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Masonry and its role in the mid-20th century: G area houses in the Le Vallette district of Turin

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ABSTRACT: The paper focuses on the housing complex designed by A. Cavallari Murat and the younger R. Gabetti, A. Isola and G. Raineri (1958-69) for the Ina-Casa public housing district of Le Vallette in Turin. The load-bearing masonry structure initially adopted by the designers, with upwards tapered pillars projecting from the façades (a solution which seems to be reminiscent of the work of Alessandro Antonelli), was abandoned during the construction phase in favour of a reinforced concrete one. If this choice had no consequences as regards architectural image, it triggered a process of technological re-elaboration which is interesting to analyse in terms of the various solutions adopted by the four construction companies involved, as concerns both the organization of the load-bearing structure and its relationships with brick cavity walls.

1 INTRODUCTION

The great public housing neighbourhood of Le Vallette was built in Turin, Italy, on the extreme northwest city limits, between the second half of the 1950s and the 1960s. Within it, the residential complex of the area known as "zone G", designed by A. Cavallari-Murat and the younger R. Gabetti, A. Isola and G. Raineri, represents a significant example of the ways the technical aspects of construction were interpreted by some of the protagonists of Italian architecture from the 1950s onwards. It is also an example of the "definitive" transition of masonry from load-bearing to non-bearing, also in the context of the Ina Casa Turin experience.

In contradiction with the setup of the neighbourhood's organic urban plan, the architects organized the area available around large courts, "something between a farmyard and a city courtyard", as they underlined in the report published in the magazine *Casabella-Continuità* (1962) to evoke perhaps one of the most evident traits of the design: its reference, among other things, to rural architecture. The general system is based upon a distribution lay-out that combines buildings and makes them function as a coherent whole, whilst offering people who would find themselves living close to one another the opportunities to meet and socialize. The frontal H-shaped buildings, boasting five storeys above ground (six on the side facing the courts, and coupled two-by-two by one-floor above-ground wings), are connected to the long low-rise (3 to 4 floors) internal slab blocks, and the latter, by means of a path overlooking the courts, are positioned over a thin ring-shaped portico (which was never built) conceived to outline a wide play area, and to funnel the flow of pedestrians reaching the homes from the centre of the neighbourhood, and vice versa. Three more H-shaped buildings complete the organization of this part of the neighbourhood (Fig. 1).

But the aesthetic strength of these houses is, along with the richness of morphological-spatial and distribution solutions, related especially, in the design delivered to and approved by the municipality in 1958, to the unique masonry system of the load-bearing structure, with pillars projecting from the façade and

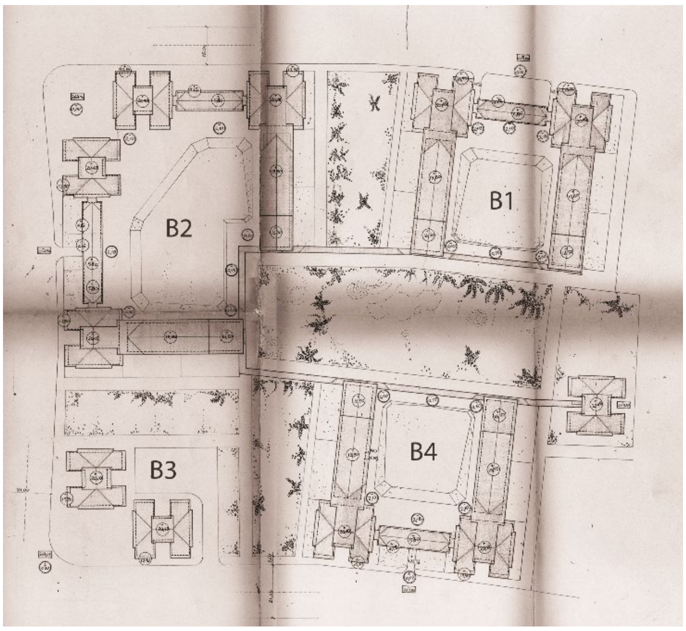

Figure 1. Le Vallette, general plan of the zone G (1:500) (ATC, 14563). Blocks numbering (B1, B2, B3, B4) is referred to in § 3.

