

The background of the cover is composed of large, expressive, overlapping brushstrokes in various shades of teal and blue. A dark, textured square is positioned in the center-right area, overlapping the brushstrokes.

COMUNICAR LA ARQUITECTURA

DEL ORIGEN DE LA MODERNIDAD A LA ERA DIGITAL

eug

The background is an abstract composition of swirling, layered teal and dark blue brushstrokes. A prominent, dark, textured square is positioned in the center-right area, appearing as if it's a piece of material or a block placed on the surface.

COMUNICAR LA ARQUITECTURA

DEL ORIGEN DE LA MODERNIDAD A LA ERA DIGITAL

TOMO I

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COMUNICAR LA ARQUITECTURA

del origen de la modernidad
a la era digital

TOMO I

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(EDS.)

COMUNICAR LA ARQUITECTURA

del origen de la modernidad a la era digital

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The Sergio Musmeci Archive as a Key to Understanding his Form Finding

El Archivo Sergio Musmeci como clave para comprender su hallazgo de formas

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Abstract

Este artículo describe el trabajo realizado en los Archivos Maxxi Architettura, del Museo MAXXI de Roma, para archivar los archivos de Sergio Musmeci y su esposa Zenaide Zanini. Musmeci está considerado uno de los ingenieros estructurales italianos más ingeniosos y audaces del siglo XX, definido como “visionario” en la investigación *SIXXI - XX Century Structural Engineering: The Italian Contribution*, IPs Sergio Poretti y Tullia Iori. Se trata de un archivo heterogéneo que describe bien la situación histórica, social y cultural italiana del siglo XX. El inventario del archivo Musmeci ha permitido aclarar algunos aspectos de la obra del ingeniero y de la evolución de su pensamiento. Este trabajo ha sido posible gracias a la gran cantidad de material conservado por los herederos y cedido a instituciones capaces, gracias a su saber hacer, de ocuparse de su conservación, pero sobre todo de ponerlo a disposición de los investigadores tanto en el Museo como en el gran mundo digital.

This paper describes the work done at the Archivi Maxxi Architettura, of the MAXXI Museum in Rome, for the stocktaking of the Archive of Sergio Musmeci, and his wife Zenaide Zanini. Musmeci is considered one of the most ingenious and daring Italian structural engineers of the 20th century, defined as “visionary” in the research *SIXXI - XX Century Structural Engineering: The Italian Contribution*, P.I. Sergio Poretti and Tullia Iori. The archive is a heterogeneous archive that well describes the Italian historical, social, and cultural situation of the 20th century. The stocktaking of Musmeci’s archive has made it possible to clarify certain aspects of the engineer’s work and the evolution of his thought. This work was possible thanks to the large amount of material preserved by the heirs and handed over to institutions capable, thanks to their know-how, of taking care of its preservation, but above all, of making it available to researchers both in the Museum and in the large digital world.

Keywords

Sergio Musmeci, búsqueda de formas, Archivos Maxxi Arquitectura Roma
Sergio Musmeci, form finding, Archivi Maxxi Architettura Roma

Introduction

Sergio Musmeci is one of the protagonists of the Italian School of Structural Engineering in the 20th century, certainly the most visionary¹. Born in Rome on 2 June 1926, he studied Civil Engineering at the University of Rome in 1944. He finished his studies four years with top marks. In 1953, he obtained his second degree in Aeronautical Engineering from the School of Engineering at the University of Rome. After his graduation, he had the opportunity to work in the Studio of Riccardo Morandi and Pier Luigi Nervi; and at the end of 1953, he married Zenaide Zanini, an architect in Riccardo Morandi's Studio. In 1954 he founded an architecture studio with Pier Luigi Nervi's son Antonio, but shortly afterwards they decided to separate and Musmeci conducted the rest of his professional activity at home, with the studio annexed to his home. In 1955, he began his academic career: first as Voluntary Assistant to the chair of *Rational Mechanics with Elements of Graphical Statics and Design* at the Faculty of Architecture at the University of Rome, then he received a teaching post from the academic year 1968-1969, and the following academic year he was appointed to the chair of *Bridges and Large Structures*. For the 1973-1975 academic year, he was also in charge of the *Bridges and Large Structures* course at the Faculty of Engineering at the University of Ancona. Being primarily a university professor, and then a designer, is a specific prerogative of Musmeci compared to the other protagonists of the Italian School of Structural Engineering. This peculiarity was then made explicit in the inventory work of the fund that led to the definition of two specific and distinct series related to this profession: “Research Activities” and “Teaching and Cultural Activities”.

