analyzed the information gathered from our surveys of the damage of the floors and artifacts. This information was initially stored in our Access databases and then imported into MapInfo for geographical analysis. From there we were able to identify specific damaging factors based on the type of damage. These damaging factors were then compared to each other to determine the severity of each one.

3.4.1 Flooding

Churches in Venice are highly susceptible to water damage. The rising tides of the lagoon, known as aqua alta, allow water to creep through the island city. The lowest elevation points in the floors are the most vulnerable. Through the bases of doors water is able to flow in causing corrosive materials, such as salt, to come in contact with the floors. The corrosive effect of the salt carried in the lagoon water is one possible factor in the deterioration of the floors and artifacts.

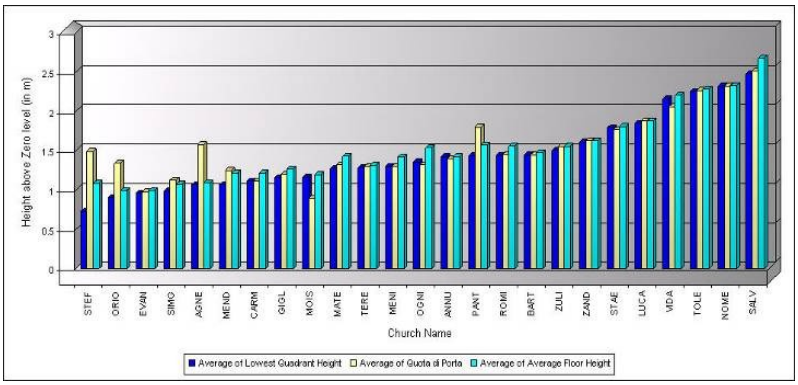


Figure 21: Flood vulnerability study

To test the high waters as a damaging factor, our group utilized the door and quadrant heights that we measured. We related these measurements to the amount of damage sustained to the artifacts in that area. MapInfo was later used to display the graphical and geographic results of damage sustained in relation to the floor height of the church. A study relating average floor height and quadrant damage can be seen in Figure 21.

3.4.2 Usage

Another factor to consider in the damaging factor of the usage of a church is its popularity among citizens. Based on the number of services a church offers each day, the foot traffic can increase significantly. The hours that each church was open to the general public were a good indicator in determining the current usage of the church. The general wear and tear that churches incur can be related to the amount of damage. This factor can be assessed by relating the amount of general usage of the church. The usage of the church can be determined primarily by how old the floors are. The older a church's floors are the greater the relation between foot traffic and damage sustained by the floors and artifacts. The areas where floors experience this type of damage is significantly related to the subsequent section on the placement of pews.

3.4.3 Pew placement

Assessing the damage of the floors in relation to pew placement was done primarily with MapInfo. Figure 22 shows a MapInfo image of the pew placement in Chiesa San Canciano. To explore this damaging factor we measured the dimensions of each pew, recorded the number of pews and calculated the percentage of each quadrant that was covered by pews in each church. Every quadrant was given a damage value based on the percentage of the quadrant that was covered by pews.

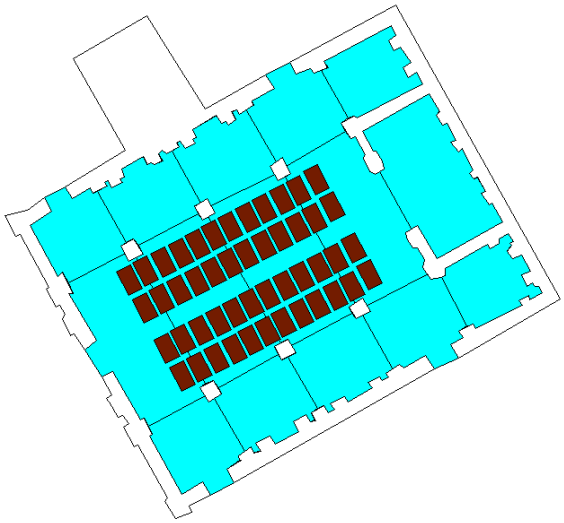


Figure 22: Pew Placement in San Canciano

The pew-related quadrant damage data was compared to that of quadrants that did not contain pews. This data was further analyzed by comparing pew-related damage information of one church to other churches in Venice.

3.5 Analyzing the informational content of the artifacts

By completing our aforementioned objective of extracting information from the artifacts we were given a wealth of knowledge to study and analyze. When extracting the information we took pieces of data from the inscriptions and entered them into a separate form, which can be seen in Appendix D: Field Forms. To make our analysis of this information we focused on the profession, name, and age of those buried in the tombs of the church floors.

By studying this information we were able to make an analysis of which regions the deceased lived in and their common professions or titles. In our analysis we were able to make correlations between their place of origin and what they did for a living. We were also able to analyze the marital status of the deceased and their dates of birth and death. This information was later able to be related to life expectancy.

4. Results

Our group visited 41 churches throughout Venice and the Venetian Lagoon, a list of which can be seen in Appendix B: List of Churches. Of the churches we visited we were able to study 14. Our study led us to churches in the *sestieri* of Cannaregio and San Marco and the islands of Torcello, Giudecca, Murano, Burano, Mazzorbo, and San Michele. A complete list of the churches we studied and their church codes is provided in Table 2 in order for the reader to easily identify churches in the subsequent graphs.

Church Code	Church Name
CANC	San Canciano
CATM	Santa Caterina di Mazzorbo
DONA	San Donato
EUFE	S. Eufemia
FOSC	Santa Fosca
FOST	Santa Fosca di Torcello
GERE	San Geremia e Lucia
GIMA	San Giorgio Maggiore
MARB	San Martino di Burano
MARC	San Marcuola
MAUR	San Maurizio
MICH	San Michele
PIEM	San Pietro Martire
REDE	Il Redentore

Table 2: Church Codes

We were able to survey the floors and quadrants of these churches, including 254 artifacts and 181 floor quadrants. The breakdown of the number of quadrants and artifacts in each church can be seen in Figure 23. Through our survey of the churches we were able to collect data and assess the floor and artifact damage, which we then entered into our database. The following results are raw data taken from our database and put into graphs and charts. Later we were able to use these results to make our final analysis.

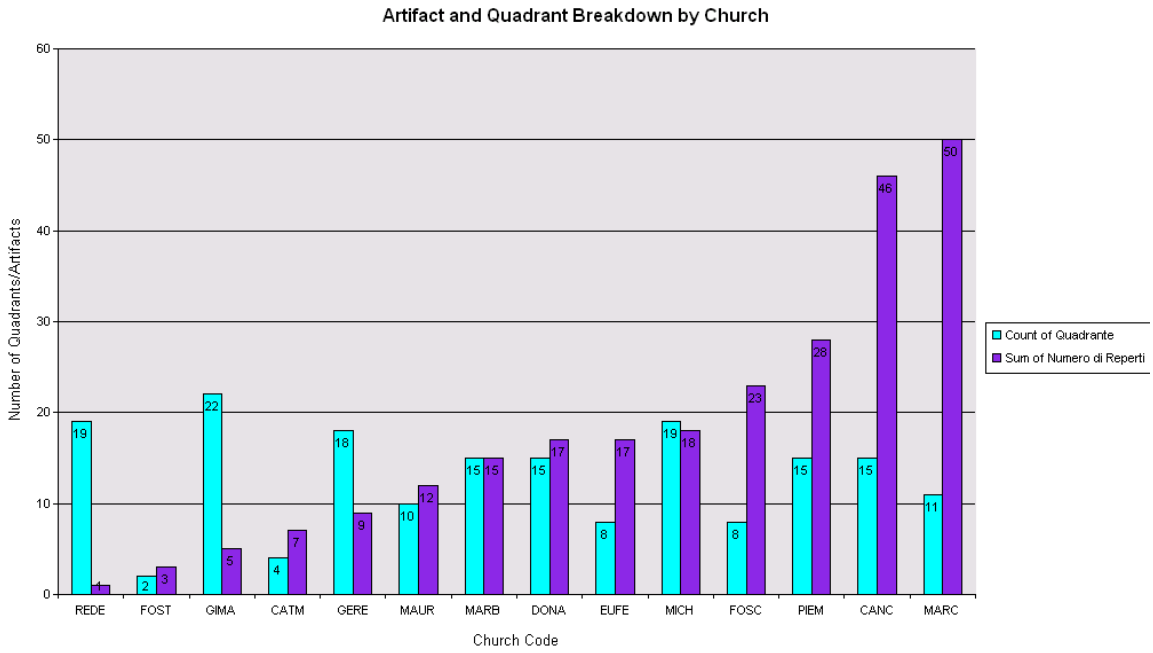


Figure 23: Number of Quadrants and Artifacts per Church

4.1 Quadrant Heights

The graph in Figure 24 shows the average quadrant heights for twelve of the fourteen churches in our groups' area of study. The average quadrant height for San Michele and Santa Fosca di Torcello could not be calculated because the elevation heights of the islands of San Michele and Torcello could not be found.

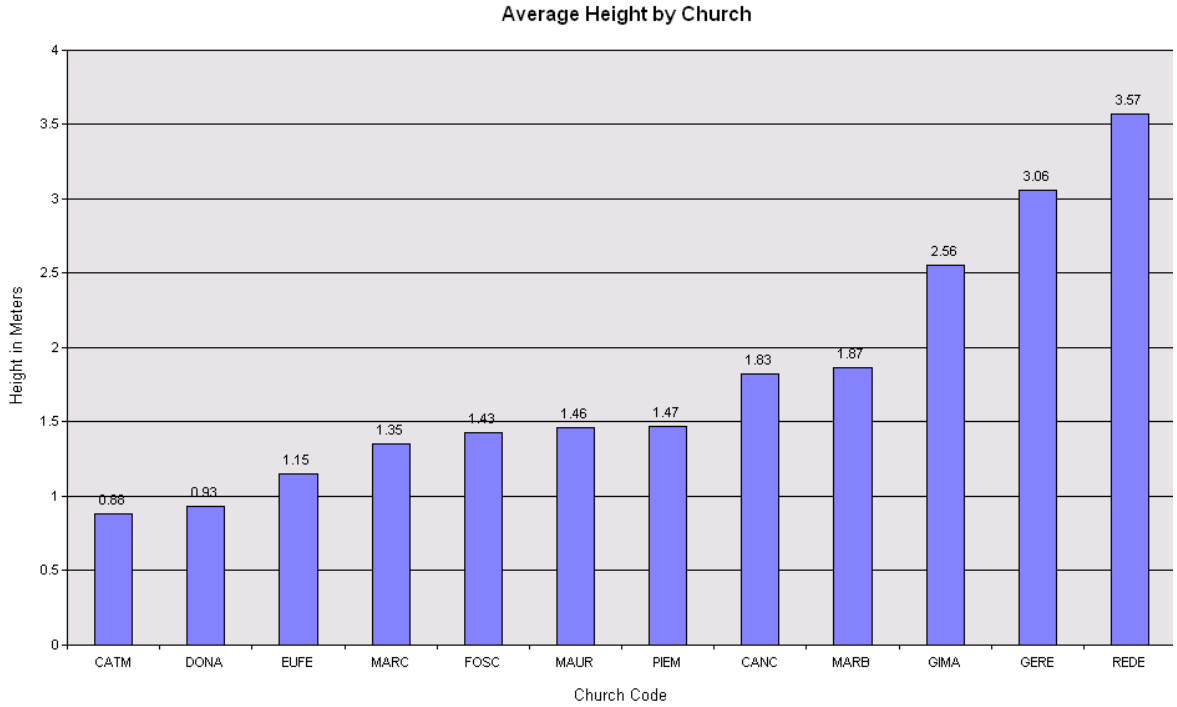


Figure 24: Average Quadrant Heights

Using the average quadrant heights the group was able to map the heights of the churches on a map of Venice. These maps can be viewed in Figure 25 and Figure 26.

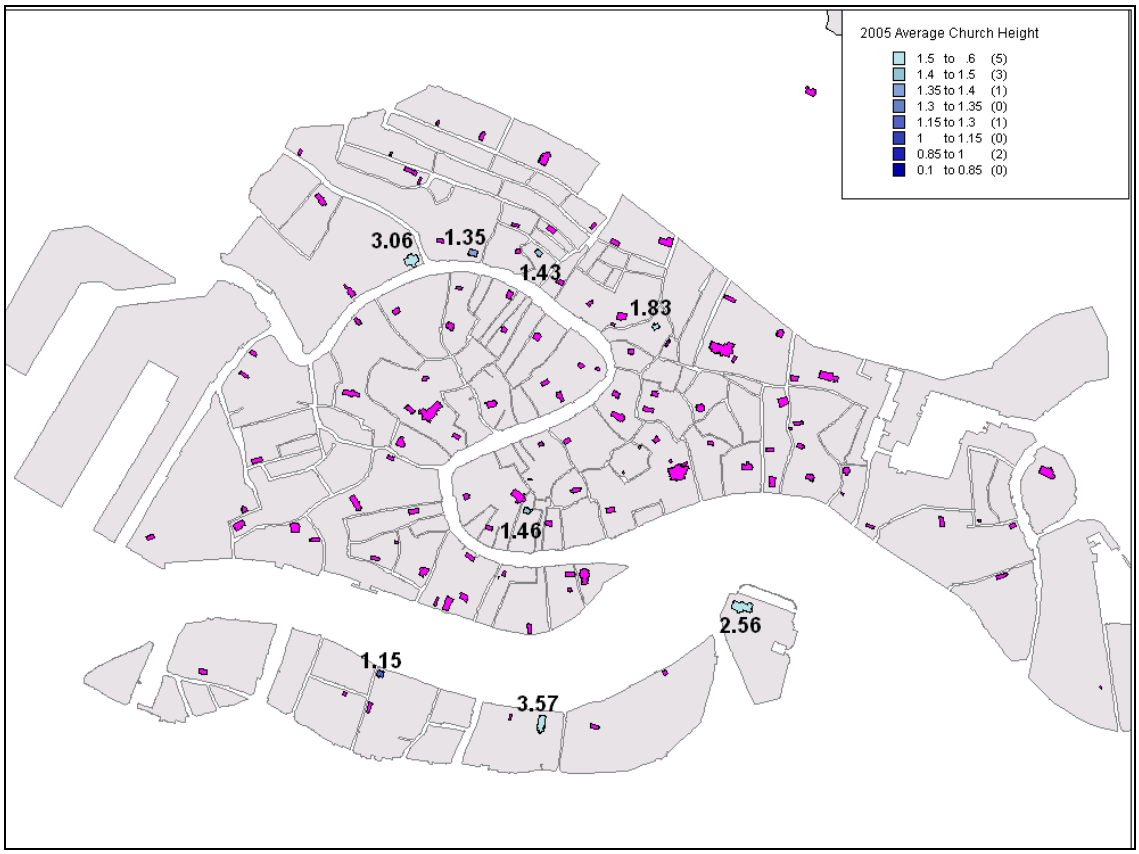


Figure 25: Venice Church Heights on 2005 Scale

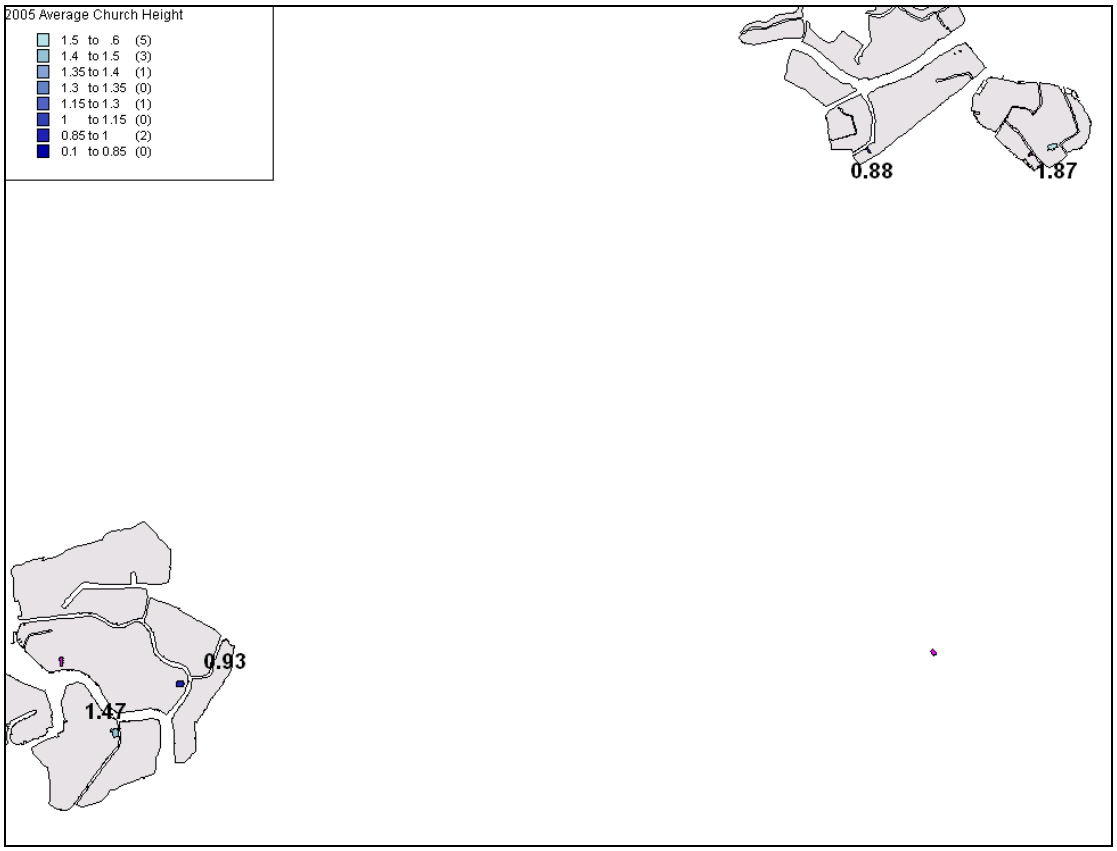


Figure 26: Island Church Heights on 2005 Scale

4.2 Quadrant Damage

Quadrant damage information was collected as previously described in our Methodology section. The collected information was entered into our Access database and Excel tables to obtain a number on the 0 to 4 damage scale. The average quadrant damage for each church was determined by taking the average of all the quadrant scores in that particular church. These scores were the average quadrant damage for each church that we studied, as shown in Figure 27. The church of Santa Fosca di Torcello (FOST) had only two quadrants and very little damage to the floors; therefore, its average damage score was 0. The rest of the churches in the graph have a significantly higher average damage score.