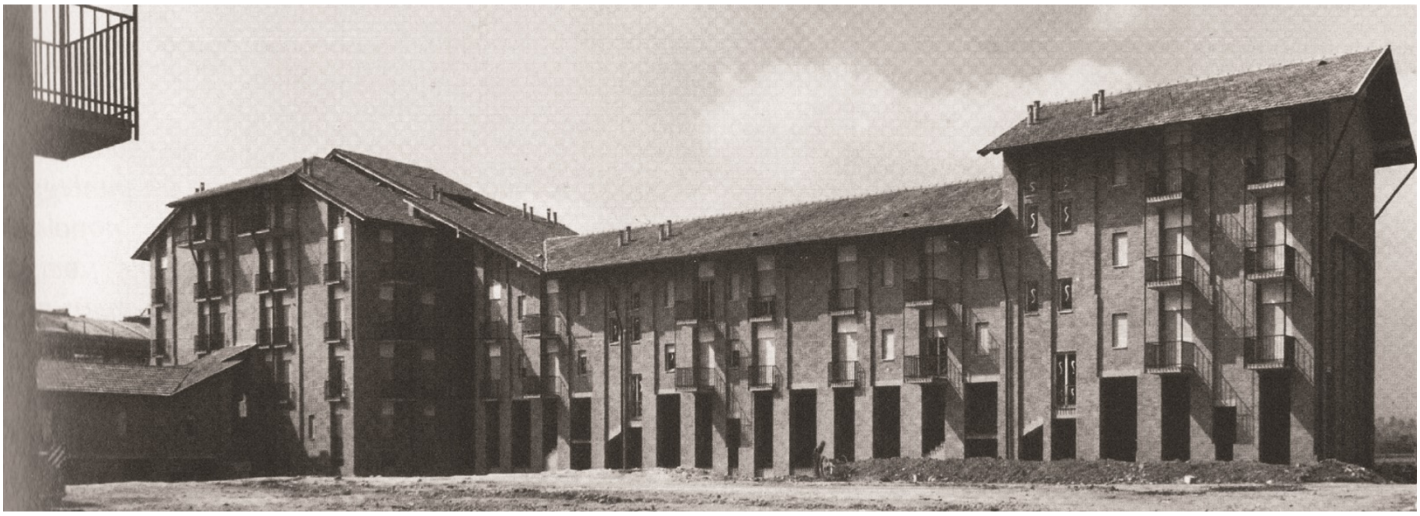

Figure 2. One of the courts in zone G with the porticoed side slab block and the H-shaped building overlooking it, ca. 1960 (ATC, 1).

tapered upwards, a system which, in the finished version of the project, was destined to survive only as a simulacrum (Fig. 2). In fact, when the construction site was opened (1959), the construction company that won the tender to build the entire complex proposed the adoption of a fully reinforced concrete structure, which was approved. The events that followed fall under a long and rough realization procedure. In 1960, the building company went bankrupt. A succession of trusted companies was selected by the commissioning institution (IACP– Istituto Autonomo Case Popolari, an independent institution for public housing in Turin) to complete a first lot of buildings and, only several years later, in 1966, were three new sites opened to finalise the construction of this part of neighbourhood (1969), which, nevertheless, would remain partially unfinished.

The reconstruction of the design and building process is the result of research undertaken at the National Archive of Turin (AST, 1; AST, 2; AST, 3) and the ATC (formerly IACP), the local housing agency of Turin (ATC, 1; ATC, 5735; ATC, 14563; ATC, 19447), and a comparison between what gradually emerged from this research and the tangible reality of the buildings.

2 A MASONRY DESIGN

In 1958, the project for zone G houses, developed in the context of the Ina Casa plan, was delivered to the municipality. The plan, as is well-known, was aimed to promote construction methods with low mechanization and high manual labour demand (Poretti 2008), and suggested the adoption of a masonry load-bearing structure for lower buildings, two/three floors above ground, highlighting its low cost-effectiveness for higher ones, starting at a height of 5 or 6 floors above ground, exactly like what envisaged for the front buildings of zone G.