This text comes after the work of inventorying the Archive of Musmeci² carried out by the group of the Maxxi Museum's Archive Centre for Architecture in Rome, consisting of Carla Zhara Buda, Angela Parente and Claudia Torrini, with the scientific support of Prof. Tullia Iori, together with the young researchers Tullia Fidelbo and Matteo Ocone. All quotations refer directly to what is preserved in the archives of the Maxxi Museum Archives Centre in Rome, which, as a result of organizational work, can largely be consulted online³. For this reason, consultation details are given, but no images are shown. The archive of Sergio Musmeci, and his wife and designer Zenaide Zanini, has been preserved in the collections of the Maxxi Architettura museum since 2003 and was generously donated by his heirs. “Si tratta di un archivio professionale completo che dopo le necessarie attività di ordinamento e catalogazione [...] è stato messo a disposizione degli studiosi, aprendo a una diversa e più completa considerazione della figura e dell'opera di Sergio Musmeci nella direzione del suo

¹ Tullia Iori, Sergio Poretti, “Fotoromanzo SIXXI 9. Capolavori postumi”, in *SIXXI 5*, ed. by Tullia Iori and Sergio Poretti (Rome: Gangemi Editore, 2020), XXI-XXXI.

² Carla Zhara Buda, *L'archivio di Sergio Musmeci nelle collezioni del MAXXI Architettura* (Rome: Edizioni Fondazione MAXXI, 2022).

³ <https://collezionearchitettura.maxxi.art/patrimonio/20d9d6da-25c6-442f-b4ba-b1ec830b09f2/musmeci-sergio-zanini-zenaide>.

pieno riconoscimento tra gli strutturisti più audaci e innovatori del XX secolo⁴. The entire work of Sergio Musmeci, as Manfredi Nicoletti has already written, had a single objective: the search for form, “una forma la cui definizione non è innescata da un atto intuitivo o capriccioso, ma da un processo che ricerca la necessaria configurazione della materia nello spazio, atta a risolvere un determinato compito strutturale impiegando il minimo indispensabile delle risorse”⁵. Musmeci’s works, as presented by himself, are classified according to the common construction characteristics resulting from his different research strands: corrugated vaults, beam grids, equitensional systems, uniform compression membranes and spatial reticular structures. For Musmeci, designing a structure means finding one of the possible answers to a complex problem with no single solution. Designing is finding the result that is expressed in a recognizable form, determined by the choice of structural material, which has specific characteristics⁶. The result will therefore be more correct the closer the form is to optimizing the characteristics of the materials used. In this way, the form becomes the means of solving the problem. Once the external conditions have been determined, which are known, the stresses involved, which are known, and the material characteristics, which are known, in Musmeci’s approach only the form remains as the true unknown. “La forma è quindi insieme fattore risolutivo sul piano tecnico e veicolo di comunicazione sul piano espressivo; le due cose sono talmente connesse che ciò può spiegare perché realmente non si ottiene mai, o quasi mai, l’una senza l’altra”⁷.

Corrugated Slabs

The first phase of research coincides with work in the 1950s, the theme being corrugated slabs that exploit strength by form. The main characteristic is that the strength of the very thin reinforced concrete slabs is guaranteed by the special corrugated shape that absorbs flexural stresses. The first pleated roof designed by Musmeci was that of the National Athletics School in Formia (LT), Italy, 1954, the construction of which was completed in 1958, recorded in the Musmeci Fund in the series “Professional Activities”, number 22,

⁴ [It is a complete professional archive that after the necessary sorting and cataloguing activities (...) has been made available to researchers, opening up a different and more complete consideration of the figure and work of Sergio Musmeci in the direction of his full recognition among the most daring and innovative structural engineers of the 20th century] Margherita Guccione, “L’archivio di Sergio Musmeci nelle collezioni del MAXXI Architettura”, in *L’archivio Sergio Musmeci nelle collezioni del MAXXI Architettura*, ed. by Carla Zhara Buda (Rome: Edizioni Fondazione MAXXI, 2022), 98-101.

