



POLITECNICO
DI TORINO

Honors thesis

COURSE OF MASTER OF
SCIENCE IN ARCHITECTURE HERITAGE
PRESERVATION AND ENHANCEMENT

Abstract

**Geomatics and Industrial Archaeology.
The paraboloid Arch of Morano sul Po: morphological
and dimensional aspect.**

Tutor

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Filiberto Chiabrando

By

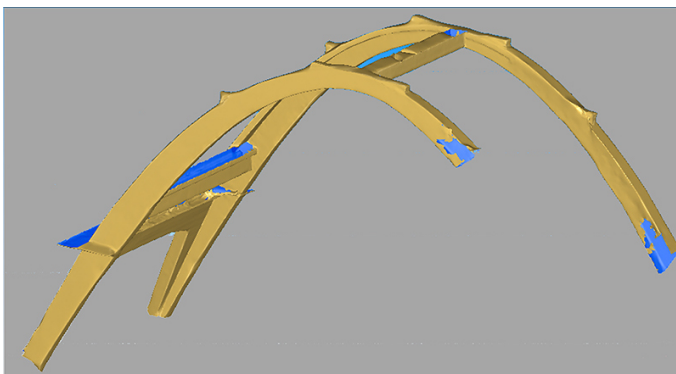
Vanessa Benigno

September 2015

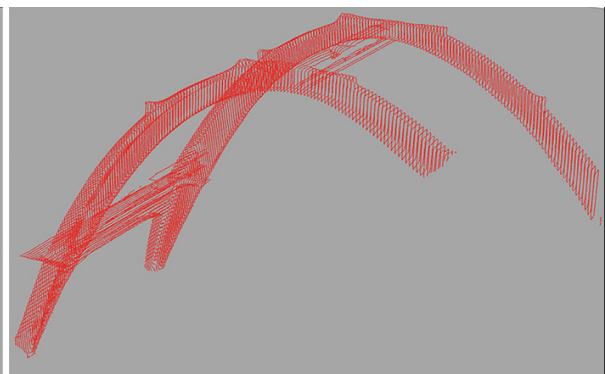
This thesis in question intrude part of extensive research and studies aimed at enhancement of the structure relevant the industrial past of Casale Monferrato. These studies are about the reconstruction of the identity of a territory, through knowledge, the survey and documentation designed to preserve a heritage from an high architectural and engineering description, through which therefore preserve the memory of a past production that has greatly influenced the social structure and economic impact of a large area. The study comes from the process of elaboration of the data acquired in July 2014 by Team DIRECT (Disaster Recovery Team) in the city of Morano sul Po, municipality in the province of Alexandria that develops on the left bank of the Po, whose history has been linked to productive activity of the cement and the territory it still preserves the signs, one of which is the Arc, the object of our study.

Morano is part of the territory of Casale Monferrato and is one of the seven municipalities that find the interests of study and the activity of promotion of the cultural Association "The Cement", established in 2006 with the aim to protect the assets of Industrial Archeology to ensure knowledge, preservation and development.

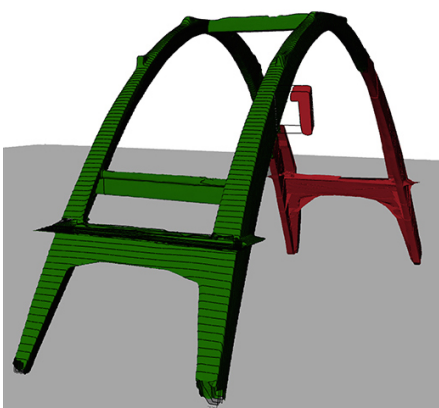
The route of thesis begins with the knowledge of the Arch, a parabolic shaped structure built in 1951 by Engineer Guido Sarti, and that allowed the passage of the cableway, protecting the viability of the ex state highway 31 bis from the carts of marl from Coniolo Brino and direct to the cement factory. The cement factory and consequently the cableway was abandoned in the 60s of the twentieth century and the main objective of this thesis is to know the morphological aspects to assess the state of conservation, and dimensional to allow comparison with structures of similar shape and made previously.