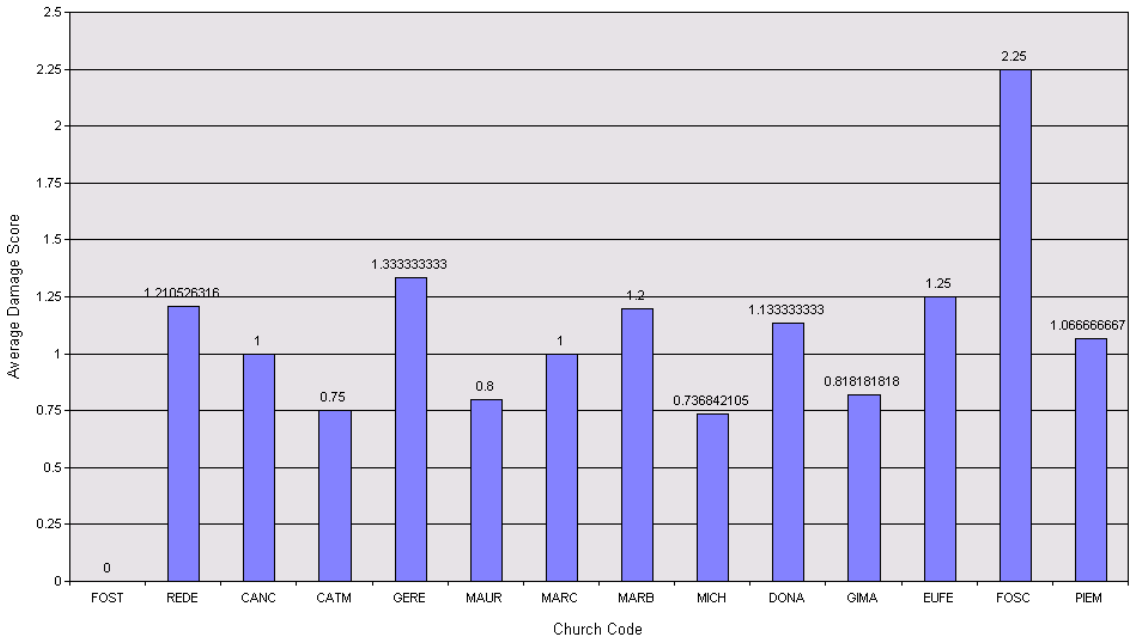


Figure 27: Average Quadrant Damage

To illustrate the overall damage of church floors we compared the damage score of each of the 181 floor quadrants. The percentage of the total quadrants that experienced each level of average damage is shown in Figure 28. Of the floor quadrants we studied nearly three-quarters of them, 73%, incurred a floor damage of 1. This information was all determined using the damage assessment formulas discussed in the Methodology Section.

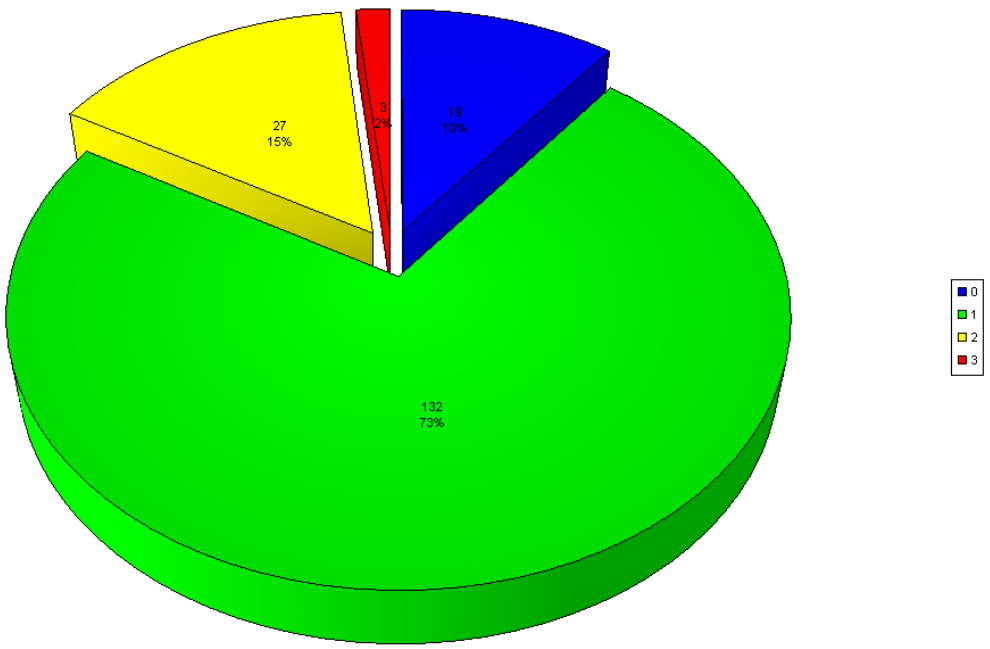


Figure 28: Quadrant Damage by Severity

4.3 Artifact Damage

To obtain the average artifact damage of each church, we first determined the damage to each artifact in the churches based on the 0 to 4 scale. Then, the damage scores for all the artifacts in that church were summed and divided by the total number of artifacts in the church, giving the church's average artifact damage. The average artifact damage for each church can be seen below in Figure 29.

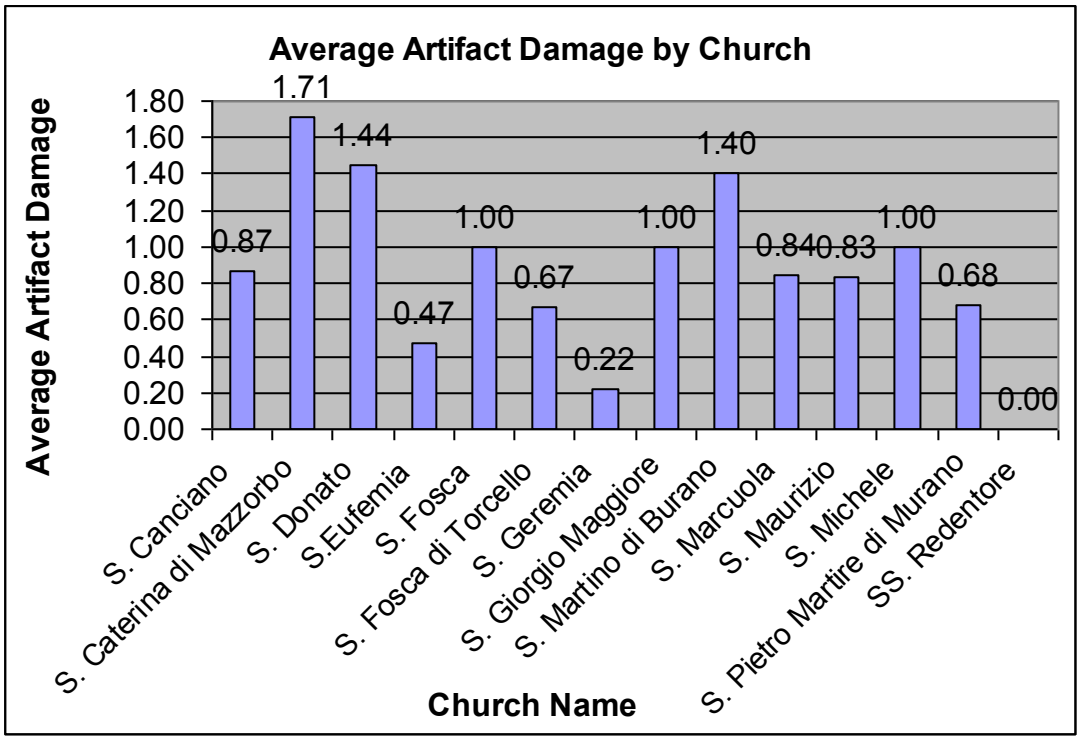


Figure 29: Average Artifact Damage

The continued breakdown of the artifact damage is shown in Figure 30, which shows the overall artifact damage severity. It is important to note that this figure does not indicate an average of the artifact damages; rather considers each individual artifact's damage rating. While 59 artifacts, or 23%, of those we surveyed experienced a damage severity of 0, the majority of the artifacts, 64%, sustained a damage level of 1. This dissemination is similar to that of the average quadrant damage shown in the previous section. The similar distribution of the two graphs will be discussed later in our Analysis Section.

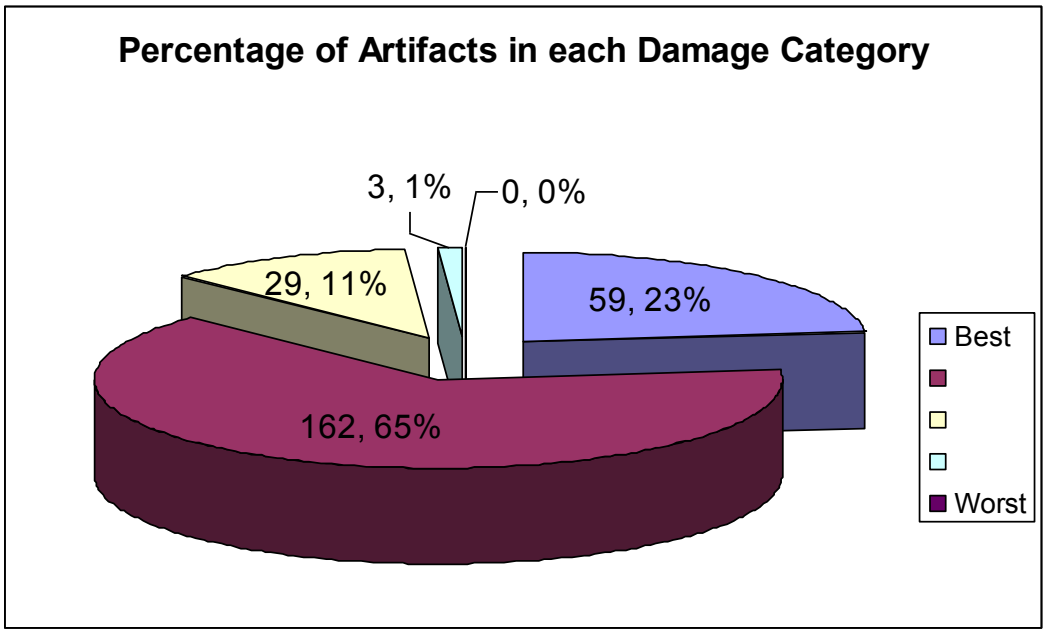


Figure 30: Artifact Damage by Severity

4.4 Artifact Readability

The damage experienced by the inscriptions contained in the artifacts of the church floors was determined using the readability scale, which ranges from 100 to 300. After receiving a preliminary score, these scores were standardized to the 0 to 4 scale. By averaging the readability scores of all the artifacts in a church our group was able to determining each church's average readability score, as shown in Figure 31.

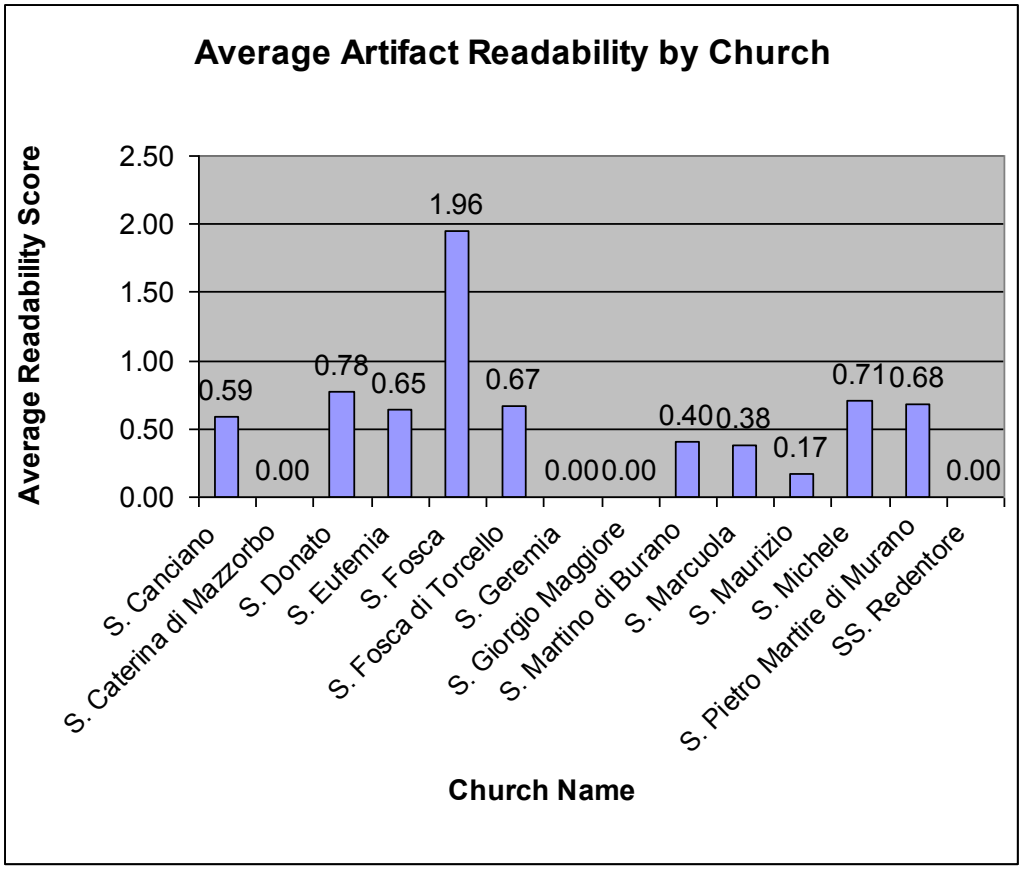


Figure 31: Average Artifact Readability on 0 to 4 Scale

The pie chart in Figure 32 takes into account each inscription and that inscription's readability score. The figure illustrates the breakdown of artifacts into the five categories of the 0 to 4 damage scale. Our results indicate that, of the 254 inscriptions, 68% sustained a readability score of 0. Based on the 0 to 4 damage scale this indicates that many of the artifacts are in very good condition. Of the total artifacts only 3% received a readability score of 4, indicating the highest damage for inscriptions.

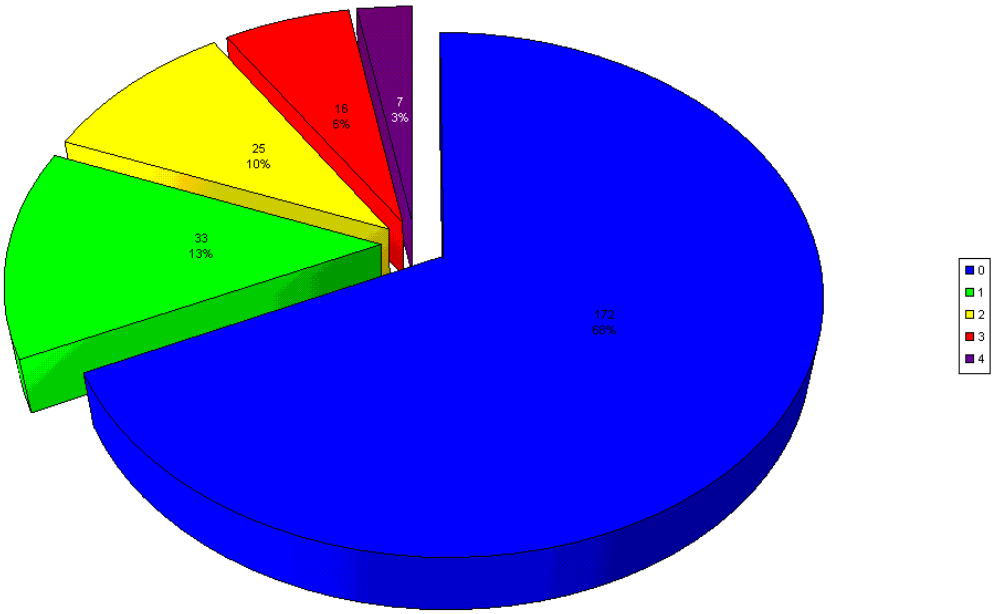


Figure 32: Artifact Readability by Damage Category

4.5 Pew Placement

During data collection our group noted the placement of pews within the churches. As described in our Methodology we measured the size of the pews; thus, we were able to measure the average percentage of quadrants that we covered by pews in each church. Of the 181 quadrants that we studied 103 contained pews and 78 did not contain pews. The one church that did not contain any pews, San Maurizio, is no longer being used as a church. The average percentage of pew coverage per church is shown in Figure 33.

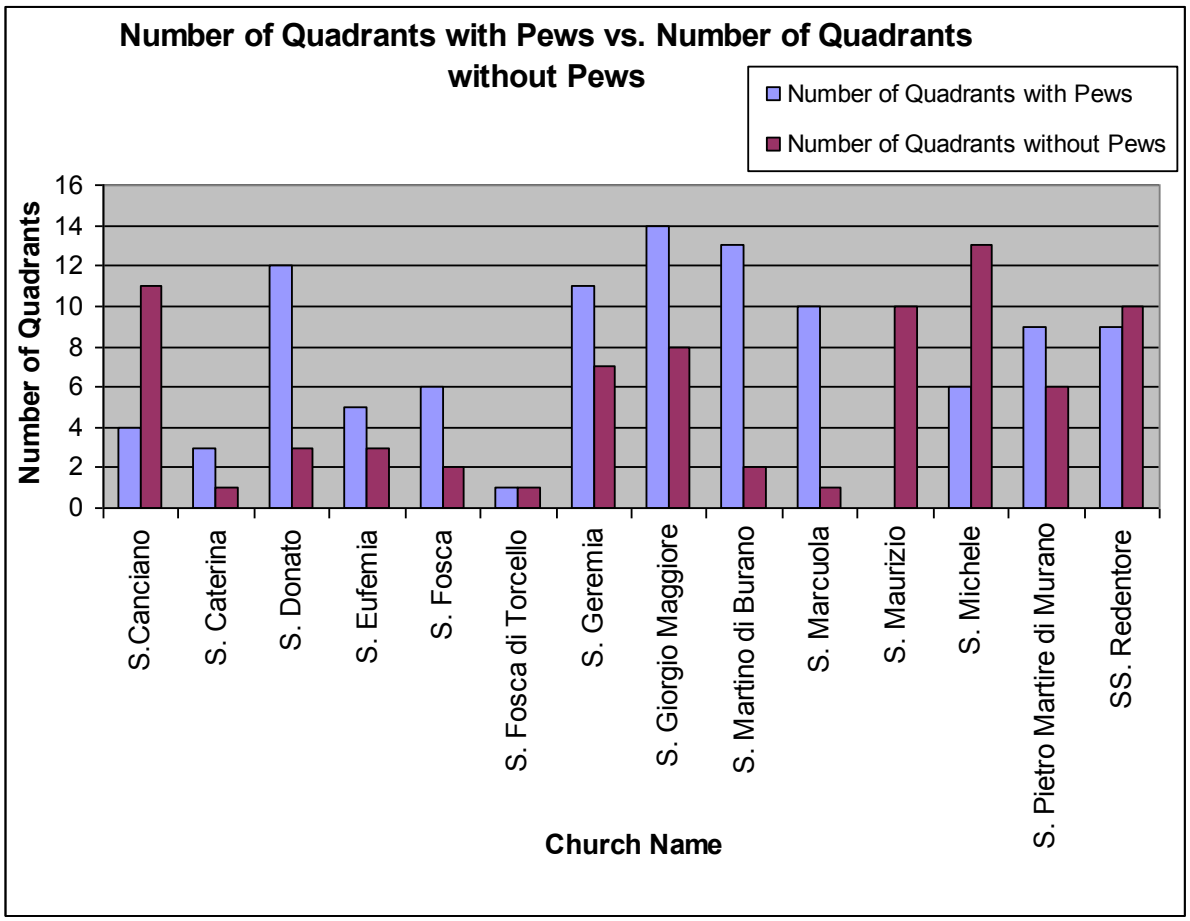


Figure 33: Church Quadrants with vs. without Pews

4.6 Individual Church Results

There are many parallels between the results of an individual church and the overall results of our study. To exemplify the consistency and show smaller scale results we use the example of Chiesa San Canciano. With 15 quadrants and 46 total artifacts this church provided us with a substantial amount of results for quadrant damage, artifact damage, artifact readability, and pew placement.