Indeed, for the Le Vallette housing complex, the choice of load-bearing masonry seems to respond to greater requirements than simple compliance with the traditionalist premises of the Fanfani plan. On the one hand, construction costs related to its employment were viewed by the architects as still competitive (Guerra & Morresi 1996); on the other hand, above all, the architects seem to have seized, in this assignment, the chance to reconnect to a technology that was by then outdated in the Turin market (and, given the epilogue of the facts, even in Ina Casa public housing) with the aim of experimenting its design values, which they believed to still be valid, in an original direction, which, when observed carefully, appear completely intrinsic to their specific interest, as well as to the development of architecture and construction in the Piedmont region.

This was a direction that had already been taken, in particular by Gabetti and Raineri, in cooperation with Massimo Amodei, in the design of a number of small Ina houses from the early 1950s (Barelli 2020). An emblematic example of these houses is the one built in San Maurizio Canavese (Turin area, 1952-53), a building of an almost didactic clarity, resting on a system of masonry pillars connected by cavity walls and conceived, as specified in a detail drawing, as solids "of uniform strength" (ATC, 5735) whose taper, rotated (as opposed to its traditional orientation) towards the wall plane, is visible on the façade, as with the houses in Le Vallette (Fig. 3). Here too, as with Le Vallette, joist slabs with hollow tiles are given the function of transferring forces to the perimeter shear walls and the central stairwells, providing lateral bracing for the whole building. They are supported by "reinforced concrete ring beams as thick as the slab" (ATC, 5735; ATC, 14563) resting on (and connecting together) the load-bearing masonry walls. In Le Vallette, the difference is that the ring beams are "covered by bricks on the visible parts of the outer walls" (ATC, 14563), because the idea was to have a continuous masonry façade.

The architects' view, upon designing the San Maurizio Canavese house and, though less notable, also the housing in Le Vallette, seems to look backwards,

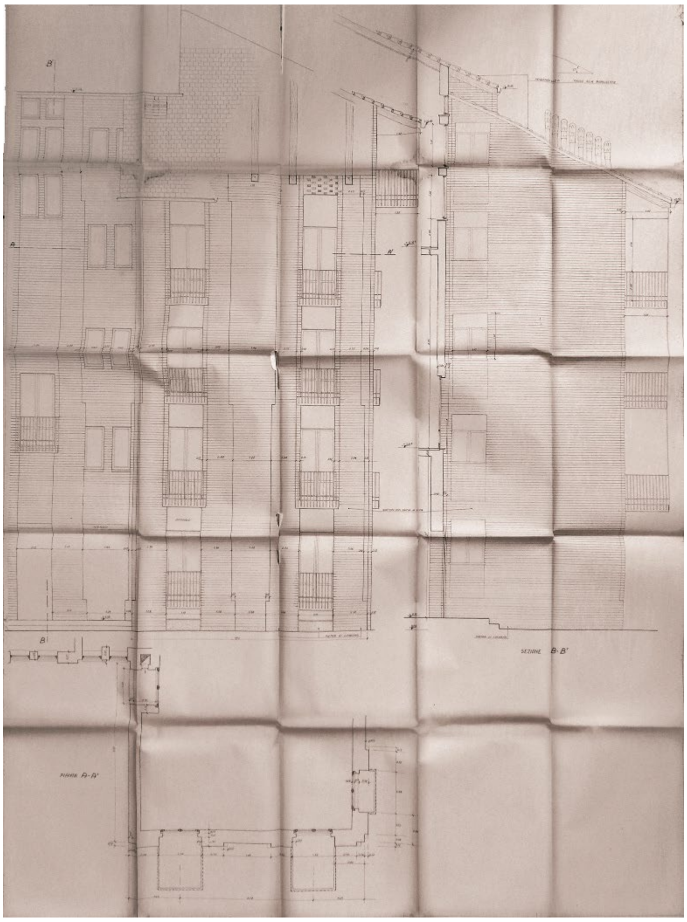

Figure 3. Detail drawing with the elevation of an H-shaped building with the system of tapered pilasters (1:10) (ATC, 14563).