⁵ [a form whose definition is not triggered by an intuitive act, but by a process that searches for the necessary configuration of matter in space, in order to solve a given structural task by employing the minimum of resources] Manfredi Nicoletti, “Sergio Musmeci. Organicità di forme e forze nello spazio”, in *Universale di Architettura* 54, ed. by Bruno Zevi (Turin: Testo & Immagine, 1999), 5.

⁶ Sabrina De Felice, “Il calcestruzzo armato e le strutture resistenti per forma nel pensiero e nell’opera di Sergio Musmeci. Conservazione e durabilità: problematiche attuali” (PhD thesis, Università degli Studi di Roma “Sapienza”, Dipartimento di Storia, Disegno e Restauro dell’Architettura, 2016)

⁷ [Form is therefore both a solution factor on a technical level and a communication vehicle on an expressive level; the two things are so closely connected that this may explain why we really never, or almost never, achieve one without the other] Typescript 1980 by Sergio Musmeci box RIC/2/23, folder Attività di Ricerca, Sergio Musmeci Archive, Centro Archivi Maxxi Architettura, Rome.

with architectural design by Annibale Vitellozzi and structural design by Musmeci, commissioned by the Italian National Olympic Committee. As Musmeci himself writes “si trattava di una semplice soletta sottile piegata autoportante su una luce di 20 metri alle estremità della quale poggiava su due grandi telai reticolari. In cantiere il disegno dei ferri disposti in modo da seguire le variazioni degli sforzi apparve particolarmente bello, Il getto del calcestruzzo avrebbe in seguito nascosto quel disegno così significativo e questa circostanza mi fece comprendere che la forma della volta non seguiva abbastanza l'andamento naturale delle forze interne per poterlo esprimere visibilmente”⁸. Musmeci continued this research, reaching shortly afterwards, in 1956, what he himself calls “un primo esempio e forse il più significativo di questo modo di dare forma visibile ai momenti flettenti”⁹. The project with Leo Calini and Eugenio Montuori, commissioned by Andrea Raffo, of the Stabilimento Raffo e C. for marble working in Pietrasanta (Lu), Italy, attested in the Musmeci archive in the series “Professional Activities”, number 35, where “si è introdotta [...] l'idea di mantenere rettilinei e continui gli spigoli tesi in modo da costruire una specie di riferimento rigido che contribuisce a rendere più chiara la percezione della forma”¹⁰. On this occasion, as also in the project for the restaurant of the Olympic Swimming Stadium in Rome, 1957-1959, with Enrico del Debbio, Annibale Vitellozzi and Riccardo Morandi, in the series “Professional Activities”, number 52, the bending of the slab arises from the stresses involved and the amplitude of the corrugation varies according to the natural variation of the stresses produced by the distribution of loads and constraints¹¹.

Beam grids

The second line of research concerns beam grids. In 1960, he drew up the design for the San Carlo church in the Villaggio del Sole in Vicenza, Italy, preserved in the archives of the series “Professional Activities”, number 59, with architect Sergio Ortolani, engineer Antonio Cattaneo and Zenaide Zanini. The roof of the church can be likened to the symbolic shape of a tent, the layout of which is generated by three logarithmic spirals. The spirals have the characteristic of always forming the same angle when they intersect with the rays

⁸ [it was a simple self-supporting folded thin slab over a span of twenty meters at the ends of which rested on two large reticular frames. At the construction site, the design of the irons arranged in such a way as to follow the variations of the stresses appeared particularly beautiful. The pouring of the concrete would later hide that significant design and this circumstance made me realise that the shape of the vault did not follow the natural course of the internal forces enough to express it visibly] Typescript 1980 by Sergio Musmeci box RIC/2/23, folder Attività di Ricerca, Sergio Musmeci Archive, Centro Archivi Maxxi Architettura, Rome.