4.6.1 Quadrant Heights in Chiesa San Canciano

Following our Methodology, our group was able to measure the heights of every quadrant in the churches. Figure 34 shows the individual quadrant heights for Chiesa San Canciano. The legend in the figure shows the height range that correlates to each color as well as the number of quadrants in the range in parenthesis. To view the maps of the quadrant heights of the other churches refer to Appendix I: Church Information.

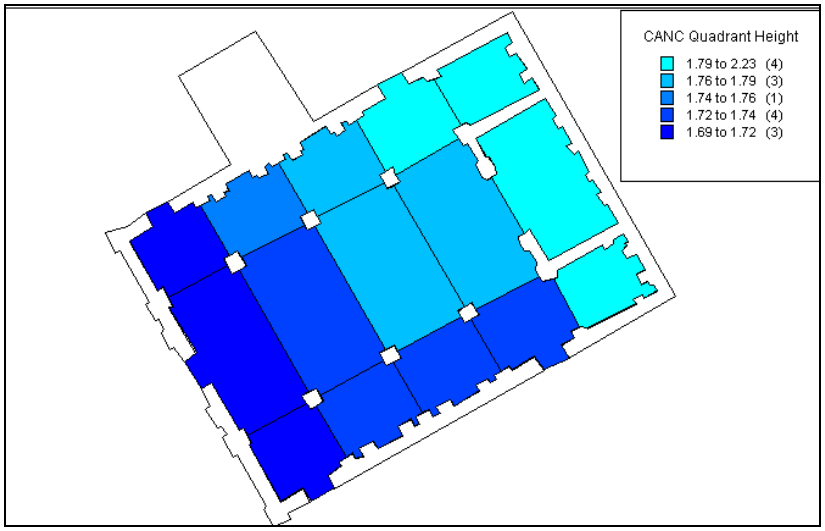


Figure 34: Quadrant Heights for San Canciano

4.6.2 Quadrant Damage in Chiesa San Canciano

Through the use of the damage assessment tables shown in Appendix C: Damage Assessment Tables, our group was able to determine the damage rating of each quadrant on the 0 to 4 scale. On this scale a score of 0 indicated the least possible damage to the quadrant while a score of 4 indicated the highest severity of damage. The most prevalent average damage score for the quadrants of San Canciano was a 1, with 11 out of the 15 quadrants receiving that score. The group collected individual quadrant damage information from every church in the study. To save space we have included a MapInfo image of the quadrant damage in San Canciano, shown in Figure 35. The quadrant damage for the remaining churches can be viewed in Appendix I: Church Information.

Figure 35: Quadrant Damage in San Canciano

4.6.3 Artifact Damage in Chiesa San Canciano

The artifact damage for the churches in our study was based on the 0 to 4 point scale. In Chiesa San Canciano the artifact damage was not distributed to all five categories of the damage scale. A majority of the artifacts in this church, 27, received a damage rating of 1. The remaining artifacts received damage scores that were distributed amongst the ratings of 2 and 0 with the latter receiving more than twice as many as the former. No artifacts in this church received a damage score of 3 or 4. Figure 36 shows a MapInfo image of the artifact damage for San Canciano. The legend in the figure shows the damage score that relates to each color, as well as the number of artifacts with that score in parenthesis. The artifact damage images for the other churches can be viewed in Appendix I: Church Information.

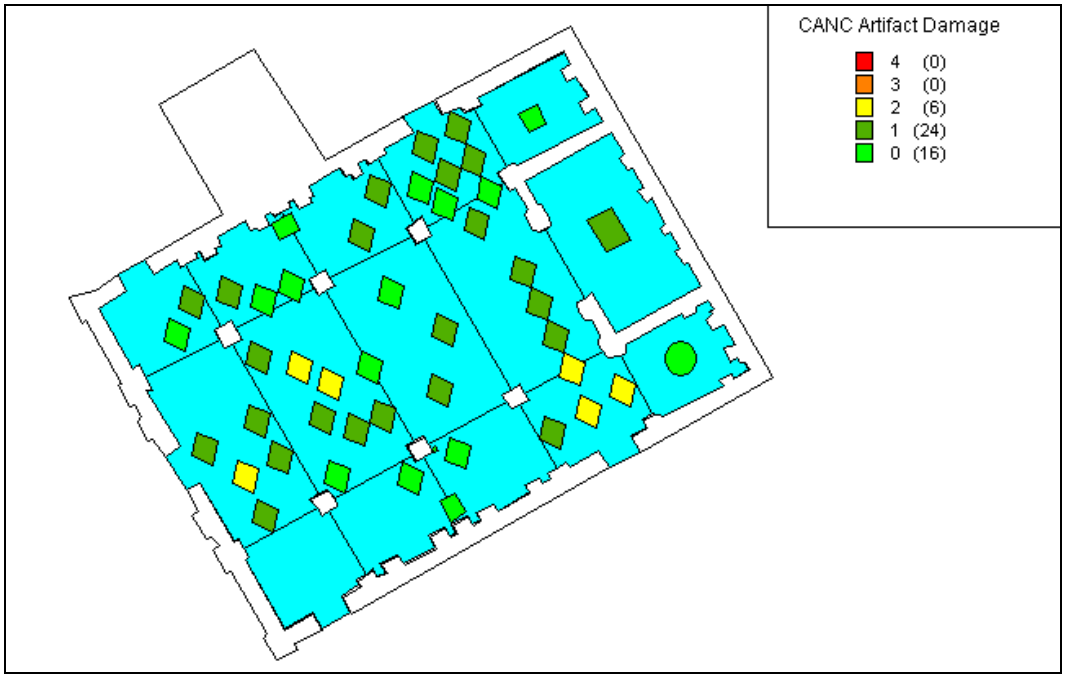


Figure 36: Artifact Damage in San Canciano

4.6.4 Artifact Readability in Chiesa San Canciano

The artifact readability scores for San Canciano correlate to the overall quadrant and artifact damage in the church. As shown in the previous figures, the church floors and artifacts did not receive a damage score higher than 2. Similarly, the majority of the artifacts in the church received low readability scores. This indicates that there is a low occurrence of damage to the artifact inscriptions. Furthermore, the correlation between the data demonstrates the consistency of our groups' results. A MapInfo image of the artifact readability in San Canciano can be seen in Figure 37.

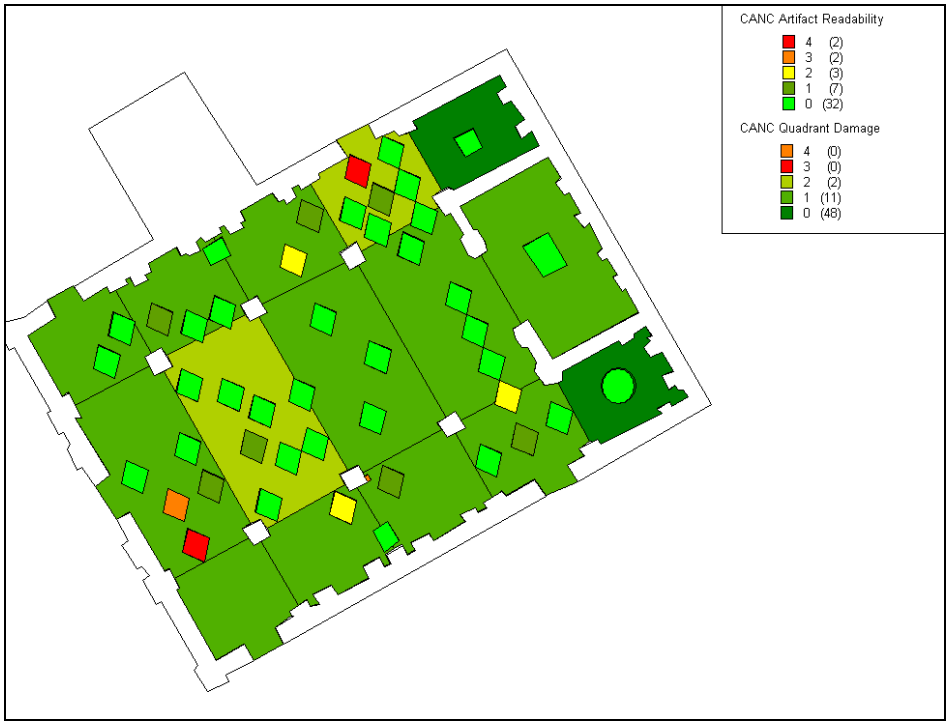


Figure 37: Artifact Readability in San Canciano

4.6.5 Pew Placement in Chiesa San Canciano

The group used MapInfo images to map the placement of pews within each church. Pew placement and size may later correlate to quadrant and artifact damage. An example of the pew placements in San Canciano can be seen in Figure 38.

Figure 38: Pew Placement in San Canciano

5. Analysis

After finishing data collection and gathering results, our group made an analysis of the information on church floors. Prior to field work our group postulated sources of damage to the floors to be flooding, pew placement, and the usage of the church. We were able to explore the accuracy of predictions on different causes of damage, correlations between types of damage, and be critical of the damage formulas created by previous groups.

Correlations and comparisons were made between artifact damage, quadrant damage, and artifact readability to ascertain the most likely causes of damage. We also continued data extraction from inscriptions. Our analysis led us to restructure many forms and tables within the database in order to manipulate the information in a useful way.

5.1 Flood Vulnerability

To assess a church's flood vulnerability our group made correlations between the height of the church and the damage the floors incurred. Assessing a church's flood vulnerability explores the relationship between average quadrant height for each church and the church's quadrant damage.

To assess each church's flood vulnerability the group used the elevation measurements calculated during data collection. Based on the average quadrant height and the door height of each church we were able to compare elevation heights to floor damage within each church. Our group used an overall scale to map out each church and its quadrants in MapInfo, giving us a greater basis of comparison to make an analysis. We were able to compare all the churches against each other because of the standard scale. The overall height scale that the group created was based on many factors, particularly flooding frequency and vulnerability.

Of the 181 quadrants that our group studied, we were able to calculate quadrant heights for 159. The quadrant heights we were unable to calculate were a result of the elevation heights for the island churches being unattainable. Although 60% of the quadrants we studied had heights above 1.50 meters, elevations this high were considered invulnerable to flooding. Of the churches studied, there were only seven quadrants with measured heights below 0.85 meters. Given these parameters we were able to create an appropriate scale by which to measure flood vulnerability. The complete scale for quadrant heights used to determine flood vulnerability can be seen in Table 3.

Quadrant Height Intervals	Number of Quadrants in Interval
< 0.85 m	7
0.85m - 0.99m	8
1.0m - 1.14m	7
1.15m - 1.29m	4
1.30m - 1.34m	11
1.35m – 1.39m	7
1.40m – 1.49m	19
> 1.50 m	96

Table 3: Quadrant Height Intervals

To explore flood vulnerability as a damaging factor our group broke the quadrant height scale into three intervals. These intervals denote the three quadrant categories of vulnerability. Quadrants with heights of less than 1 meter were considered very vulnerable to flooding, quadrants with heights ranging between 1 to 1.4 meters were considered somewhat vulnerable to flooding, and those quadrants measured above 1.4 meters were considered invulnerable to flooding. The breakdown of the average quadrant damage for these three quadrant ranges can be seen in Figure 39.

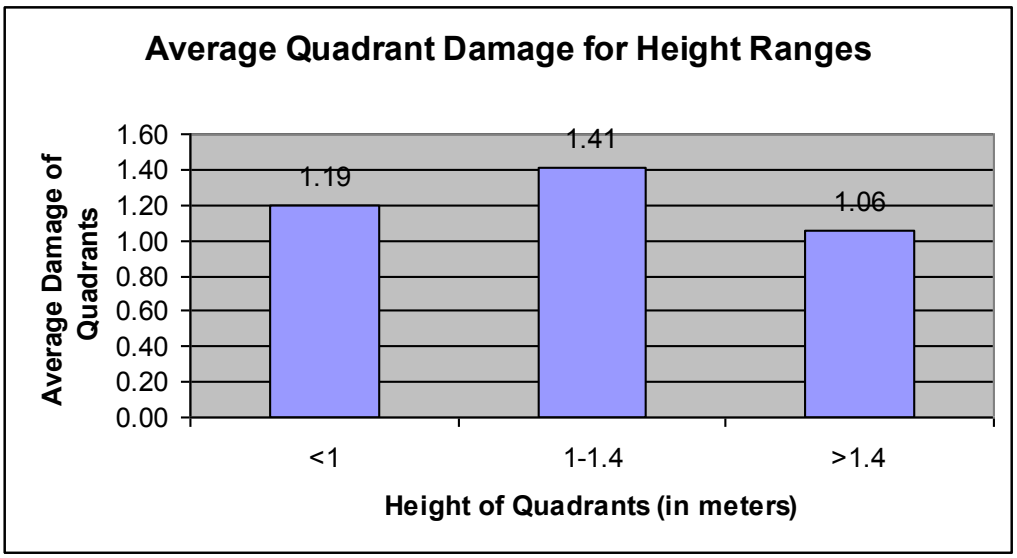


Figure 39: Damage in Height Intervals

As shown in the previous figure, no correlation can be made between quadrant height and floor damage. The quadrants in the central range of elevation levels had the overall highest quadrant damage, while the quadrants with the lowest elevation levels had the second highest average quadrant damage. To make a more comprehensive analysis of flood vulnerability the group assessed the average height of the damage categories of quadrant damage that we encountered during field work. Our group did not find any quadrants with a damage score of 3 or 4, therefore these categories could not be evaluated. The average heights for the remaining damage categories can be seen in Figure 40.

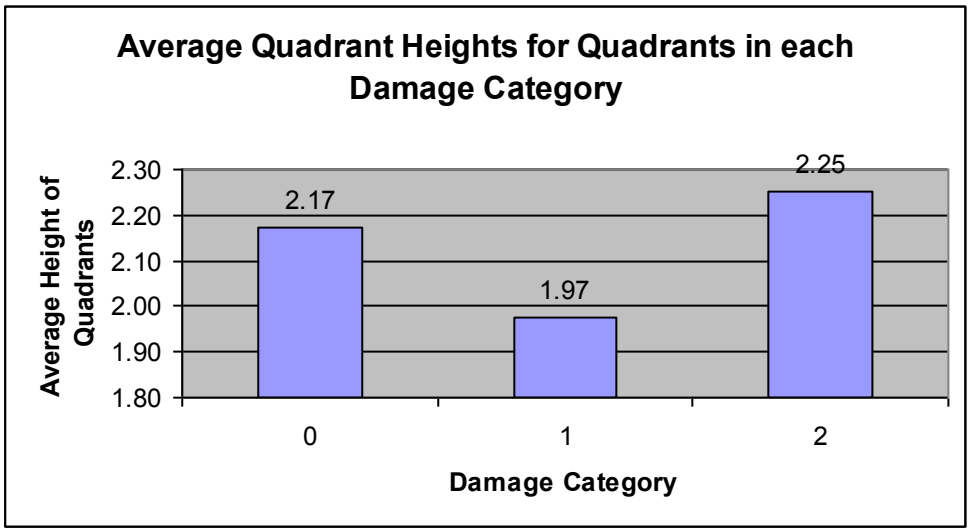


Figure 40: Average Quadrant Height for Damage Categories

Prior to analysis our group postulated flooding to be one of the most significant causes of damage to floor and artifacts. However, after a thorough analysis of church heights and the correlating damage scores of the floors, our group has concluded that flooding and a church's vulnerability to flooding is not a significant factor in floor damage. Assessing the heights and damages of all 84 churches that have been studied through IQP projects in Venice, Italy would show more clear and complete results on flood vulnerability.

5.2 Usage

To examine floor damage our group examined areas within each church that experienced more severe damage or wearing. During our data collection we noted quadrants that contained entrances and those that did not and the number of masses per week in each church. Using this information and the GIS maps of quadrant damage we were able to explore the usage of a church as a possible cause of damage. The graph in Figure 43 shows the numbers of quadrants with the presence of entrance ways.

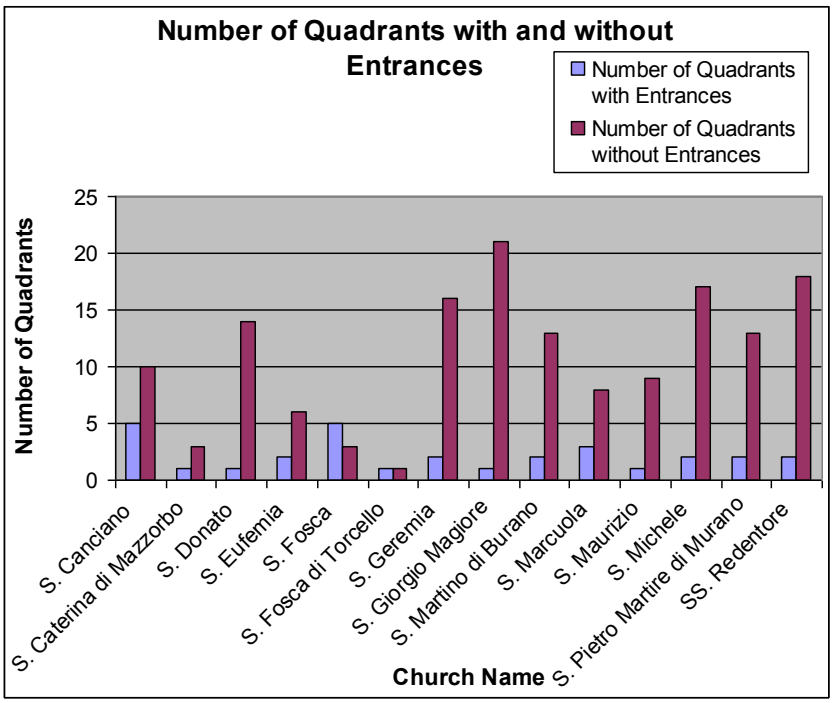


Figure 41: Quadrants with and without Entrances

From our GIS maps we were able to identify quadrants in each church that had more severe quadrant and artifact damage. Our group postulated that quadrants with entryways and areas that were central within the churches would incur higher floor and artifact damage scores than those along walls or in areas with lower foot traffic. During data collection our group noted the presence of an entryway in each quadrant.