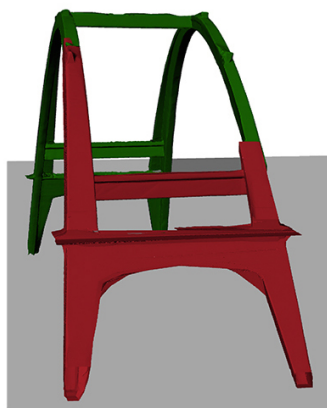
ELABORAZIONE DELLA SUPERFICIE MESH DELL'ARCO



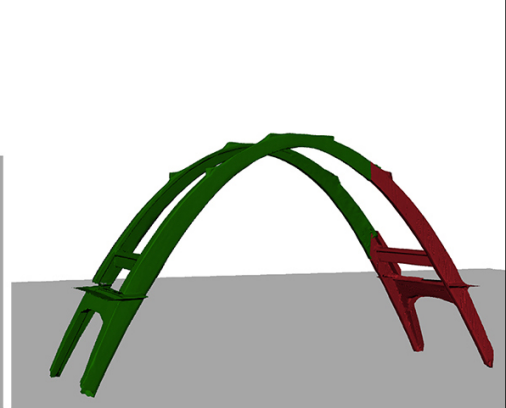
ESTRAZIONE DI PROFILI VERTICALI A PASSO STRETTO PER VERIFICARE LE EVENTUALI ALTERAZIONI