⁹ [a first example and perhaps the most significant of this way of giving visible form to bending moments] Typescript 1980 by Sergio Musmeci box RIC/2/23, folder Attività di Ricerca, Sergio Musmeci Archive, Centro Archivi Maxxi Architettura, Rome.

¹⁰ [the idea of keeping the edges stretched straight and continuous was introduced in order to build a kind of rigid reference that contributes to a clearer perception of the shape] Typescript 1980 by Sergio Musmeci box RIC/2/23, folder Attività di Ricerca, Sergio Musmeci Archive, Centro Archivi Maxxi Architettura, Rome.

¹¹ Alessia Sisti, “Struttura e forma nella sperimentazione di Sergio Musmeci” (PhD thesis, Università degli Studi di Roma “Tor Vergata”, Dipartimento DICII, 2020).

coming from the geometric center. The lattice of beams is therefore designed by Musmeci using three logarithmic spirals as a base to obtain triangular meshes as close as possible to the equilateral shape. “Questo modo di progettare quando la forma della struttura ha una matrice più geometrica che statica”¹² is also visible in the section where the network of beams thickens as it rises in height. Following the path of a spiral, from its end towards the center, at each intersection node with one of the beams, it rises in elevation by a constant amount and “da ciò consegue la forma della copertura che è quella di una superficie di rivoluzione con una linea direttrice logaritmica. La sezione delle travi ha dimensioni che diminuiscono proporzionalmente alla distanza dal centro e ciò è in buon accordo con la graduale riduzione degli sforzi di flessione che caratterizzano la parte perimetrale della struttura, protesa a sbalzo oltre l'appoggio sui muri, a mano a mano che ci si avvicina alla cuspidale centrale dove invece prevale un comportamento a membrana caratterizzato da sforzi normali di compressione”¹³. The structure, in the process of approaching the centre, passes from a discrete system of beams to a continuous surface that, accentuating its curvature, requires less resistant material, expressed by the reduction in height and width of the ribs, thus resulting in a mixed system¹⁴.

Experimentation with the subject of beam grids can also be identified in other works such as the Auditorium, for the Atomic City of Trombay, Bombay in India, where Musmeci was called upon in 1960 to make his contribution by Studio Calini-Montuori. This contribution is documented in the series ‘Photographic Materials’, more precisely FOT/1/1/23, FOT/1/59, FOT/2/2, FOT/3/5/1.

Equitensional systems

From the evolution of research starting with beam grids comes another line of study: equitensional systems. “Se una rete di travi o di archi o di cavi tesi è formata da elementi equivalenti, aventi la stessa sezione resistente è naturale cercare di ottenere che lo sforzo sia identico in tutti e pari al massimo consentito dalla sezione. Questo principio di intrinseca economicità si traduce in una forma di organizzazione strutturale fortemente espressiva

¹² This design experience where the shape of the structure has a matrix that is more geometric than static] Sergio Musmeci, “La genesi della forma nelle strutture spaziali”, *Parametro*, n.º 80 (1979): 36-47.

¹³ [From this follows the form of the roof, which is that of a surface of revolution with a logarithmic directrix. The section of the beams has dimensions that decrease in proportion to the distance from the center. This is in accordance with the gradual reduction of the bending stresses that characterize the perimeter part of the structure. In the center, on the other hand, the closer one gets to the central cusp, the more a membrane behavior characterized by normal compressive stresses prevails] Typescript 1980 by Sergio Musmeci box RIC/2/23, folder Attività di Ricerca, Sergio Musmeci Archive, Centro Archivi Maxxi Architettura, Rome.

¹⁴ Sisti, “Struttura e forma...”.

proprio perché efficiente”¹⁵. This is the case, for example, of the roof for the 1955 Araldo cinema in Rome, which was not realised, documented in the series ‘Photographic materials’, FOT/1/50, where an identical value was established for all thrusts. From this, the heights of the crossing nodes of arches connecting the points on the perimeter where the supporting elements were planned were then determined. The longer arches assumed a “very peculiar course with an inversion of curvature towards the supports thanks to which they were able, before reaching them, to rest on the shorter arches they crossed”¹⁶. The static functioning of the entire structure is therefore “characterised by the property that the thrust of the polygonal arches is the same for all of them. This is the result of an appropriate choice [...] of the heights of the intersection points of the ribs. The equality between the thrusts of the various arches justifies the adoption of the same section for all of them and allows maximum static efficiency”¹⁷.