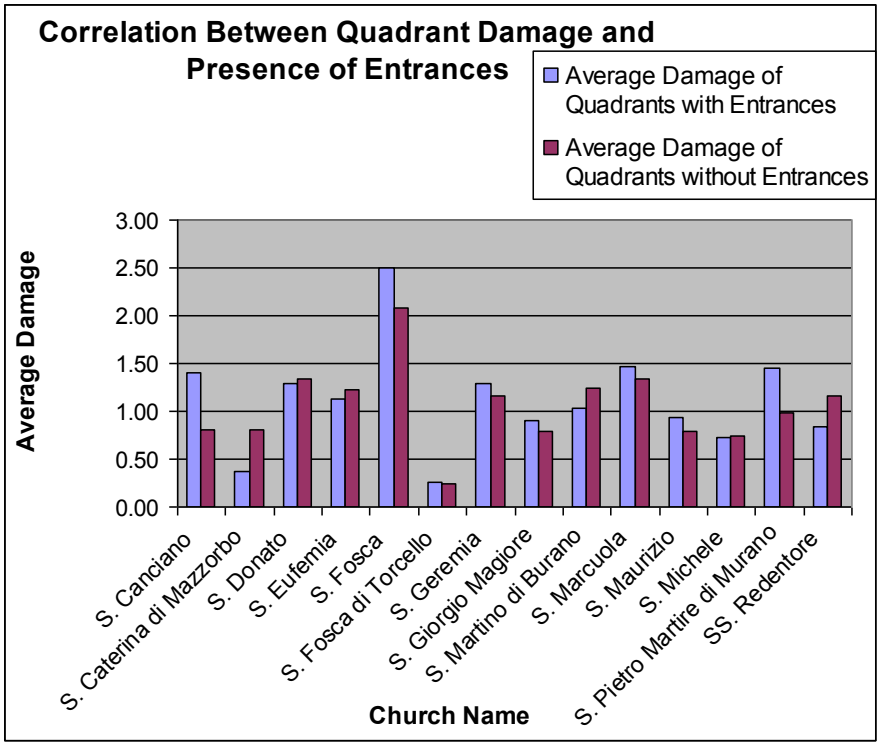


Figure 42: Damage in Quadrants with and without Entrances

During data collection the group noted whether or not quadrants contained entryways. In most cases entryways were doors leading outside of the church, but also included doors into separate rooms or chapels. Quadrants with entryways did not have a significantly higher rate of damage than quadrants that did not contain entryways. In Figure 43 we see the floor and artifact damage for Chiesa San Giorgio Maggiore. The areas in darker green denote the highest level of floor and artifact damage within the church. The overall floor damage for the church is the same. The Areas in which the floor damage is higher do not have entryways. Our analysis of the presence of entryways does not identify them as a significant factor in floor and artifact damage.

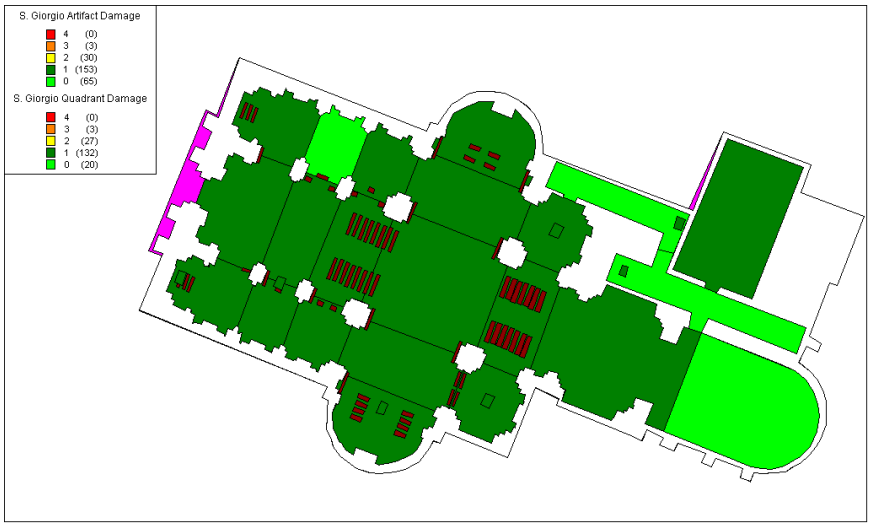


Figure 43: Quadrant and Artifact Damage in S. Giorgio Maggiore

To assess the usage of a church our group also considered the number of masses per week that occur in each church. The frequency of masses indicates the popularity of a church among the population. Thus, prior to data collection our group postulated that the higher the number of masses per week the more significant floor damage would be. The graph in Figure 44 shows the number of masses per week in each church compared to the average quadrant damage.

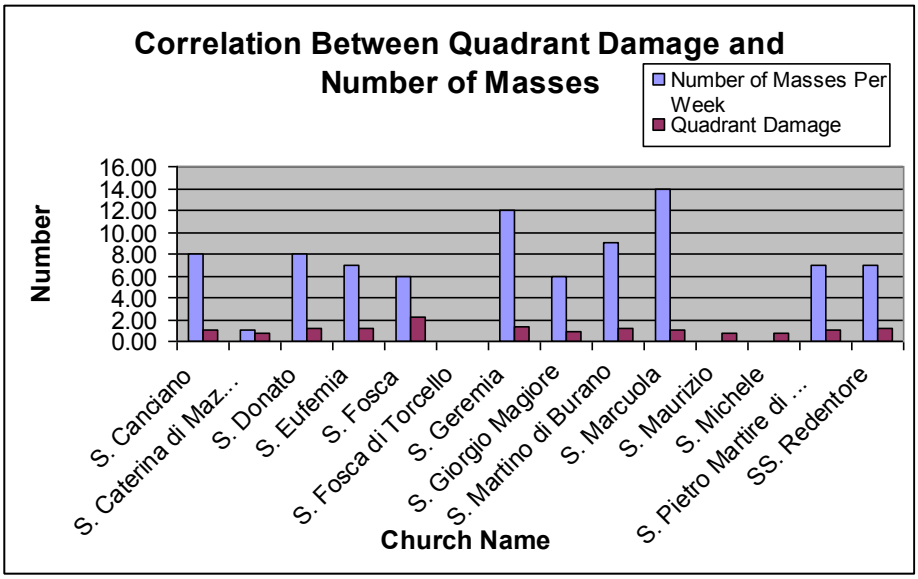


Figure 44: Number of Masses per week

Looking at the graph in the previous figure it can be seen that there is no correlation between the number of masses and the average quadrant damage in a church. The average floor damage compared to mass frequency appears to be arbitrary. Therefore, this type of usage is not considered a significant factor in floor damage.

5.3 Relationship Between Quadrant Damage and Pew Placement

Prior to examining the data our group considered pews to one of the most significant factors in floor damage. During field work the group measured the size of pews within each church and noted the percentage of each quadrant that was covered by pews. Through these measurements and comparing the placement of the pews in each quadrant we were able to more accurately assess the importance of pews' presence in floor damage.

During our assessment of damage to the floors, our group noted additional damage to church floors that may be related to the placement of pews. In the churches we studied, the design of the pews allowed them to rest all of the pew's weight on only a few points on the floor. The small legs of the pews create less surface area for the weight of the pews, and the people they support, to be spread out upon. However, even given this drawback of pew placement, pews pose little threat to the condition of the church floors.

The pie chart in Figure 45 shows the average damage of quadrants containing pews and that of quadrants that do not contain pews. Approximately 50 percent of the quadrants we surveyed contained pews. According to our results, the presence of pews does not contribute to floor damage. The average floor damage for both categories of quadrants was almost exactly equal.

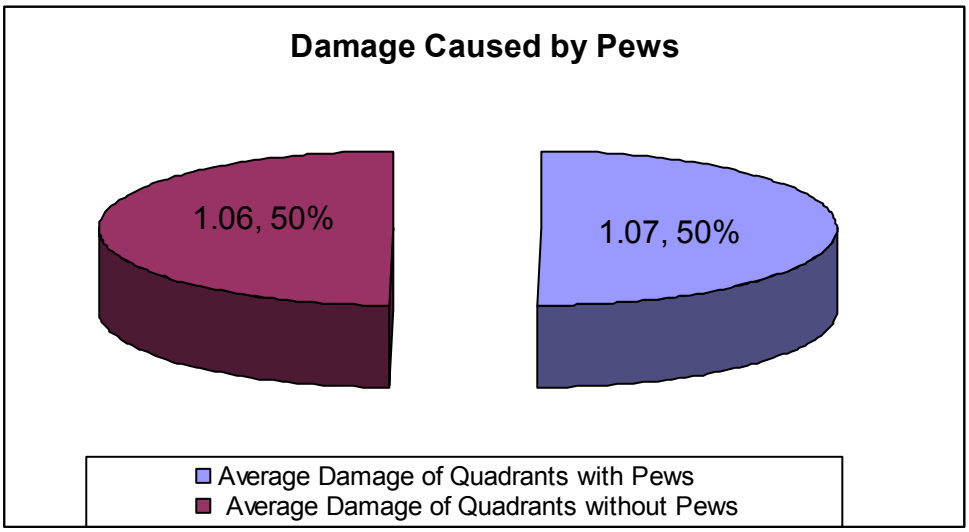


Figure 45: Quadrant Damage with versus without Pews

The overall damage scores for quadrants with and without pews for each church can be seen in Figure 45. This graph shows that pews have little or no effect or quadrant damage scores. After assessing the relationship between the damage category of surface damage and pews, our group found that pew presence actually prevented damage to the floors. Our group concluded that the presence of pews is not a significant factor in the damage of the floors and that these seating areas can help prevent surface damage by covering the floors from higher foot traffic.

5.4 Relationship Between Quadrant Damage and Artifact Damage

Our group explored the correlation between quadrant damage and artifact damage to determine if the presence of artifacts in floors created a higher severity of floor damage. Prior to field work we considered artifacts to cause more damage to floors. This idea was based on the fact that artifacts are often taken out of the floors leaving chips and cracking around the edges of tiles adjacent to the artifacts. Also, tiles around artifacts tend to have higher joint gaps than those that are not, and joint gaps are considered a significant cause of damage to quadrants.

The graph in ** compares the average damage scores of

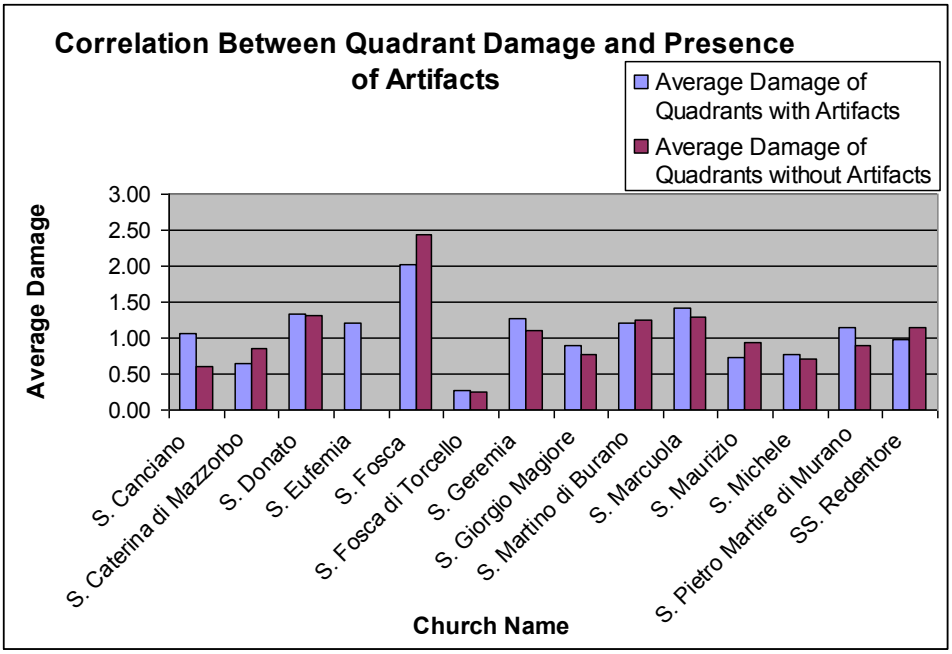


Figure 46: Correlation between Presence of Artifacts and Quadrant Damage

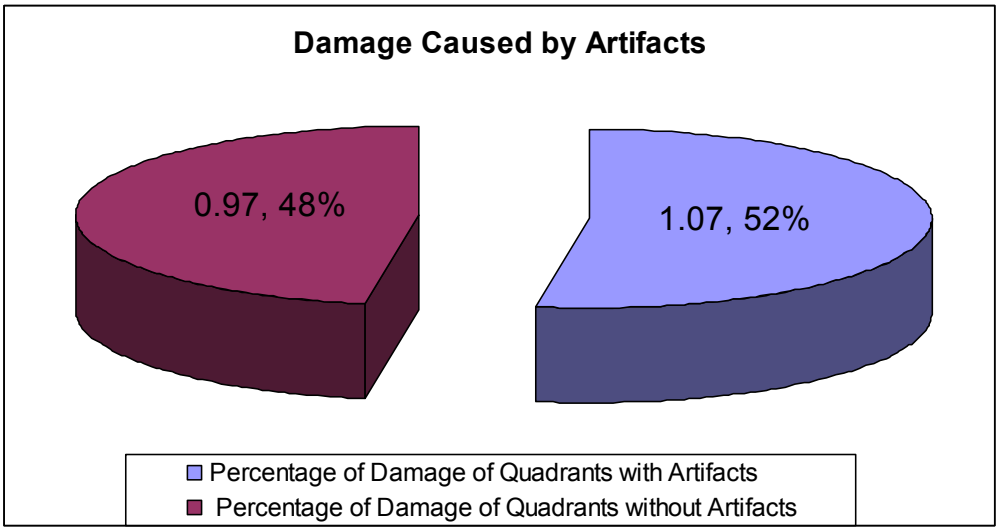


Figure 47: Artifact contribution to Quadrant Damage

Our analysis for testing artifact presence as a source of damage to church floors is inconclusive. The amount of artifacts in a quadrant does not significantly affect the overall damage score of the floors.

5.5 Relationship Between Artifact Damage and Readability

The group's results indicate that the greater the damage score of an artifact on the 0 to 4 damage scale, the higher the readability score of the artifact. The higher the readability score of an artifact the more illegible it becomes. There is an unmistakable correlation between an artifact's surface damage and

the legibility of its letters. Illegibility of inscription also stems from general wear and tear on church floors. The more an artifact is walked on, the smoother the surface of the artifact becomes, inevitably wearing away the inscription.

5.6 Types of Damage and Weights

To assess the accuracy of the damage formulas for quadrants and artifact damage our group looked at the different types of damage and their overall percentage of damage.

The graph in Figure 48 shows the averages of the breakdown of damage categories for each church. As can be seen there were average holes totals of 0 percent for all the churches except for three. This shows that holes have little or no significance in the overall damage to floors. Currently the damage scale lists holes with a weight of 0.1 or 10 percent on the overall scale. This weight is more than is necessary to assess the damage caused by holes in the floors. The damage category of holes should be given a new weight of 0.05 or 5 percent.

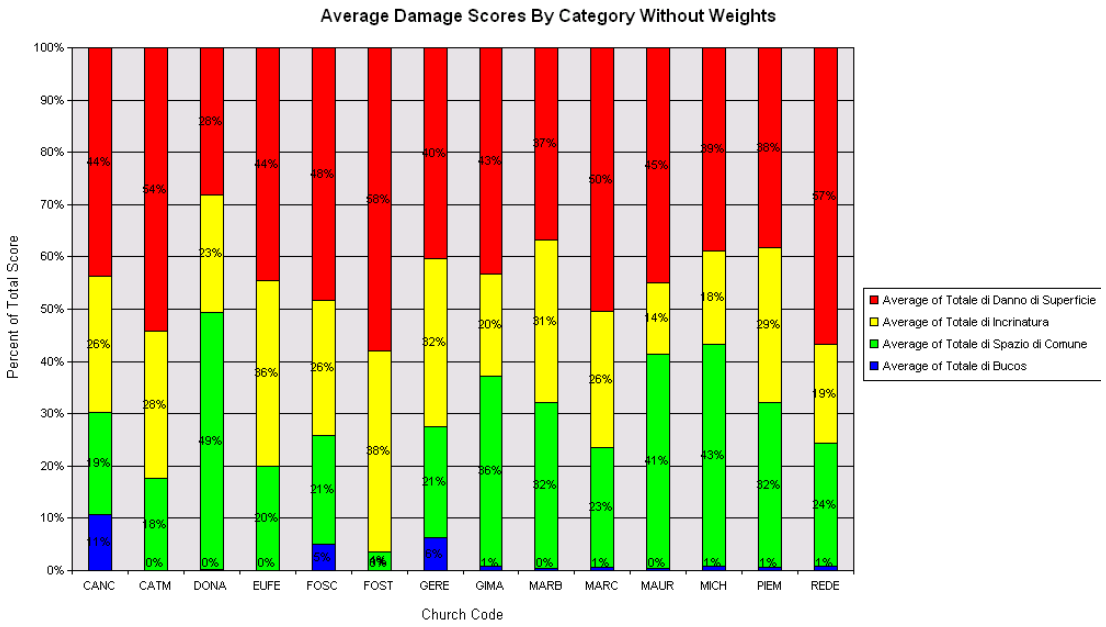


Figure 48: Average Damage Scores without Weights

It can also be seen from the figure that surface damage plays the largest role in quadrant and artifact damage. Currently, surface damage is given a weight of 0.5 or 50 percent. This weight should be increased to a value of 0.65 or 65 percent. This higher figure more correctly reflects the detrimental effects of surface damage.

Floor areas with higher joint gaps have a higher occurrence of tile chipping around the edges. However, this occurrence is not so prominent as to deserve a damage weight of 0.2 or 20 percent. The damage category of joint gaps has little effect on the overall damage to the floors. Therefore, the weight for this category should be reduced to 0.1 or 10 percent.

The damage category of cracks has a significant effect on the legibility of letters in artifact inscriptions. Higher severity cracks in artifacts and floors lead to larger problems. This cracking allows further water damage and severe chipping to the surface of the object. Cracks in the floors currently have a damage weight of 0.2 or 20 percent. This damage weight is appropriate for the significance of cracks to floor damage.

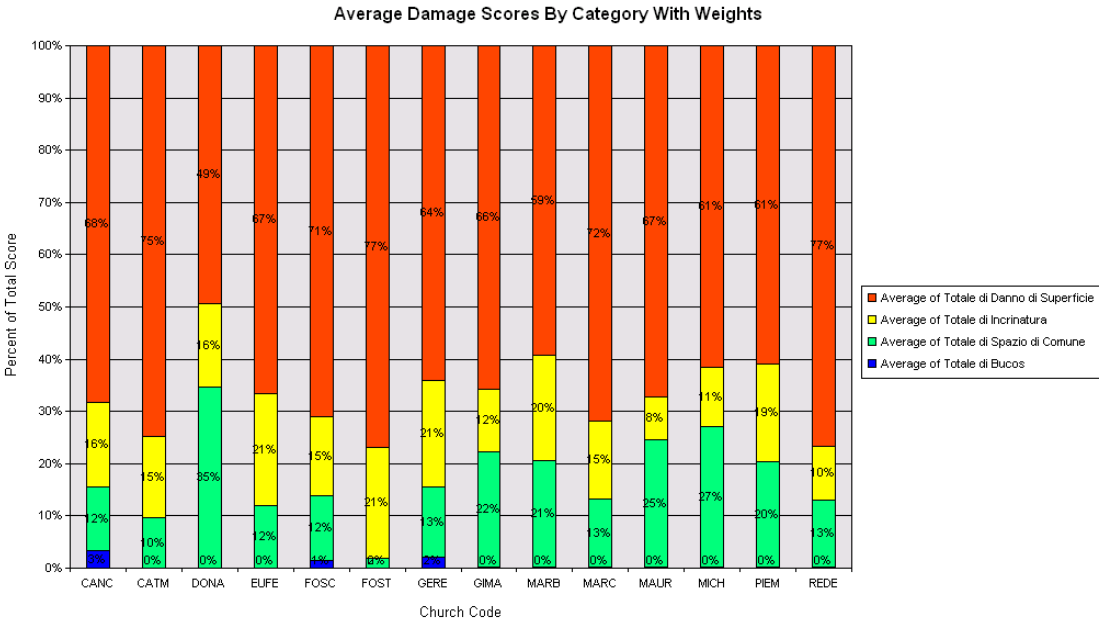


Figure 49: Average Damage Scores With Weights

The damage scale for assessing quadrant and artifact damage has significant problems with the weights given to each category. The scale should be reassessed to more accurately compute the damage to church floors.