towards that "Antonelli system", on which Roberto Gabetti would linger in a famous long essay in 1962, and which had been developed, pursuing an ideal that could be traced back to the aim (Rosso 1989) of reducing architecture to its essentials, i.e. single load-bearing columns, aiming at minimising cost and structural weight. This system is based on a grid of single "brick columns and pillars (…), designed precisely to support only vertical loads" (horizontal thrusts being counteracted by a system of metal tie-rods embedded in masonry) and, for the external walls, on "cavity walls, with two 12-cm masonry wythes (one external, one internal) connected by legs every 70-80 cm", namely by orthogonal half-brick walls bonded with facing and backing wythes (Gabetti 1962). The building systems perfected by Antonelli, states Gabetti, had by then established themselves in current construction and, as emerges in subsequent studies (Barrera 1982), even in early twentieth century public housing in Turin. The specifications of the aforementioned Ina houses refer recurrently to masonry load-bearing structures with lightened cavity walls (Barelli 2020).

Nevertheless, in the documentation collected to date, the design for zone G housing contains certain intrinsic ambiguities related, in particular, to the actual presence of the cavity walls.

On the one hand, the specifications, which are rather generic overall (probably deriving from template specifications applicable to all IACP sites), describe in detail the unique characteristics of the structure, underlining that "Where specified in the drawings, the load-bearing structures shall be made of masonry pillars of the specified thickness, which will be tapered upwards", and specifying the presence of "intermediate cavity walls whose outer wythe is bonded with the pillars themselves, and once again made of a 12-cm solid brick facing and a 8-cm hollow brick backing" (ATC, 14563). It is worth noting here the different role assigned to the wythes of the cavity wall, with the half-brick facing bonded with the load-bearing pillars, thus contributing to overall stability. As a further proof, another specification states that "the half-leaf partition walls, though made of solid shiners, may not be considered load-bearing", whilst "the 12-cm single-leaf walls" may indeed be, albeit "only for 70% of the transverse section, and depending on their height and connection conditions".

On the other hand, it is important to note how the drawings included in the specifications, even the detail drawings, never indicate the presence of cavity walls (which are, instead, represented precisely in the design for the house in San Maurizio Canavese), nor where we should expect to find them. The hollowing of certain pillars (to insert garbage chutes), as well as the weakening, rather than the strengthening, of corners (although less evident in the initial design version), might lead us to think that, in Le Vallette, the architects were inspired by Antonelli's system mostly in terms of aesthetics - no longer single supporting pillars and cavity walls, but continuous, solid walls strengthened by projecting pilasters tapered upwards.

Thus, on this matter, research has yet to achieve certain results. Although the design documents do not resolve the ambiguities between description and representation, they nonetheless seem to take on an interlocutory form, which, within a shared framework of a construction art that is still traditional, requires certain essential choices to be made in the building phase.

The masonry walls on all storeys have a constant thickness of 40 cm, with a half-brick increase for the pilasters (52 cm thick). The latter are organized quite flexibly in plan view, as seems to be highlighted, for instance, by the different rhythm of the two opposite façades of the long inside slab blocks, and the freedom with which the ones facing the court are designed. In the vertical layout of pilasters, the recesses, half a brick in thickness (12 cm), are positioned usually every two floors, thus becoming one of the distinctive aesthetic elements of the complex.

The analysis of the drawings allows us to reconstruct more or less the evolution of the solutions proposed for the load-bearing structure, which would undergo certain adjustments in terms of internal organization.

In some of the initial drawings, most certainly the first ones delivered to the institution (though undatated), the vertical load-bearing structure is made entirely of brick.