In 1969, Musmeci was called upon by Giancarlo Petrangeli to deal with the structural design of the *Sant’Alberto* Church in Sarteano (Si), Italy, documented in the series “Professional Activities”, number 114. The roof consists of “a system of taut cables arranged radially from a vertical element, the bell tower, to which they are anchored at points placed at varying heights following a helical curve”¹⁸. The cables assume a curvilinear course dictated by a static necessity since “the cables bear a load that increases linearly as they gradually move away from each other, the funicular line according to which they must be arranged is a particular curve easily obtained by calculation”¹⁹. In this case, the tension is not constant because the cables do not cross each other to form a network. It is the horizontal components that are designed to be the same in all cables: the shape of the roof is thus determined. Even the shape of the perimeter walls, made of reinforced concrete, is specially designed to easily absorb the general horizontal thrusts of the tensile roofing structure. Therefore, Musmeci is “più incline a forme complesse che non si capiscono ma che si intuiscono e che [...] sono le vere forme moderne, perché utilizzano una conoscenza di tipo scientifico, in cui altri mezzi logici e concettuali giocano un ruolo decisivo”²⁰.

¹⁵ [If a network of beams or arches or tensioned cables is made up of equivalent elements, having the same resistant section, it is natural to try to obtain that the stress is identical in all of them, and equal to the maximum allowed by the section. This principle of intrinsic economy translates into a form of structural organisation that is highly expressive precisely because it is efficient] Typescript 1980 by Sergio Musmeci box RIC/2/23, folder Attività di Ricerca, Sergio Musmeci Archive, Centro Archivi Maxxi Architettura, Rome.

¹⁶ Typescript 1980 by Sergio Musmeci box RIC/2/23, folder Attività di Ricerca, Sergio Musmeci Archive, Centro Archivi Maxxi Architettura, Rome.

¹⁷ Sergio Musmeci, “Volte ad archi poligonali”, *L’architettura. Cronache e storia*, n.º 6 (1956): 880-882.

¹⁸ Typescript 1980 by Sergio Musmeci box RIC/2/23, folder Attività di Ricerca, Sergio Musmeci Archive, Centro Archivi Maxxi Architettura, Rome.

¹⁹ Typescript 1980 by Sergio Musmeci box RIC/2/23, folder Attività di Ricerca, Sergio Musmeci Archive, Centro Archivi Maxxi Architettura, Rome.

²⁰ [more inclined to complex forms that are not understood but intuited and which (...) are the true modern forms, because they use a scientific type of knowledge, in which other logical and conceptual means play a decisive role] Tullia Iori, “Intervista (im)possibile a Sergio Musmeci, un visionario”, *Rassegna di architettura e urbanistica*, n.º 168 (2022): 8-17.

Membrane structures

Another line of research in Musmeci's experimentation concerns reinforced concrete membrane structures. These types of structures have never achieved widespread use due to their theoretical and constructional difficulty. In this area, Musmeci introduces a fundamental change of paradigm: "se invece nelle equazioni si introducono le tensioni come quantità note e si cerca di ottenere la forma come l'incognita da ricercare, le cose possono essere spesso più facili e in ogni caso si ottiene un'utilizzazione più razionale del materiale e insieme, cosa molto importante, forme più espressive della sua natura e dell'equilibrio statico in atto nello spazio"²¹. Musmeci also emphasizes that the mathematical difficulties can be less than those encountered in traditional verification calculations if calculation is used as a means of synthesizing forms and not just as verification of assigned forms²².