5.7 Artifact Inscriptions and Data Extraction

Many of the artifacts that our group studied were tombs or plaques that contained inscriptions. The inscriptions often included basic information about the person buried there. The graves could be a tomb for a single person, an entire family, or a grouping of people such as priests of that particular church. The information that we gathered allowed us to analyze the inscriptions for their historical content. Our analysis shows a substantial correlation between burial practices and the social atmosphere of Venice throughout the city's history.

With assistance our group translated the Latin inscriptions and extracted information from them. To analyze the information we chose fields of interest that were likely to appear on most tombs. Such fields included whether or not the bones of a person were buried or ashes. A complete list of the data fields we extracted from the artifacts, as well as their English translation, can be seen in Table 4.

Latin	English
Cineres	Ashes
Prete	Priest
Patrizio	Nobel
Forestiero	Foreigner
Plebeo	Plebian
Ossa	Bones
Capitulare Sepulcrum	Grave
Famiglia	Family

Table 4: Fields for Inscription Analysis

Our group went through all of the artifacts that we extracted inscriptions from and categorized the types of people that might were found buried in the church tombs. The graph in Figure 50 shows the breakdown of the 254 artifacts that we cataloged. Out of the total artifacts we did the most common type of tomb we encountered were family tombs. These were often erected in memory of a single person and later other family members were added to categorize it as a family tomb.

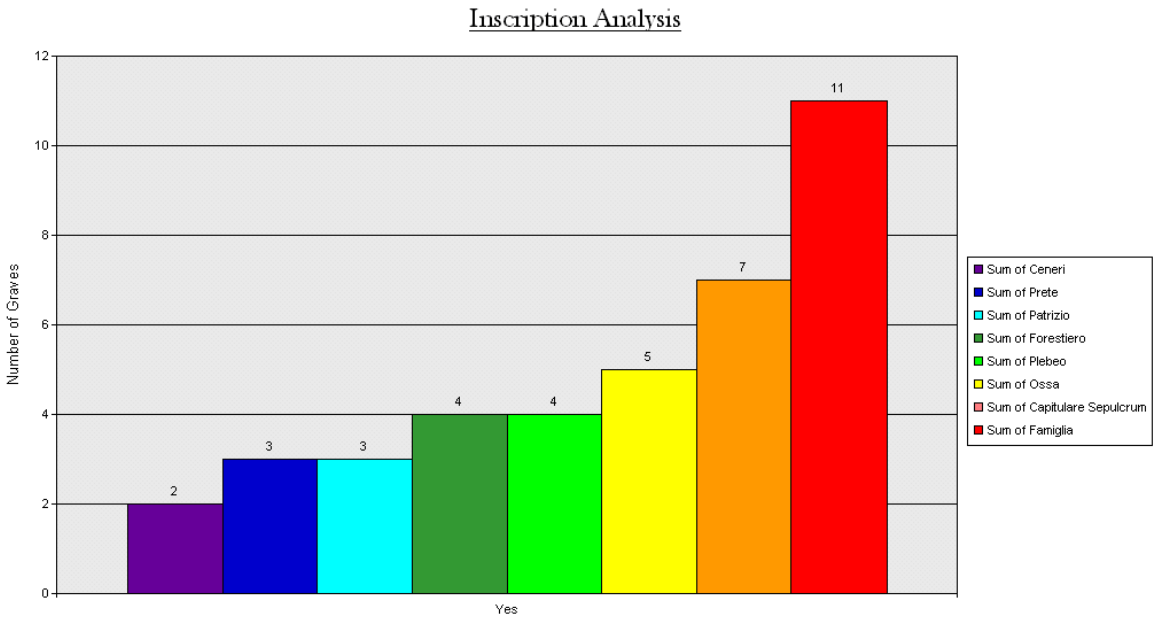


Figure 50: Inscription Analysis

During the study of church floors our group encountered four graves of foreigners. These tombs often contained the bodies of merchants or traders who were famous for their travels and selling of goods. Two tombs of foreigners were found in Chiesa San Canciano. Both men were merchants from the Hague. On their tombstones it is clearly indicated that they were not Catholic. The burial of non-Catholic persons inside a Catholic Church is not very commonplace. These burials are an indication of the social ideals of Venice.

The city of Venice was a major port for hundreds of years. Many different types of people lived and worked together in the small city. Thus, over time Venetians became more accepting of outsiders or foreigners. The burials of foreign, non-Catholic merchants in Catholic Churches, the most sacred

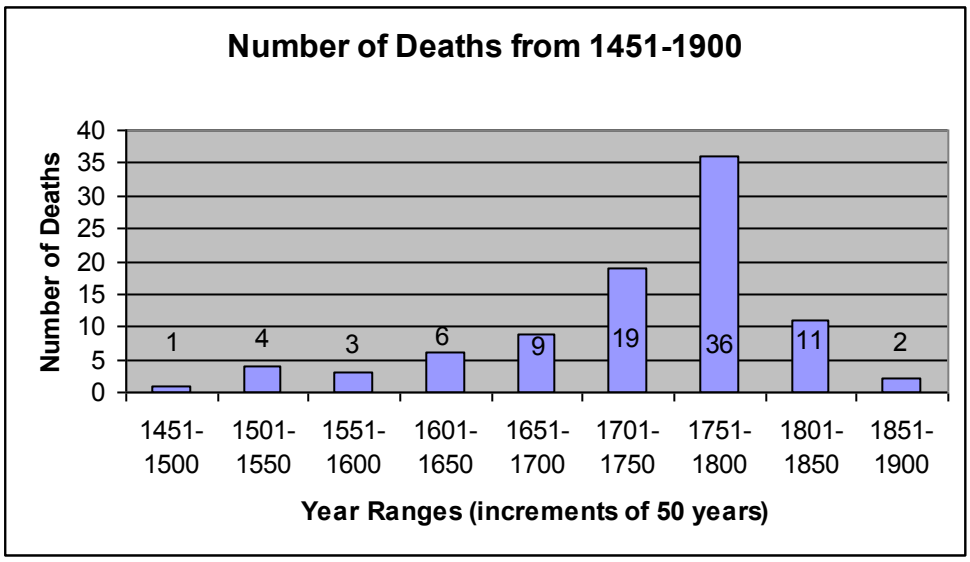


Figure 51: Dates of Death in Inscriptions

buildings in the city, shows their social views and open mindedness toward outsiders.

Figure 51 shows the breakdown of the years in which the artifacts were laid in the church floors. The graph is split into 50 year ranges to span the more than 400 year range of the artifact ages. Very few of the artifacts that we cataloged dated from before the 17th century. As the floors in churches change or are replaced over the centuries, artifacts can be lost, broken, or left beneath the surface. The change in church floors over time contributes heavily to lack of presence of older artifacts.

The majority of the artifacts we studied dated from the mid to late 1700's, after which point the number of artifacts declines steeply. The reduction in artifacts has a direct correlation to the social and political atmosphere of the 19th century. As discussed in our Background section, Napoleon Bonaparte outlawed church burials in Venice around 1800. This new law accounts for the change in the practice of church burials, as well as for the existence of such a quantity of artifacts that date back more than 200 years.

6. Conclusions and Recommendations

Our group explored the possible damaging effects of flood vulnerability, pew placement, and church usage. Based on our group's results and analysis there we found no significant factors that attribute to floor and artifact damage. Although the aforementioned factors all contribute to the damage incurred on church floors, we were able to categorize any as important factors. One damaging factor that we explored, pews, actually proved to be helpful in preserving the condition of the floors.

Our teams' recommendations, should there be any future church floors groups, would be to reorganize the database of church information. Although the database contains a wealth of historical information it needs to be made more searchable. The database needs more work in terms of artifacts and artifact inscriptions.

Although the inscriptions were extracted to the best of our ability, many of them contain mistakes or holes where information is missing. A group with a larger linguistic background would be more useful to extract this information and make corrections to the current database. A point of origin would be to check the artifact pictures to correct grammatical and spelling errors. Also, entering the inscriptions as they appear on the artifacts, for example with the correct line breaks, would make the database more accurate.

If the database were reworked the inscription information could analyzed for its deeper historical value. The artifacts found in churches reveal a lot about the social workings of Venice. By correcting the inscriptions there would be a larger database of information from which to draw conclusions about Venetian history. The information contained in the artifacts is in danger of being lost if it is not cataloged correctly; therefore, correcting the mistakes in the database is imperative to maintaining the information.

Also, a new damage scale that takes into consideration our groups analysis of the current damage scale would be necessary. The current assessment equation does not place enough emphasis on the most significant damaging factor to floors, surface damage. Other damage categories such as holes and joint gaps receive weights that are too high. The inconsistency of the scale with the importance of each factor significantly changes the overall scores of quadrant and artifact damage.

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Appendix A: Annotated Bibliography

Past IQPs

Scott Blanchard, Jeffery Caputo, Matthew Regan, Matthew Shaw. An Analysis of the Archeological Potential of Venetian Church Floors, Venice, Italy, 2004.

This was the 2004 IQP on Venetian church floors. It was extremely useful in the completion of our IQP. It contains a complete collection of all the data gathered by the past three Church Floor groups in a uniform style.

Hilary Lohnes Hayes, James Liu, Christian A Salini, Alexis Steinhart. An Archeological and Analytical Study of Venetian Church Floors, Venice, Italy, 2003.

This paper was developed by the 2003 Venetian church floors group, much of the information in the report was restated or reworked in the 2004 group. It was very long and included a lot of unnecessary information in it.

Amanda Delaive, Elaine Kristant, Craig Petrowski, Luiz Santos. The Church Floors in Venice, Italy: An Archeological Study and Analysis, Venice, Italy, 2002.

This was the first report done by WPI students on Venetian church floors. This report was the least useful out of the three because much of the information and methodology contained in this report was changed by the subsequent groups.

Funerary

Curl, James Stevens. A celebration of death. New York: Charles Scribner's Sons, 1980

This book was of some use. It gives an introduction to funerary artwork, architecture, and traditions around the world. It helped give us an understanding of why things where done the way they were with regards to tombs in Venice.

New Advent. http://newadvent.org/cathen/03504a.htm

This website contains a wealth of articles on every aspect of the Christian faith. The article that was used contained information on burial practices from early Christians to present day.

Architecture

Galardi, Alberto. New Italian Architecture. Frederick A. Praege: Publishers, 1967

This book was useful in understanding the general Architecture and layout Venetian church's and church floors. It has many diagrams and descriptions on the arrangement of church floors.

Goy, Richard. Venice: The City and its Architecture. London: Phaidon Press Limited, 1997.

This book is an excellent source of information for the background section on church construction. It discusses in detail how the foundations were built, the materials used for construction, and the limitations to building in Venice. There are also useful pictures of church floors plans that were utilized in our methodology.

Hills, Paul. Venetian Colour: Marble, Mosiac, Painting and Glass. New Haven and London: Yale University Press, 1999

This book has an entire section dedicated to Venetian church pavements. It takes a look at pavements from an artistic perspective.

Meeks, Carroll. Italian Architecture. New Haven and London: Yale University Press, 1966.

This is a very in-depth book, which covers all types of Italian Architecture. It discusses different styles of churches, but was too broad to be useful.

Ruskin, John. Stones of Venice. New York: John Riley and Sons, 1884

This source has a detailed account of architecture and construction techniques used in early Venice.

Floors

Norwich, John . Decorative floors of Venice. London: Merrell publishers limited, 1999

As the title suggests this book is focuses exclusively of the Venetian floors. It was helpful when looking at the floors from an artistic and historical perspective. It also contained lots of illustrations.

Fawcett, Jane. Historic Floors: Their Conservation. Woburn, MA: Butterworth Herinemann, 1998

This book had a useful discussion on the preservation of historic floors. It elaborates on ways to analyze the damage to historic floors and how to prevent further damage. It also has some information on the types of objects that can be found in the floors.

Archeology

Ackerman, James. Art and Archaeology. New Jersey: Prentice- Hall, 1965

This book looks was of little use. It contains a lot of information how the field of archeology is conducted.

Churches

http://www.invenicetoday.com/art-tour/churches/sest_castello.htm

This site was very useful because it gives specific information about churches in the six sestieri of Venice.

Venice

Plant, Margaret. Venice: Fragile City. New Haven, London: Yale University Press, 2002.

This book gives an in depth background on the history of Venice from 1797 to the present. This source was useful for background information on the political climate of Venice.

United Nations Educational, Scientific, and Cultural Organization website. www.unesco.org/

This source contains information on historians and scientists and their contact information.

Venice In Peril Org. http://www.veniceinperil.org/othorg/intpvtcomm.htm

This website was most useful for facts about restoration projects done in Venice and the groups that are dedicated to maintaining the city.

Venice Offices of United Nations Educational, Scientific, and Cultural Organization
http://portal.unesco.org

This site was helpful in finding information on ongoing restoration projects in Venice.

Appendix B: List of Churches

Codice Chiesa	Local Nome della Chiesa	Nome della Chiesa	Island	Notes	COMPLETED
ANGE	S. Maria degli Angeli	Chiesa di S. Maria degli Angeli	Murano	Under Restoration as of 2005	Inaccessible
ANGL	I Anglicana	Chiesa Anglicana	Cannaregio	Closed as of 2005	Inaccessible
ANGM	S. Angelo	Chiesa di S. Angelo	Mazzorbo		Inaccessible
ANNA	S. Anna	Chiesa di S. Anna	Castello	Under Restoration since 2003	Inaccessible
ANTN	S. Antonin	Chiesa di S. Antonino	Castello	Closed Since 2003 Under Restoration since 2005	Inaccessible
ASST	S. Maria Assunta	Chiesa di S. Maria Assunta di Torcello	Torcello		Inaccessible
BARB	S. Barbara	Oratorio di S. Barbara di Burano	Burano	Now a government building.	Inaccessible
BONA	S. Bonaventura	Chiesa di S. Bonaventura	Cannaregio	Closed Since 2005	Inaccessible
CANC	San Canciano	Chiesa di S. Canciano	Cannaregio		Yes
CATM	S. Caterina	Chiesa di S. Caterina di Mazzorbo	Mazzorbo		Yes
CONV	S. Convertite	Chiesa di S. Maria Maddalena Convertite	Giudecca	Women's Correctional Facility	Inaccessible
COSM	S. Cosmo	Chiesa di S. Cosma e Damiamo	Giudecca	Under construction	Inaccessible
CROA	Santa Croce	Chiesa della S. Croce degli Armeni	San Marco	Closed Since 2004	Inaccessible
CROC	La Croce	Chiesa della Croce	Giudecca	Closed.	Inaccessible
DONA	S. Donato	Chiesa di S. Donato	Murano		Yes
DORO	Suore Dorotee	Suore Dorotee	Cannaregio		Inaccessible
EUFE	S. Eufemia	Chiesa di S. Eufemia	Giudecca		Yes
FOSC	S. Fosca	Chiesa di S. Fosca	Cannaregio		Yes
GERA	S. Gerardo	Chiesa di S. Gerardo	Giudecca	New floors	Inaccessible
GERE	S. Geremia	Chiesa di S. Geremia e Lucia	Cannaregio		Yes

GIMA	S. Giorgio	Ciesa di S. Giorgio Maggiore in Isola	Giudecca		Yes
GIUS	S. Giustina		Cannaregio	Now part of a school	Inaccessible
LEON	S. Leonardo	Chiesa di S. Leonardo	Cannaregio	Closed as of 2005	Inaccessible
MADD	La Maddalena	Chiesa di S. Maria Maddalena	Cannaregio	Under Restoration as of 2005	Inaccessible
MARB	S. Martino	Chiesa di S. Martino di Burano	Burano		Yes
MARC	S. Marcuola	Chiesa di S. Ermagora e Fortunato	Cannaregio		Yes
MAUR	S. Maurizio	Chiesa di S. Maurizio	San Marco		Yes
MICH	S. Michele	San Michele	S. Michele		Yes
PENT	Le Pentitenti	Chiesa si S. Maria delle Penitenti	Cannaregio	Closed	Inaccessible
PIEM	S. Pietro Martire	Chiesa di S. Pietro Martire	Murano		Yes
REDE	I Redentore	Chiesa del SS. Redentore	Giudecca		Yes
RINA	S. Caterina	Chiesa di S. Caterina	Cannaregio	Under Restoration as of 2005 Part of a School	Inaccessible
SAMU	S. Samuele	Chiesa di S. Samuele Profeta	San Marco	closed	Inaccessible
SCHI	S. Giorgio degli Schiavoni	Chiesa di S. Giorgio degli Schiavoni	Castello	Converted - School in 2003	Inaccessible
SIMP	S. Simeon Piccolo	Chiesa di S. Simeone e Giuda	Santa Croce	Under Restoration Since 2004	Inaccessible
FOST	S. Sofia	Chiesa di S. Sofia di Torcello	Torcello		Yes
TOMA	S. Tommaso	Chiesa di S. Tomà	San Polo	Closed Since 2003 Floor covered with felt. Impossible to assess in current condition. 2004	Inaccessible
TRIN	S. Trinità	Chiesa della SS. Trinità	Giudecca		Inaccessible
VALV	La Misericordia	Chiesa di S. Maria di Val Verde	Cannaregio	Closed & Padlocked since 2005	Inaccessible
ZANI	S. Zaninovo		San Marco	Closed. Now a storage facility	Inaccessible
ZITE	Le Zitelle	Chiesa di S. Maria della Presentazione	Giudecca		Inaccessible

Appendix C: Damage Assessment Tables

The following tables give a complete overview of the assessment standards we used to score quadrant and artifact damage. Our group used the same damage assessment as the 2004 Church Floors group.

Cracks

Cracks can be telling signs of problems beneath the floor and high traffic areas. These cracks indicate weaknesses in the floor and could be future sites for floor detachment. Our team judged the cracks based on their size and whether or not we considered them problematic. Cracks that are over 2 mm wide and cut into the floor material were considered problematic. Cracks smaller than this and surface cracks were considered smaller cracks. The following table shows the 0-4 point scale on which the severity of the cracks was measured.

Scale	Description
0	Minimal or no cracks present
1	Low severity of cracks Low level of cracks, none are considered problematic
2	Intermediate level of cracks Either some problem cracks present or many small cracks present
3	High level of cracks Significant number of problem cracks and many small cracks present
4	Severe level of cracks High frequency of problem cracks and small cracks

To illustrate the progression of this scale, a picture for each severity level is shown below.

Figure 52: Crack severity 0

Figure 53: Crack Severity 1

Figure 54: Crack severity 2

Figure 55: Crack severity 3

Figure 56: Crack severity 4

Joint Gaps

Joint gaps are larger than usual separations between floor tiles, either vertically or horizontally. The following table shows the 0-4 point scale on which the severity of the joint gaps were measured.