RICOSTRUZIONE DELLA PARTE MANCANTE DI MESH



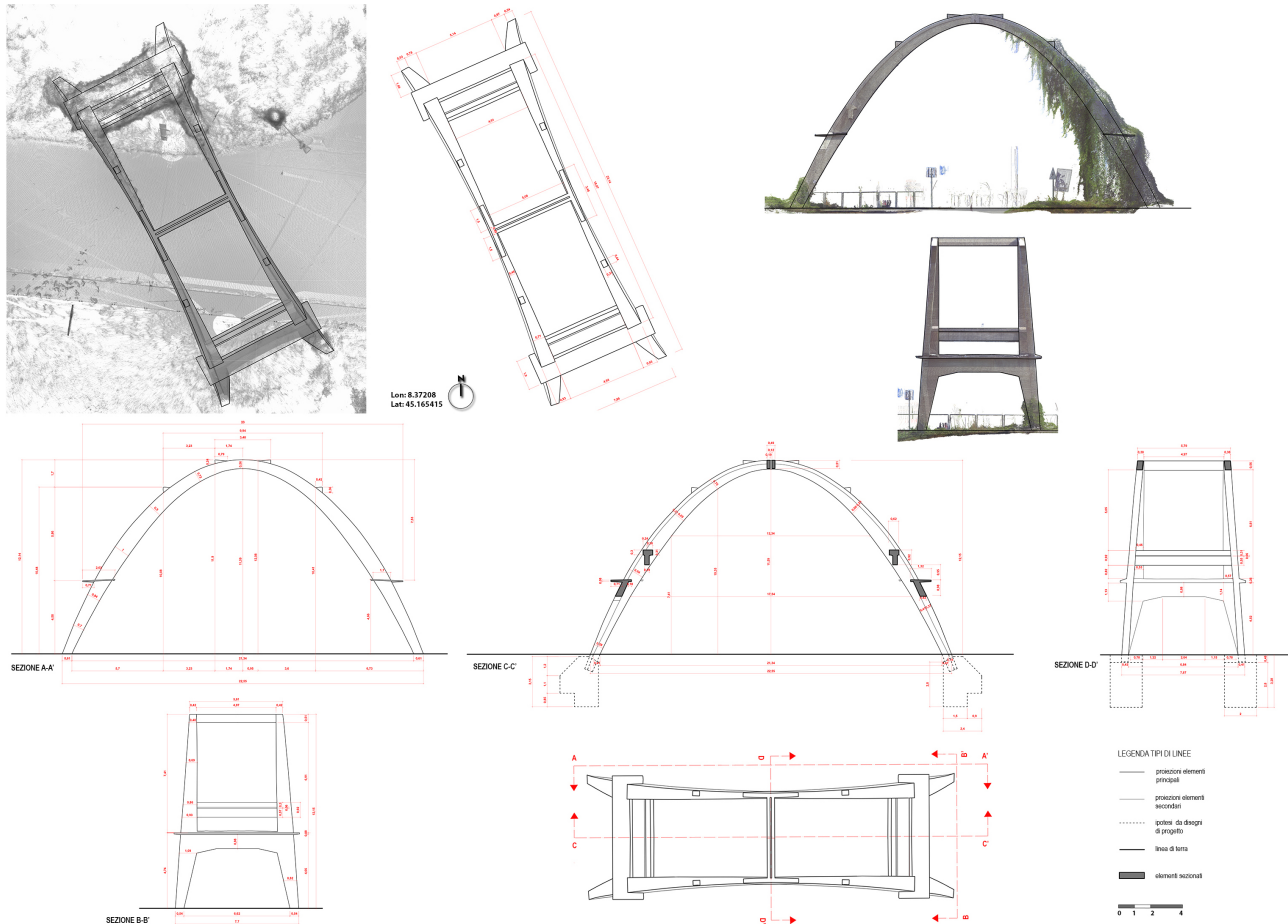
ATTACCO TRA LA MESH E LA PARTE RICOSTRUITA



VISIONE COMPLETA DELLA MESH

Surface processing and reconstruction of the portion of missing model, in reality entirely covered by weed.

The process of the knowledge come from data processing acquired by Team Direct with innovative techniques and methods of relief, such as laser scanners and total station, through which it was possible to generate the numerical model. The integration of point cloud in the system topographical of network framework, has allowed that the relief could be georeferenced. They have been employed different software and highly specialized for the recording scans into a unique archive of 3D points and for modeling.