To this strand of research belongs the design for the 1959 competition, with Ugo Luccichenti, for the bridge over the Tiber in Rome, Tor di Quinto area, documented in the series "Attività Professionale", number 47, where the shape of the supports was created as a consequence of a static regime of uniform compression. The determination of the shape abandons the two-dimensional dimension of cables and wires but is determined with a strongly tensioned rubber model. The bridge supports are V-shaped, and their curvature follows the minimum surface development. Here Musmeci implements all the main elements of the design methodology that will later form the basis of the Potenza project²³. Any double-curved surface can have membranous behavior if certain conditions on the edge design are respected. In the case of the Tor di Quinto bridge project, the edges must be able to collect the internal compression of the membrane: "la forma della superficie influenza così la forma dei bordi e ne è a sua volta influenzata"²⁴. Sergio Musmeci's approach, completely opposite to the tradition of structural design, is therefore also clear in this project: science must serve invention and not only verification. In this way we arrive, as is amply documented thanks to the reorganization of the archive, at the discovery of optimal forms that for a given system of external forces accommodate, with the use of minimal material, the stresses involved.

Minimal surfaces

The evolution of minimal surfaces ends in the last field of research that Sergio Musmeci approached before his premature death in 1981. The discretized version of minimal surfaces are spatial lattice structures, a structural type that Musmeci himself defines as

²¹ [if instead one introduces stresses as known quantities into the equations and tries to obtain the form as the unknown to be researched, things can often be easier and in any case one obtains a more rational use of the material and at the same time, very importantly, forms that are more expressive of its nature and of the static equilibrium taking place in space] Typescript 1980 by Sergio Musmeci box RIC/2/23, folder Attività di Ricerca, Sergio Musmeci Archive, Centro Archivi Maxxi Architettura, Rome.

²² Sergio Musmeci, "Struttura ed architettura", *L'Industria Italiana del Cemento*, n.º 10 (1980): 231-246

²³ Carlo La Torre, "Il ponte sul Basento a Potenza: un percorso di ricerca", in *Il ponte e la città. Sergio Musmeci a Potenza* (Rome: Gangemi Editore, 2004), 95-107.

²⁴ [the shape of the surface thus influences the shape of the edges and is in turn influenced by them] Sergio Musmeci, "Ponte sul Basento a Potenza", *L'Industria Italiana del Cemento*, n.º 11 (1977): 885-906.

completely different from the others. In these projects, the geometric matrix is the only protagonist, as the elements “are not distinguished by their static role but only as parts of a geometric composition within which each one is in a position completely equivalent to that of every other”²⁵. In 1978 Musmeci extended the study of spatial reticular structures to all regular structural meshes thanks to the use of a new material: concrete impregnated with artificial resins patented by the company Italcementi. In Rome in 1979 for the “*Settimana dell'Architettura*”, this innovative material was used experimentally for a structure designed by Sergio Musmeci. In an article published in “*L'industria italiana del cemento*”²⁶ by Musmeci the new material was presented, but above all the new forms that could be created with it: “nothing can stimulate the development of new structural forms like a new construction process or the introduction of a new material, and there are many reasons to consider impregnated concrete as a new material”²⁷. In 1979, in “*Parametro*”²⁸, Musmeci had published an in-depth study dedicated to the geometry of polyhedra, in which he analysed the way of inventing structures that leads to the geometries of the discrete: “gli elementi che compongono la struttura sono identici e numerabili e ciò che conta sono i punti nodali, e le aste che li compongono, i rapporti tra distanze e angoli, il manifestarsi in definitiva di leggi di organizzazioni che consentono di leggere, lo spazio. In questo caso la geometria ha un ruolo più diretto perché un'asta non viene tanto percepita come una linea di forza quanto come un vettore geometrico”²⁹, so reads the typescript. These geometries are then put in relation to the possibility of creating new modular spatial structures through the use of the new material, impregnated concrete: “these are structural forms that, although they present various analogies with the spatial reticular structures in steel, differ from them in many respects and in any case enough to be considered as typical applications of the new material and therefore as expressive forms of its structural qualities”³⁰. During the “*Settimana dell'Architettura*” organized by In/Arch in Piazza San Salvatore in Lauro in Rome in 1979, Musmeci experimented with these spatial reticula forms and with Italcementi, Italy's leading cement manufacturer, produced prototypes with polymerised concrete. This structure is obtained by joining identical elements whose equilateral triangular shape can generate the

²⁵ Typescript 1980 by Sergio Musmeci box RIC/2/23, folder Attività di Ricerca, Sergio Musmeci Archive, Centro Archivi Maxxi Architettura, Rome.