Scale	Description
0	Minimal or no joint gaps present
1	Low severity of joint gaps Few joint gaps that present no danger to the floor structure
2	Intermediate level of joint gaps Multiple joint gaps potentially endangering the floor structure
3	High level of joint gaps Many joint gaps that threaten damage to the floor structure
4	Severe level of joint gaps Majority or area contains joint gaps damaging the floor structure

To illustrate the progression of this scale, a picture for each severity level is shown below.

Figure 57: Joint Gap Severity 0

Figure 58: Joint Gap Severity 1

Figure 59: Joint Gap Severity 2

Figure 60: Joint Gap Severity 3

Figure 61: Joint Gap Severity 4

Holes

Holes are considered as an area of missing floor at least 1.5 cm deep. The following table shows the 0-4 point scale on which the severity of the holes was measured.

Scale	Description
0	Minimal or no holes present
1	Low severity of holes Few holes that present no danger to the floor structure
2	Intermediate level of holes Multiple holes potentially endangering the floor structure
3	High level of holes Many holes that threaten damage to the floor structure
4	Severe level of holes Majority or area contains holes damaging the floor structure

Figure 62: Example of a Hole

Floor Detachment

Floor detachment is considered as any piece of a tile missing or an entire tile itself. The team recorded the percentage of each floor quadrant suffering from detachment.

Figure 63: Example of Floor Detachment

Floor Replacement

Floor replacement is considered when any part of the floor has been replaced with new tiles or other new materials. The team recorded the percentage of each floor quadrant suffering from replacement.

Figure 64: Floor Tile Replaced by Wood

Surface Damage

Surface damage has many causes ranging from foot traffic, flooding, and pews rubbing the floors among other things. The three types of surface damage that our team inspected for are wearing and fading, pitting, and discoloration. The following table shows the 0-4 point scale on which the severity of the surface damage was measured.

Scale	Description
0	Good condition No signs of fading, wear, pitting or discoloration
1	Slightly worn but color and/or design is still visible Noticeable wear, slight pitting, or small areas are discolored
2	Moderately worn and color and/or design is not entirely visible Noticeable wear, moderate pitting, or medium areas are discolored
3	Heavily worn and color and/or design is barely visible Noticeable wear, significant pitting, large areas are discolored
4	Severely worn and color and/or design not visible Noticeable wear, severe pitting, majority of area is discolored

To illustrate the progression of this scale, a picture for each severity level is shown below.

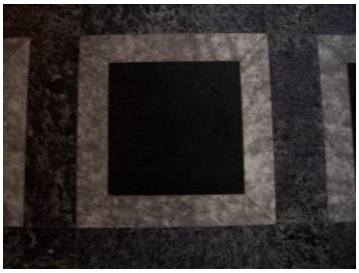

Figure 65: Surface Damage Severity 0

Figure 66: Surface Damage Severity 1

Figure 67: Surface Damage Severity 2

Figure 68: Surface Damage Severity 4

Appendix D: Field Forms

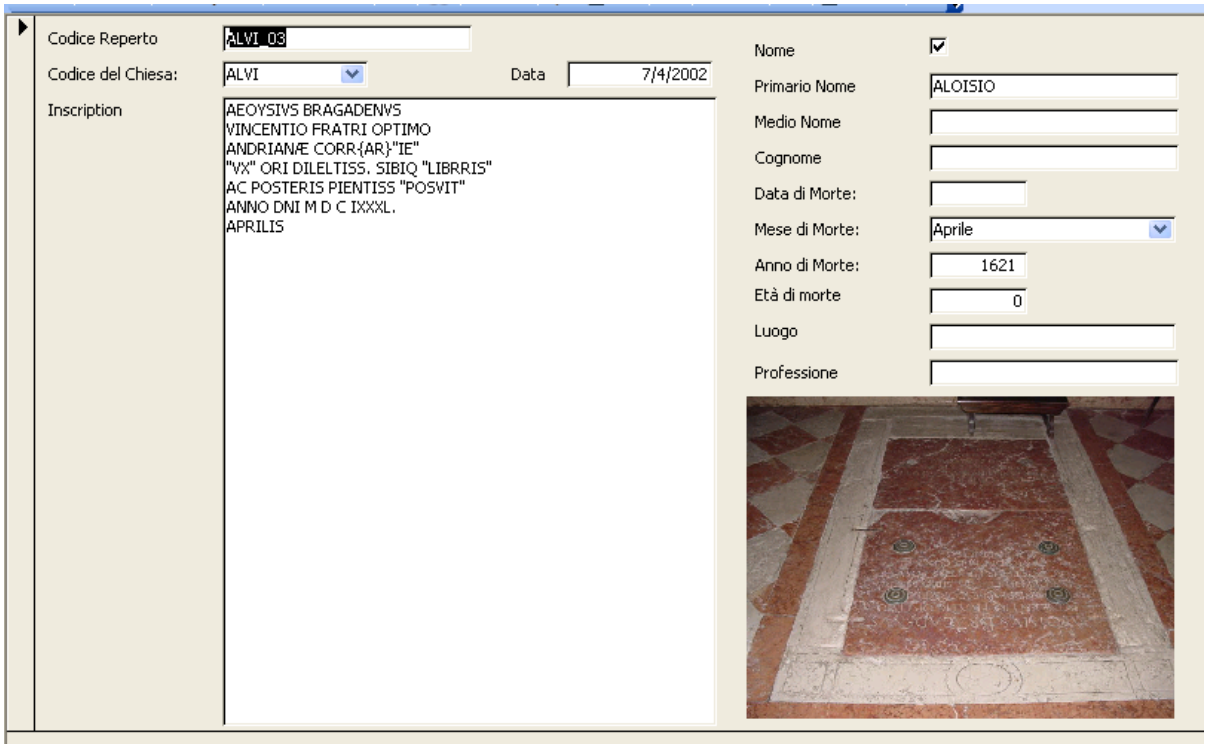

Figure 69: Historical floor inscription field form

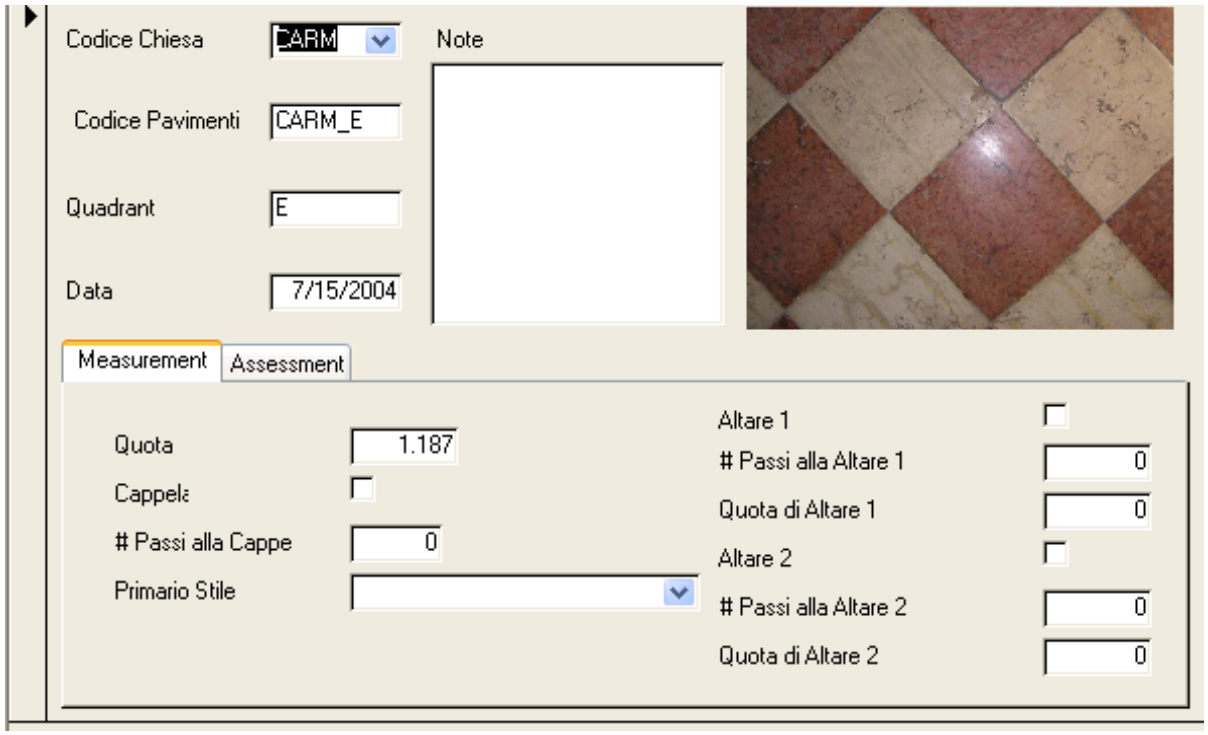

Figure 70: Pavement field form

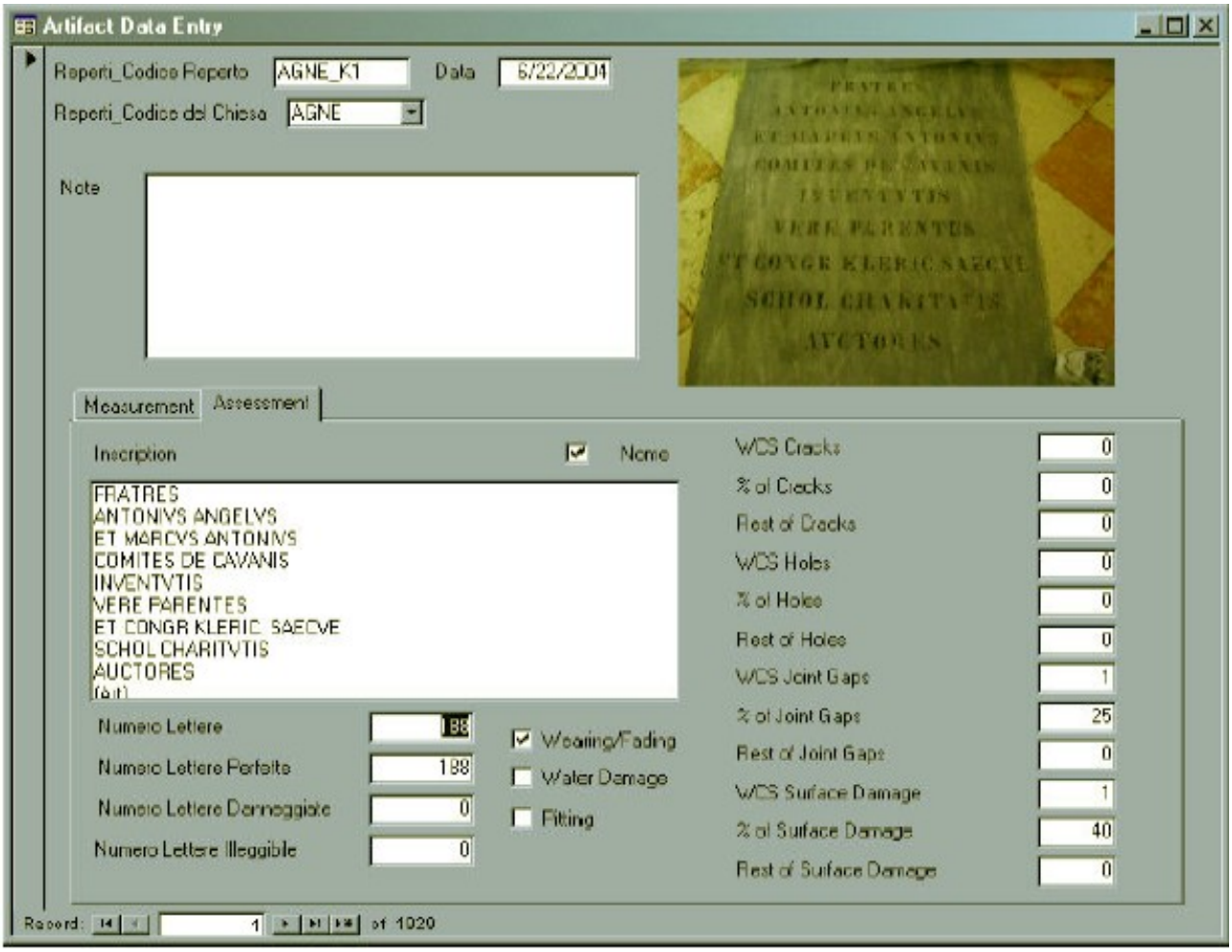

Figure 71: Artifact data entry field form

Appendix E: Databases

(Note: Due to the size of the databases, it is impossible to fit one onto one page. For this reason we will be showing as much of the databases as we possibly can, but not the entire thing.)

	Codice Chiesa	Local Nome della Chiesa	Nome della Chiesa	Vecchio Codice del Chiesa	Indirizzo	Telefono	Sestiere	Prir
+	AGNE	S. Agnese	Chiesa di S. Agnese	AGNE	San Agnese		Dorsoduro	Red Verona,
+	ALVI	S. Alvise	Chiesa di S. Alvise	ALVI	San Alvise		Cannaregio	Red Verona,
+	ANDR	La Zirada	Chiesa di S. Andrea Apostolo	ANDR	?		Santa Croce	
+	ANGE	S. Maria degli Angeli	Chiesa di S. Maria degli Angeli	ANGEM			Murano	
+	ANGL	I Anglicana	Chiesa Anglicana	ANGL			Cannaregio	
+	ANGM	S. Angelo	Chiesa di S. Angelo	SANGM			Mazzorbo	
+	ANNA	S. Anna	Chiesa di S. Anna	ANNA			Castello	
+	ANNU	Oratorio dell'Annunciata	Oratorio dell'Annunciata	ANNU	Sant'Angelo		San Marco	Red Verona,
+	ANTN	S. Antonin	Chiesa di S. Antonino	ANTO			Castello	
+	ANTP	Sant'Antonio	Sant'Antonio	ANTOP			?	
+	APON	S. Aponal	Chiesa di S. Aponallinare	APON	San Aponal		San Polo	
+	APOS	I Santi Apostoli	Chiesa di S. Apostoli	APOS	Campo Santi Apostoli		Cannaregio	Red Verona,
+	ASSG	I Gesuiti	Chiesa di S. Maria Assunta dei Gesuiti	ASSU	Campo dei Gesuiti		Cannaregio	Green Veron
+	ASSM	S. Maria dell'Assunzione	Chiesa di S. Maria dell'Assunzione	ASSUM			Lido	
+	ASST	S. Maria Assunta	Chiesa di S. Maria Assunta di Torcello	ASSUT			Torcello	
+	BARB	S. Barnaba	Oratorio di S. Barnaba di Burano	BARB			Burano	
+	BARN	S. Barnaba	Chiesa di S. Barnaba	BARN	San Barnaba		Dorsoduro	Red Verona,
+	BART	S. Bartolomeo	Chiesa di S. Bartolomeo	BART	San Bartolomeo		San Marco	Istria, and Bl
+	BASI	S. Marco	Basilica di S. Marco	BASI	Piazza San Marco		San Marco	Mosaic Tiling
+	BASS	S. Basso	Chiesa di S. Basso	BASS	?		San Marco	
+	BENE	S. Benedetto	Chiesa di S. Benedetto	BENE	San Benedetto		San Marco	
+	BIAG	S. Biagio	Chiesa S. Biagio	BIAG	San Biagio		Castello	Red Verona,
+	BONA	S. Bonaventura	Chiesa di S. Bonaventura	BONA			Cannaregio	
+	BRAG	La Bragora	Chiesa di S. Giovanni Batista in Bragora	BRAG	Bandierra e Moro	415205908	Castello	Red Verona,
+	CADI	Ca' di Dio	Chiesa della Ca' di Dio	CADI		415210099	Castello	
+	CANC	San Canciano	Chiesa di S. Canciano	CANC	San Canciano		Cannaregio	
+	CAPP	Le Cappuccine	Chiesa di S. Maria Madre del Redentore	LECA			Cannaregio	Red Verona,
+	CARI	La Carità	Chiesa di S. Maria de la Carità	CARI			Dorsoduro	
+	CARM	I Carmini	Chiesa di S. Maria Assunta del Carmelo	CARM	Carmini		Dorsoduro	Red Verona,
+	CASS	S. Cassian	Chiesa di S. Cassiano	CASS	San Cassan		San Polo	Red Verona,
+	CATM	S. Caterina	Chiesa di S. Caterina di Mazzorbo	CATEM			Mazzorbo	
+	CONV	S. Convertite	Chiesa di S. Maria Maddalena Convertite	CONV			Giudecca	

Figure 72: Church database

	Codice Chiesa	Codice Reperto	Data	Posizione - X Coordinato	Sinistra	Destra	Posizione - Y Coordinato	Davanti	Retro	Forma	Lunghezza	Larghezza	Orien
+	AGNE	AGNE_K1	6/22/2004	434	☑	☐	294	☑	☐	Rettangolo	163	97	
+	ALVI	ALVI_01	7/4/2002	223	☐	☐	1168	☐	☐	Rettangolo	230	128	
+	ALVI	ALVI_02	7/4/2002	1295	☐	☐	1168	☐	☐	Rettangolo	258	156	
+	ALVI	ALVI_03	7/4/2002	1086	☐	☐	1532	☐	☐	Rettangolo	262	172	
+	ALVI	ALVI_04	7/4/2002	742	☐	☐	1532	☐	☐	Rettangolo	262	158	
+	ALVI	ALVI_05	7/4/2002	420	☐	☐	1465	☐	☐	Rettangolo	218	120	
+	ALVI	ALVI_06	7/4/2002	420	☐	☐	1600	☐	☐	Rettangolo	218	134	
+	ALVI	ALVI_07	7/4/2002	144	☐	☐	2178	☐	☐	Rettangolo	238	138	
+	ALVI	ALVI_08	7/4/2002	1340	☐	☐	2178	☐	☐	Rettangolo	248	136	
+	ALVI	ALVI_09	7/4/2002	1223	☐	☐	2577	☐	☐	Losanga	40	40	
+	ALVI	ALVI_10	7/4/2002	1036	☐	☐	2577	☐	☐	Rettangolo	242	147	
+	ALVI	ALVI_11	7/4/2002	889	☐	☐	2577	☐	☐	Rettangolo	242	147	
+	ALVI	ALVI_12	7/4/2002	742	☐	☐	2577	☐	☐	Rettangolo	242	147	
+	ALVI	ALVI_13	7/4/2002	595	☐	☐	2577	☐	☐	Rettangolo	242	147	
+	ALVI	ALVI_14	7/4/2002	448	☐	☐	2577	☐	☐	Rettangolo	242	147	
+	ALVI	ALVI_15	7/4/2002	261	☐	☐	2577	☐	☐	Rettangolo	65	40	
+	ALVI	ALVI_16	7/4/2002	742	☐	☐	2919	☐	☐	Rettangolo	242	147	
+	APOS	APOS_01	7/2/2002	278	☐	☐	265	☐	☐	Rettangolo	86	39	
+	APOS	APOS_02	7/2/2002	369	☐	☐	285	☐	☐	Rettangolo	146	126	
+	APOS	APOS_03	7/2/2002	240	☐	☐	402	☐	☐	Triangolo	72	37	
+	APOS	APOS_04	7/2/2002	186	☐	☐	456	☐	☐	Triangolo	36	72	
+	APOS	APOS_05	7/2/2002	369	☐	☐	459	☐	☐	Quadrato	148	148	
+	APOS	APOS_06	7/2/2002	614	☐	☐	508	☐	☐	Quadrato	148	148	
+	APOS	APOS_07	7/2/2002	933	☐	☐	681	☐	☐	Quadrato	148	148	
+	APOS	APOS_08	7/2/2002	1059	☐	☐	681	☐	☐	Quadrato	148	148	
+	APOS	APOS_09	7/2/2002	1281	☐	☐	459	☐	☐	Quadrato	148	148	
+	APOS	APOS_10	7/2/2002	1726	☐	☐	149	☐	☐	Quadrato	150	150	
+	APOS	APOS_11	7/2/2002	1726	☐	☐	459	☐	☐	Quadrato	150	150	
+	APOS	APOS_12	7/2/2002	1503	☐	☐	483	☐	☐	Quadrato	148	148	
+	APOS	APOS_13	7/2/2002	1614	☐	☐	483	☐	☐	Losanga	52	52	
+	APOS	APOS_14	7/2/2002	1726	☐	☐	682	☐	☐	Quadrato	148	148	
+	APOS	APOS_15	7/2/2002	1762	☐	☐	793	☐	☐	Losanga	52	52	