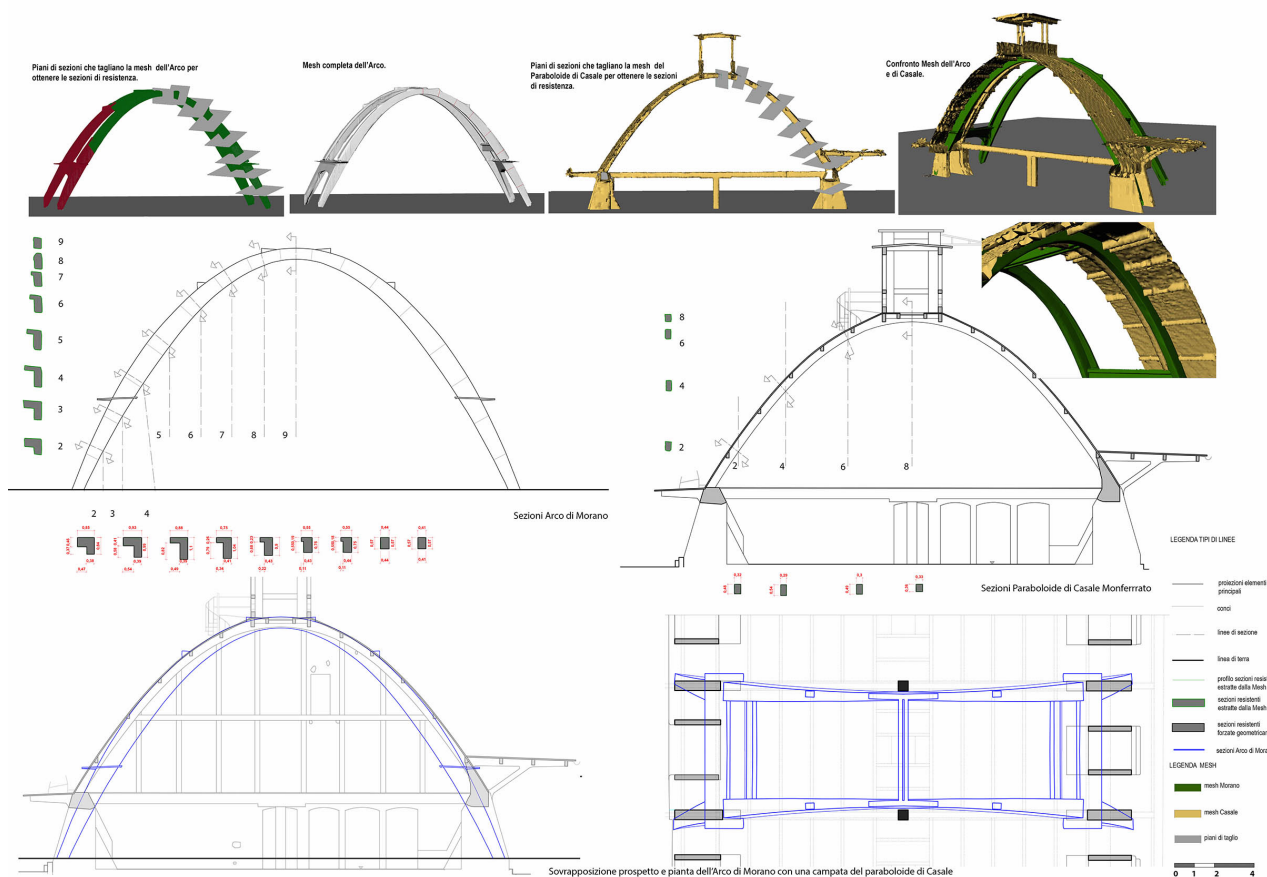


Realization of architectural drawings

For the reconstruction of the parts that had not been possible to reveal because of weeds, we extracted the vertical sections. The assumption of exact symmetry of the structure, have allowed the complete modeling. The extraction of two-dimensional data (views and parallel sections on the cloud) has allowed the realization of the elaborate architectural, which were compared with the original drawings of the project, of 1951. The result provides an exact correspondence, there is a dimensional congruence, the light is identical, the key is similar, ground attack presents a slight difference in height, perhaps produced to raising the road surface / sidewalk or the missed to total visibility of the attack in sections extracted, because of the vegetation that covers it. Also the resistant sections of the project were compared with the results of the laser survey, showing that the profile that generates the curve paraboloid changes in size as it approaches from the base to the ridge, part from one section to "L", which reaches the maximum dimensions at the height of the kidneys of the arc and then shrink gradually losing the shape of a "L" and end with a rectangular section of reduced size in the key.

Ultimately, driven by the consideration that in Casale Monferrato, is an example of a structure with shape parabolic, said the Paraboloide, it was decided to compare the development of two-dimensional data of the Arch of Morano with those of the structure of Casale. The Paraboloide, was built at the start of period in which the structures were made in reinforced concrete resistant for form, it is assumed in the '20s of the twentieth century, it had been destined to store clinker and has already been a subject of studies.

The very interesting result is the fact that the two paraboloids have a dimensional coherence, a profile almost identical, with an identical light, and the key is deduced that it is similar, because it departs of a few tens of centimeters. This would suggest that probably Eng. Sarti had viewed the design drawings of Casale Monferrato. Even in the model of the paraboloid of Casale were extracted resistant sections and are compared with the Arc, in this case the profile that generates the curve has a rectangular section that decreases in size slightly as it approaches the key.



Comparison between the resistant sections, the prospectus and the plant of Morano's Arc and Casale's Paraboloide

The project of knowledge integrates new information on the Arch of Morano that is already included in the mapping of the Archaeological Heritage Industrial of Casale, and builds a good basis for future studies on the state of preservation and stability tests that will re-integrate with similar insights about the Paraboloide of Casale Monferrato.