²⁶ Sergio Musmeci, “Strutture nuove per un materiale nuovo”, *L'industria Italiana del Cemento*, n.º 5 (1980): 345-360.

²⁷ Sergio Musmeci, “Strutture nuove per un materiale nuovo”, *L'industria Italiana del Cemento*, n.º 5 (1980): 345-360.

²⁸ Sergio Musmeci, “La genesi della forma nelle strutture spaziali”, *Parametro*, n.º 80 (1979): 36-47.

²⁹ [the elements that make up the structure are identical and numerable, and what counts are the nodal points, and the rods that make them up, the relationships between distances and angles, the manifestation ultimately of laws of organizations that allow one to read, space. In this case, geometry plays a more direct role because a rod is not so much perceived as a line of force but as a geometric vector] Typescript 1979 by Sergio Musmeci box RIC/2/21, folder Attività di Ricerca, Sergio Musmeci Archive, Centro Archivi Maxxi Architettura, Rome.

³⁰ Typescript 1980 by Sergio Musmeci box RIC/2/23, folder Attività di Ricerca, Sergio Musmeci Archive, Centro Archivi Maxxi Architettura, Rome.

structural mesh in a univocal process. The spatial grid is determined by arranging the rods without connecting elements. The use of Italcementi concrete allows for the prefabrication of construction elements with a geometric rigour that is difficult to achieve with ordinary concrete, and the reading of three-dimensional space is closely linked to the absolute coherence of the forms with the geometric matrix, made such thanks to the use of this material.

Conclusion

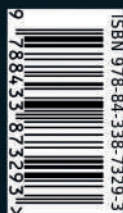
In conclusion, it can therefore be stated that “il contenuto è apparenza e che la forma è l'unica verità accessibile. Essa appare in ogni caso come la realtà ultima a cui si giunge per astrazione dal particolare all'universale. Alla forma almeno deve essere attribuito un valore in sé, alla stessa stregua con cui lo si attribuisce alla materia e all'energia”³¹. The result for Musmeci is more valid when the role of form takes on more importance. Form becomes how the problem of design is solved, that is, to organise and reconcile chaotic data in an organism.

The whole story and evolution of Sergio Musmeci's thought has only been defined and reconstructed thanks to the work done on the archive³², which has been reordered and organised according to the peculiar characteristics that gradually emerged from the study of the original materials. The very subdivision into series and subseries is the result of the characteristics of the individual documents that make up the archive, therefore a careful study of the individual documentary units and their organisation that is as transparent as possible remains of fundamental importance. The richness of this archive is now available to researchers, but also to current planners. and to all curious people. Designers will be able to understand just how far Sergio Musmeci's design went, towards a boundary defined only by the instrumental limits of the time: the computer was developing in those years, but Musmeci was already designing using computers to verify his theories and search for the most suitable form to respond to certain external parameters³³. Certainly, today where tools are no longer a limitation, where the computer can be used as Musmeci imagined, one can and must make designs where form is the real unknown. This approach, paraphrasing Musmeci's words for form, it is clearer how the study through archive materials is a resolving factor on a technical level and a vehicle of communication on an expressive level; the two things are so connected that this may explain why we really never, or almost never, achieve one without the other.

³¹ [the content is appearance and that the form is the only accessible truth. It appears in each case as the ultimate reality to which one arrives by abstraction from the particular to the universal. The form at least must be attributed a value, in the same way as one attributes it to matter and energy] Typescript 1980 by Sergio Musmeci box RIC/2/23, folder Attività di Ricerca, Sergio Musmeci Archive, Centro Archivi Maxxi Architettura, Rome.

³² Fidelbo Tullia, Matteo Ocone, “Regesto dei progetti attestati in archivio”, in *L'archivio di Sergio Musmeci nelle collezioni del MAXXI Architettura*, ed. by Zhara Buda Carla (Rome: Edizioni Fondazione MAXXI, 2022), 142-186.

³³ Tullia Iori, Sergio Poretti, “Pop Structures per il nuovo millennio”, *Rassegna di architettura e urbanistica*, n.º 137-138 (2012): 9-28.



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