Figure 73: Artifact database

	Codice Chiesa	Codice Pavimenti	Quadrant	Data	Quota	Cappela	Primario Stile	# Passi alla Cappella	Altare 1	# Passi alla Altare 1	Quota di
+	AGNE	AGNE_A	A	6/22/2004	1.059	☑		0	☑	2	
+	AGNE	AGNE_B	B	6/22/2004	1.108	☐		0	☐	0	
+	AGNE	AGNE_C	C	6/22/2004	1.138	☐		0	☑	2	
+	AGNE	AGNE_D	D	6/22/2004	1.086	☐		0	☑	2	
+	AGNE	AGNE_E	E	6/22/2004	1.110	☐		0	☐	0	
+	AGNE	AGNE_F	F	6/22/2004	1.128	☐		0	☑	2	
+	AGNE	AGNE_G	G	6/22/2004	1.112	☐		0	☐	0	
+	AGNE	AGNE_H	H	6/22/2004	1.101	☐		0	☐	0	
+	AGNE	AGNE_I	I	6/22/2004	1.115	☐		0	☐	0	
+	AGNE	AGNE_J	J	6/22/2004	1.303	☑		2	☑	3	
+	AGNE	AGNE_K	K	6/22/2004	1.542	☑	Wooden Floor	2	☑	0	
+	AGNE	AGNE_M	M	6/22/2004	1.274	☑	Smaller Red and White Checkered	2	☑	3	
+	ALVI	ALVI_A	A	7/4/2002	1.350	☐			☐		
+	ALVI	ALVI_B	B	7/4/2002	1.350	☐			☐		
+	ALVI	ALVI_C	C	7/4/2002	1.350	☐			☐		
+	ALVI	ALVI_D	D	7/4/2002	1.350	☐			☐		
+	ALVI	ALVI_E	E	7/4/2002	1.350	☐			☐		
+	ALVI	ALVI_F	F	7/4/2002	1.350	☐			☐		
+	ALVI	ALVI_G	G	7/4/2002	1.350	☐			☐		
+	ANNU	ANNU_A	A	7/5/2004	1.451	☐		0	☐	0	
+	ANNU	ANNU_B	B	7/5/2004	1.450	☐		0	☑	1	
+	ANNU	ANNU_C	C	7/5/2004	1.531	☑		1	☑	0	
+	APOS	APOS_A	A	7/2/2002	1.250	☐			☐		
+	APOS	APOS_B	B	7/2/2002	1.250	☐			☐		
+	APOS	APOS_C	C	7/2/2002	1.250	☐			☐		
+	APOS	APOS_D	D	7/2/2002	1.250	☐			☐		
+	APOS	APOS_E	E	7/2/2002	1.250	☐			☐		
+	APOS	APOS_F	F	7/2/2002	1.250	☐			☐		
+	APOS	APOS_G	G	7/2/2002	1.250	☐			☐		
+	APOS	APOS_H	H	7/2/2002	1.250	☐			☐		
+	APOS	APOS_I	I	7/2/2002	1.250	☐			☐		
+	APOS	APOS_J	J	7/2/2002	1.250	☐			☐		
+	APOS	APOS_K	K	7/2/2002	1.250	☐			☐		
+	APOS	APOS_L	L	7/2/2002	1.250	☐			☐		
+	APOS	APOS_M	M	7/2/2002	1.250	☐			☐		
+	APOS	APOS_N	N	7/2/2002	1.250	☐			☐		
+	ASSG	ASSG_A	A	6/20/2002	1.890	☐			☐		
+	ASSG	ASSG_B	B	6/20/2002	1.890	☐			☐		
+	ASSG	ASSG_C	C	6/20/2002	1.890	☐			☐		

Figure 74: Floor database

Appendix F: Letter from the Soprintendenza all'Archeologia

Written by our sponsor and signed by Dott. Luigi Fozzati, this letter explained the basis of our project work to priests. It was very helpful in gaining permission to study the church floors from either the priest or caretaker of the church.

al presente fax non
seguirà l'originale
(art. 6, 2°c, L. 30.12.1991, n. 412)

Ministero per i Beni e le Attività Culturali
Soprintendenza per i Beni Archeologici del Veneto
NAUSICAA
Nucleo Archeologia Umida Subacquea
Italia Centro Alto Adriatico
Cannaregio 5031 30121 VENEZIA
Tel 0415200201 Fax 0415200419

Molto Rev.do Parroco
della Chiesa di SAN CANCIANO
30100 VENEZIA

VENEZIA, 17 GIU. 2005

Prot. N° 1892 Allegati _____

OGGETTO: VENEZIA, città e laguna; PROGETTO MIR (Progetto Monasteri e Insediamenti Religiosi in Venezia e laguna), sottoprogetto di studio e ricerca sui pavimenti delle chiese. Ricerca relativa alla chiesa di SAN CANCIANO.

Molto Rev.do Don Aldo MARANGONI
Direttore Sezione Beni Ambientali
Architettonici Ecclesiastici
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L'Ufficio Scrivente – d'intesa con il Direttore della Sezione Beni Ambientali Architettonici Ecclesiastici della Curia Patriarcale di Venezia – promuove nell'ambito dell'archeologia urbana di Venezia una ricerca relativa al restauro di pavimenti di chiese, restauro che ovviamente presenta o può presentare evidenti riflessi sul patrimonio archeologico. Al fine di ricostruire le vicende relative alla storia, manutenzione, restauro dei pavimenti delle chiese veneziane e, di conseguenza, al fine di mettere a punto una specifica metodologia di studio, si avvia una fase sperimentale di ricerca grazie alla collaborazione del Venice Project Center di Worcester (USA) diretto dal Prof. Fabio Carrera.

Si richiede pertanto al titolare di Codesta Chiesa di voler agevolare gli studenti del Venice Project Center per la compilazione della scheda di catalogo che Le verrà successivamente inviata ufficialmente in copia per il Suo Archivio.

L'équipe di ricerca è composta dai seguenti studenti: David Gagnon, Eric Ruscitti e Kelly Thompson; nonché dai docenti Prof. Fabio Carrera e Prof. John Zeugner e dal Direttore del Progetto MIR Dott. Marco Bortoletto.

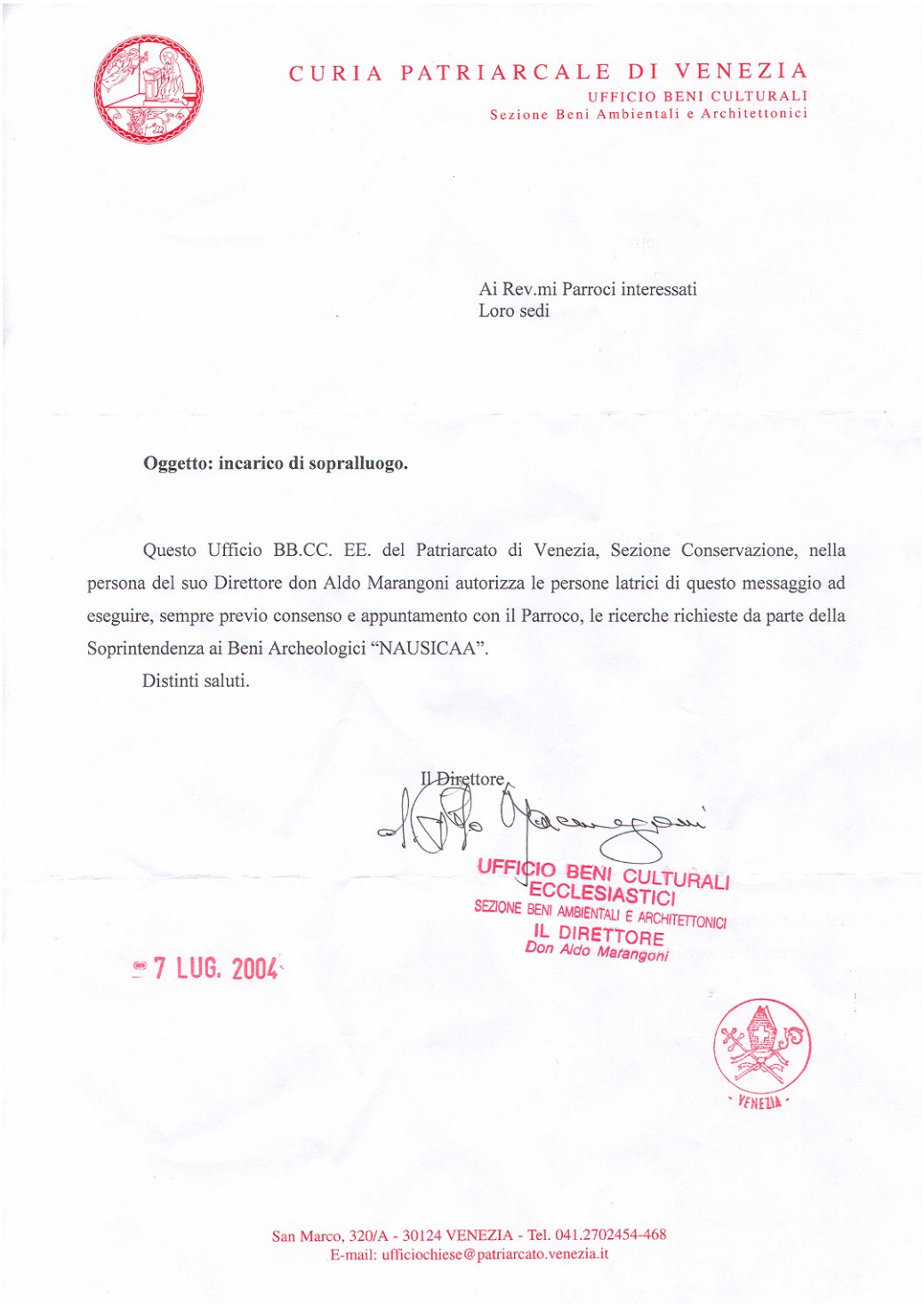
Per qualsiasi delucidazione in merito al progetto su esposto, si prega di contattare la Segreteria di questo Ufficio al seguente numero: 041-5200201.

Distinti saluti.

IL DIRETTORE DI NAUSICAA
Dott. Luigi FOZZATI

Appendix G: Letter from Don Aldo

This letter from Don Aldo was written for the use of the 2004 Church Floors IQP. Our group was also able to use this letter to gain access to churches in Venice.



CURIA PATRIARCALE DI VENEZIA
UFFICIO BENI CULTURALI
Sezione Beni Ambientali e Architettonici

Ai Rev.mi Parroci interessati
Loro sedi

Oggetto: incarico di sopralluogo.

Questo Ufficio BB.CC. EE. del Patriarcato di Venezia, Sezione Conservazione, nella persona del suo Direttore don Aldo Marangoni autorizza le persone latrici di questo messaggio ad eseguire, sempre previo consenso e appuntamento con il Parroco, le ricerche richieste da parte della Soprintendenza ai Beni Archeologici "NAUSICAA".

Distinti saluti.

Il Direttore

UFFICIO BENI CULTURALI ECCLESIASTICI
SEZIONE BENI AMBIENTALI E ARCHITETTONICI
IL DIRETTORE
Don Aldo Marangoni

7 LUG. 2004

VENETIA

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E-mail: ufficiochiese@patriarcato.venezia.it

Appendix H: Table of Abbreviations

This table of abbreviations was taken from the works of Cicogna. Cicogna studied Venetian Church floors in the early 1800's, specifically their artifacts and inscriptions. From his studies he was able to produce tables of common Latin abbreviations used on tombs. An example of his works can be seen below.

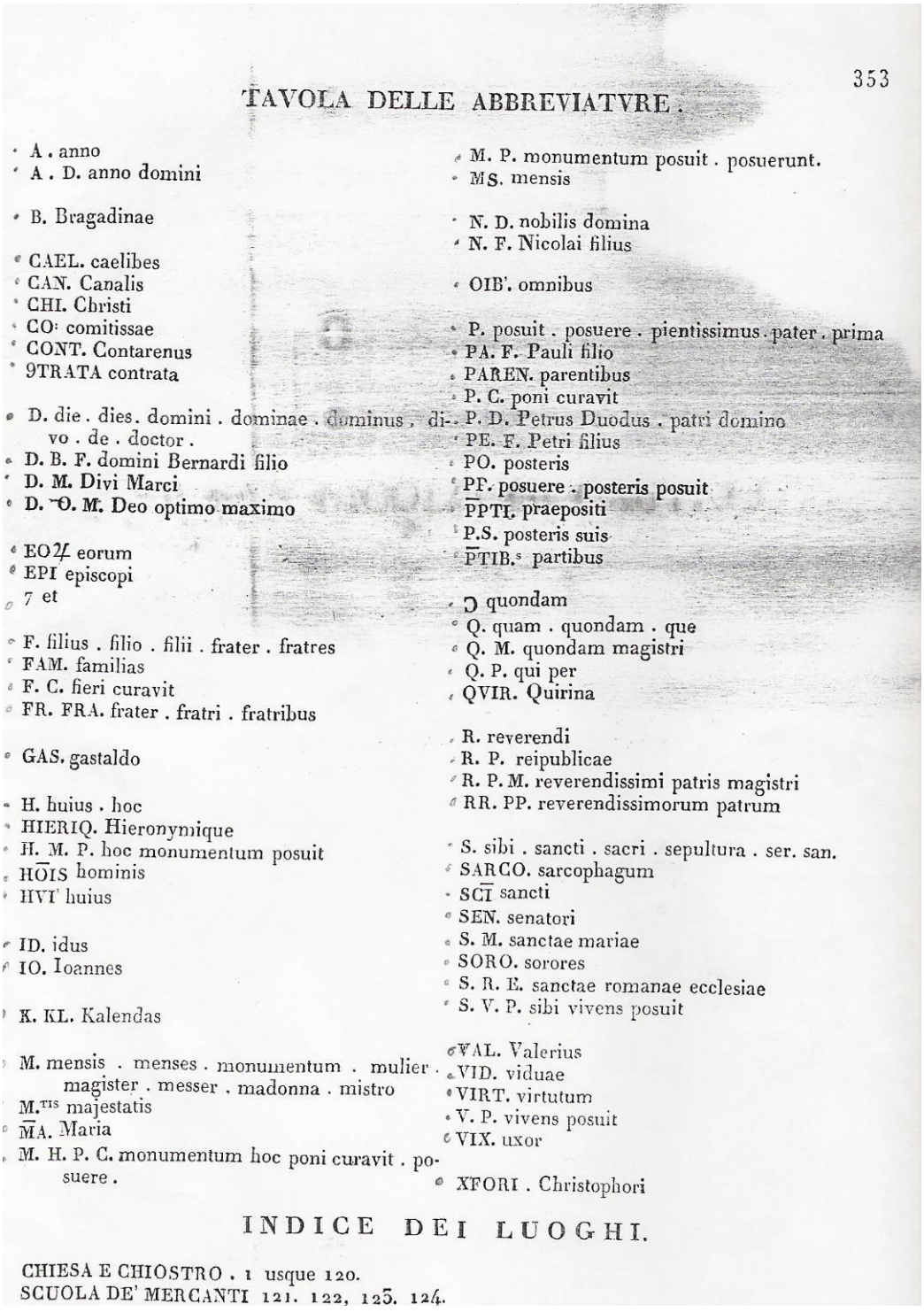

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TAVOLA DELLE ABBREVIATVRE.

A. anno
A. D. anno domini

B. Bragadinae

CAEL. caelibes
CAN. Canalis
CHI. Christi
CO: comitissae
CONT. Contarenus
9TRATA contrata

D. die. dies. domini. dominae. dominus, divo. de. doctor.
D. B. F. domini Bernardi filio
D. M. Divi Marci
D. O. M. Deo optimo maximo

EO2 eorum
EPI episcopi
7 et

F. filius. filio. filii. frater. fratres
FAM. familias
F. C. fieri curavit
FR. FRA. frater. fratri. fratribus

GAS. gastaldo

H. huius. hoc
HIERIQ. Hieronymique
H. M. P. hoc monumentum posuit
HOIS hominis
HVI' huius

ID. idus
IO. Ioannes

K. KL. Kalendas

M. mensis. menses. monumentum. mulier. magister. messer. madonna. mistro
M.TIS majestatis
MA. Maria
M. H. P. C. monumentum hoc poni curavit. posuere.
M. P. monumentum posuit. posuerunt.
MS. mensis

N. D. nobilis domina
N. F. Nicolai filius

OIB'. omnibus

P. posuit. posuere. pientissimus. pater. prima
PA. F. Pauli filio
PAREN. parentibus
P. C. poni curavit
P. D. Petrus Duodus. patri domino
PE. F. Petri filius
PO. posteris
PP. posuere. posteris posuit
PPTI. praepositi
P.S. posteris suis
PTIB.S partibus

Ↄ quondam
Q. quam. quondam. que
Q. M. quondam magistri
Q. P. qui per
QVIR. Quirina

R. reverendi
R. P. reipublicae
R. P. M. reverendissimi patris magistri
RR. PP. reverendissimorum patrum

S. sibi. sancti. sacri. sepultura. ser. san.
SARCO. sarcophagum
SCI sancti
SEN. senatori
S. M. sanctae mariae
SORO. sorores
S. R. E. sanctae romanae ecclesiae
S. V. P. sibi vivens posuit

VAL. Valerius
VID. viduae
VIRT. virtutum
V. P. vivens posuit
VIX. uxor

XFORI. Christophori

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Appendix I: Church Information

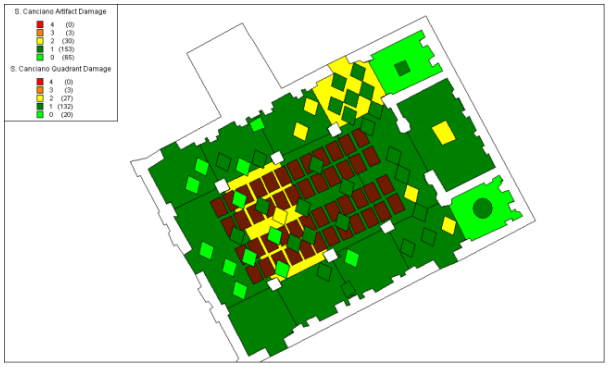

Figure 76: CANC Quadrant Damage, Artifact Damage and Pew Placement

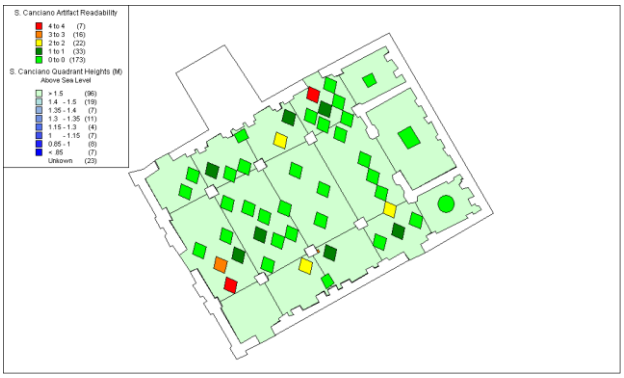

Figure 75: CANC Floor Height and Readability

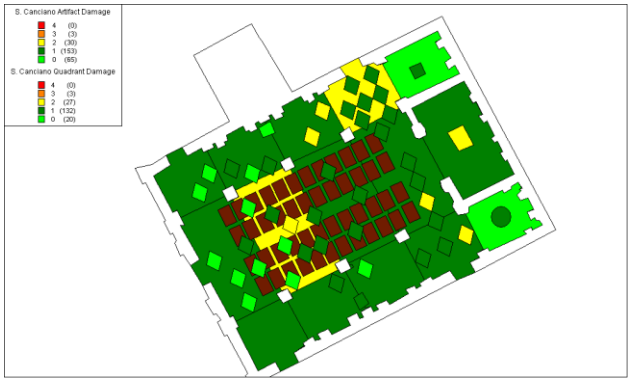

Figure 78: CATM Quadrant Damage, Artifact Damage and Pew Placement

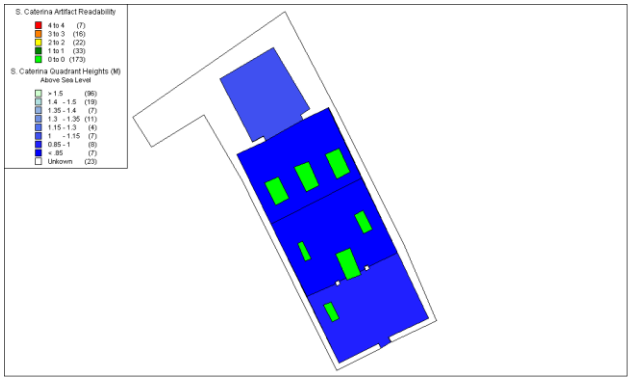

Figure 77: CATM Floor Height and Readability

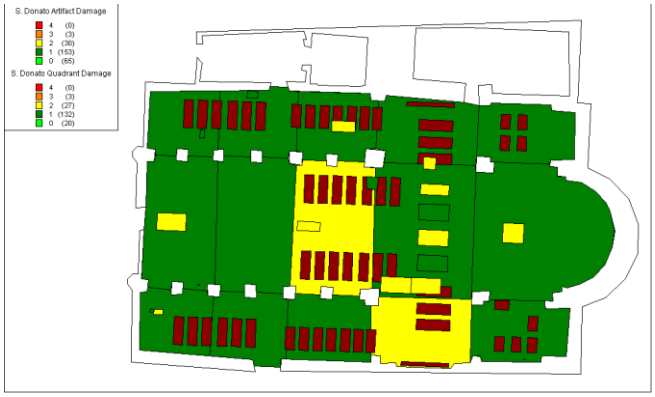

Figure 79: DONA Quadrant Damage, Artifact Damage and Pew Placement

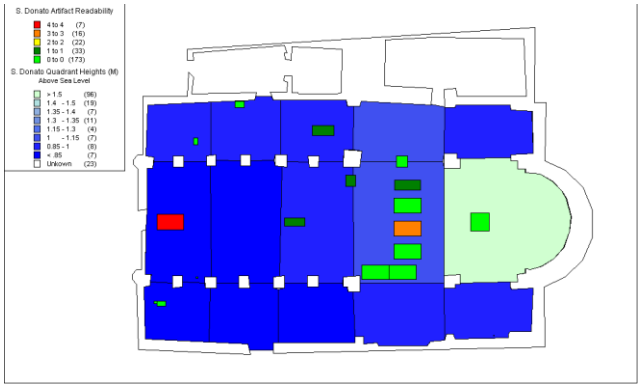

Figure 80: DONA Floor Height and Readability

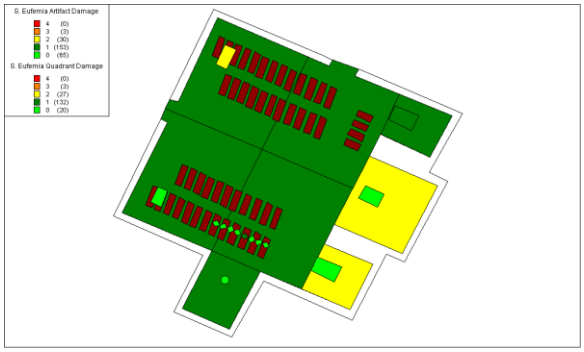

Figure 81: EUFE Quadrant Damage, Artifact Damage and Pew Placement

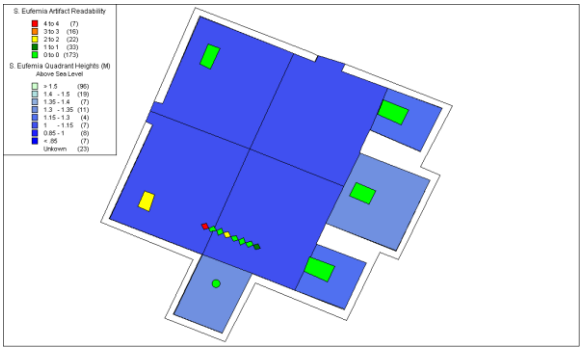

Figure 82: EUFE Floor Height and Readability

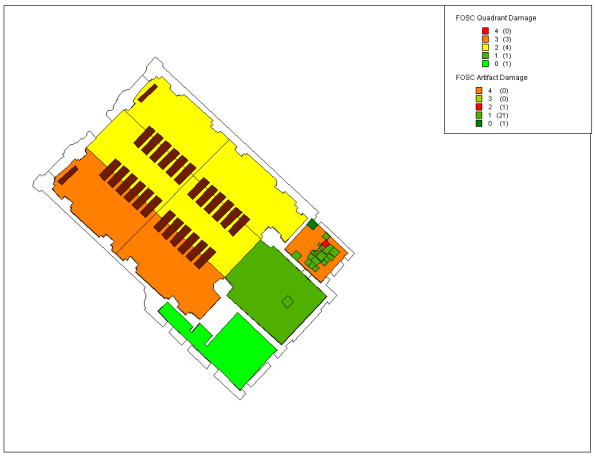

Figure 83: FOSC Quadrant Damage, Artifact Damage and Pew Placement

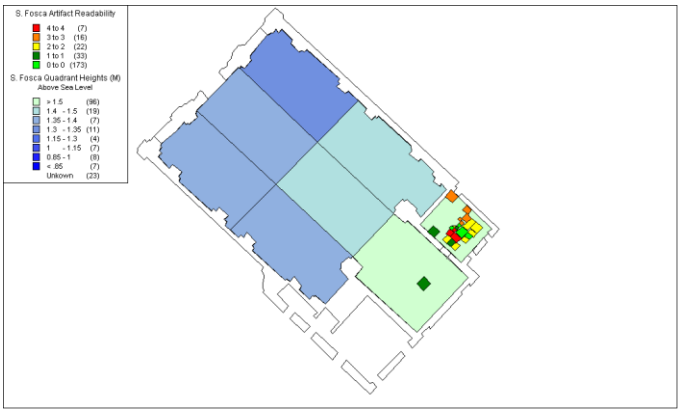

Figure 84: FOSC Floor Height and Readability

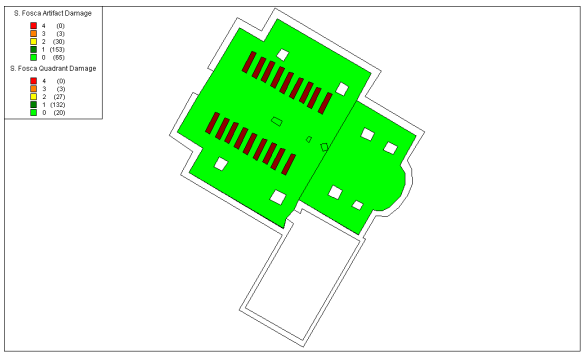

Figure 86: FOST Quadrant Damage, Artifact Damage and Pew Placement

Figure 85: FOST Floor Height and Readability

Figure 87: GERE Quadrant Damage, Artifact Damage and Pew Placement

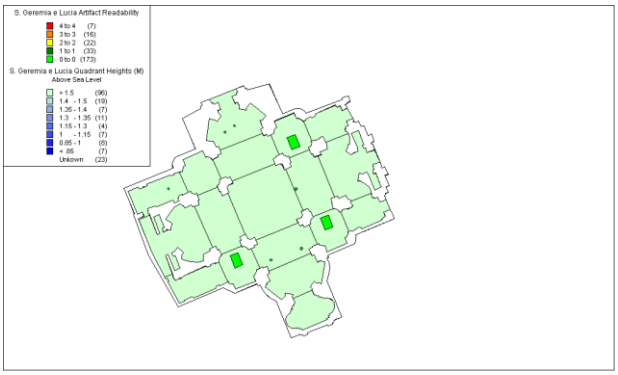

Figure 88: GERE Floor Height and Readability

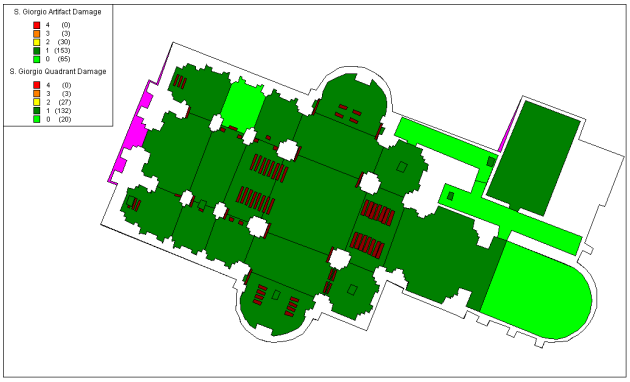

Figure 89: GIMA Quadrant Damage, Artifact Damage and Pew Placement

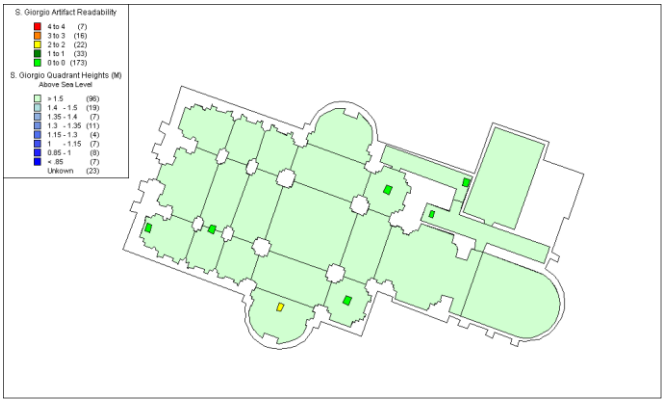

Figure 90: GIMA Floor Height and Readability

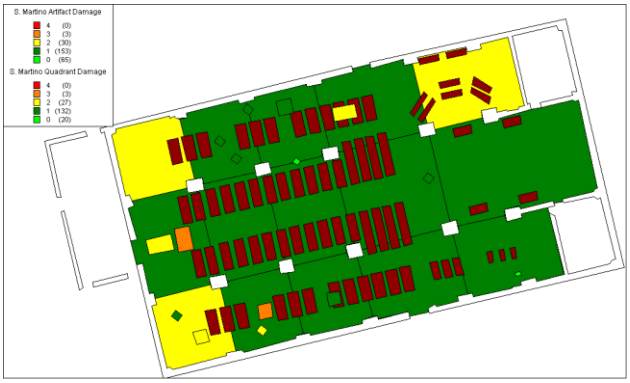

Figure 91: MARB Quadrant Damage, Artifact Damage, and Pew Placement

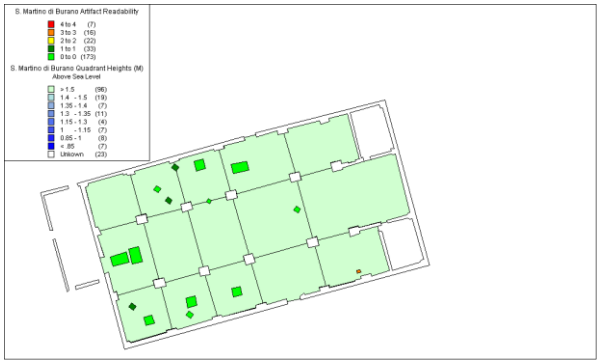

Figure 92: MARB Floor Height and Readability

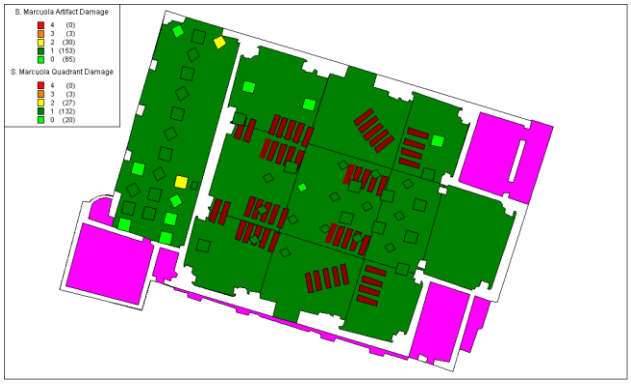

Figure 93: MARC Quadrant, Artifact Damage, and Pew Placement

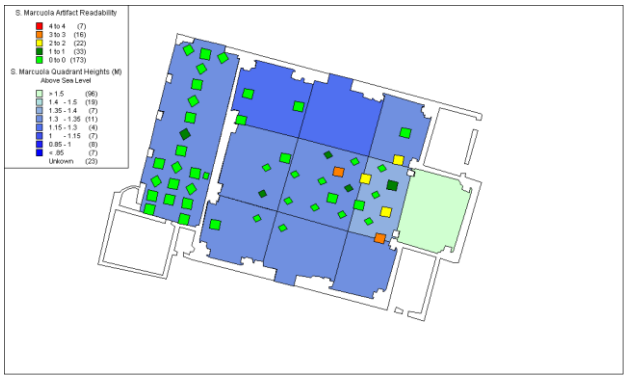

Figure 94: MARC Floor Damage and Readability

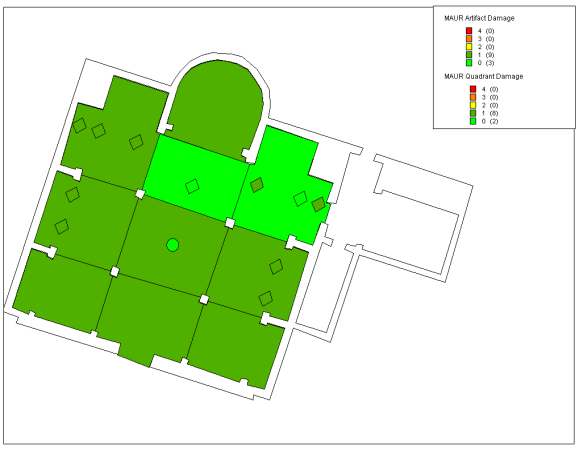

Figure 95: MAUR Quadrant Damage, Artifact Damage and Pew Placement

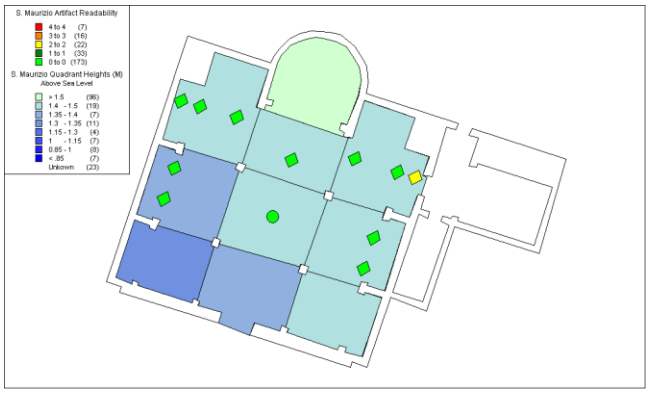

Figure 96: MAUR Floor Height and Readability

Figure 97: MICH Quadrant Damage, Artifact Damage and Pew Placement

Figure 98: MICH Floor Height and Readability

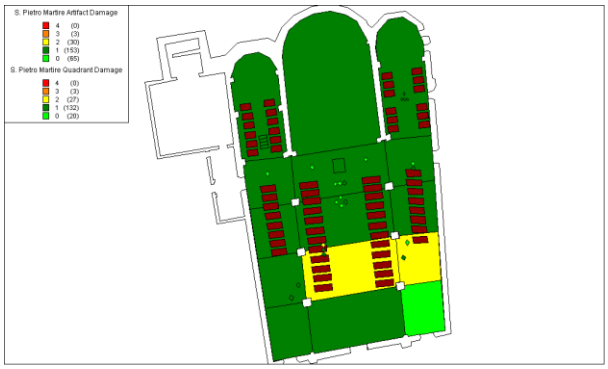

Figure 99: PIEM Quadrant Damage, Artifact Damage and Pew Placement

Figure 100: PIEM Floor Height and Readability

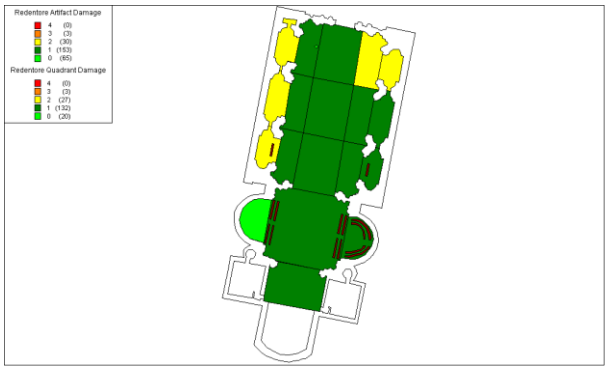

Figure 102: REDE Quadrant Damage, Artifact Damage and Pew Placement

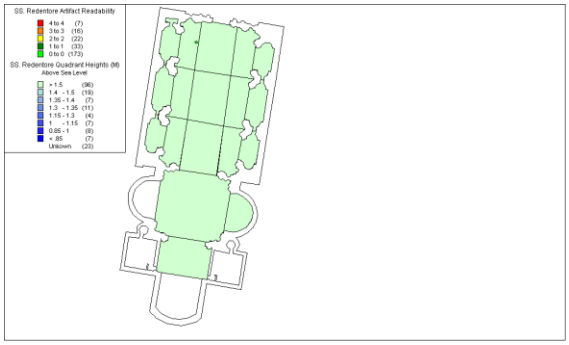

Figure 101: REDE Floor Height and Readability