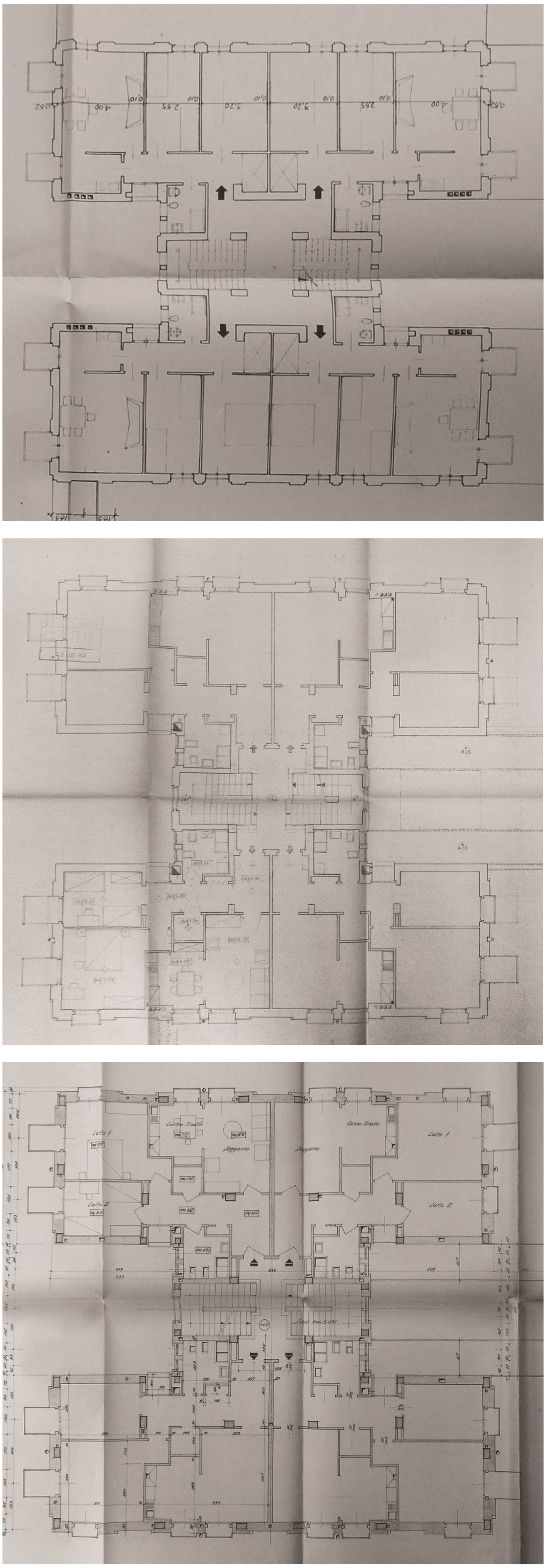

Figure 4. Changes in the internal distribution and the load-bearing system from design to execution: details from the plans of masonry (top), mixed (centre) and r.c (bottom) versions (1:100) (ATC, 14563).

In the H-shaped front structures, the continuous partition walls in the two wings at the sides of the central stairwell act as an intermediate support for the 7.5 m span slabs and this explains the somewhat rigid (as it was in the past) circulation of the apartments (Fig. 4, top). In the rear side buildings which outline the court, a spine wall runs lengthwise, becoming thinner in certain points, or coming to an end where there are openings, which is also typical of nineteenth century masonry construction. But due to the presence of rigid horizontal r.c. slabs, the only transverse shear walls, along with the short side façades, are those surrounding the stairwells. Thus, the design relies on the ability of the slabs to wind-brace the structure.

In the later versions, the design was gradually aligned to the recurring building methods of Ina Casa constructions, used, for example, from 1953 to 1958 in the La Falchera neighbourhood, also in Turin (Bardelli et al 2003). Rows of inner pillars appeared in the lateral wings of the H-shaped front structures, initially laid out with close centre-to-centre distances (about 3 metres), which became longer in the approved version, clearly taking on the composition of reinforced concrete columns (Fig. 4, centre). Likewise, the central spine of the long internal slab blocks turned into a succession of pillars.

But the decade was by then coming to an end. The choice of a mixed solution, masonry and reinforced concrete, would actually represent, as remarked in the introduction, the first step towards the adoption of a fully reinforced concrete frame (Fig. 4, bottom). This was proposed as soon as the site was opened by the winner of the tender, Saicca, and was a subject of dispute which would see the architects as the losing party.

3 THE CONSTRUCTION SITE AND THE ADOPTION OF THE R.C. STRUCTURE

The construction of the zone G housing complex would last much longer than the time planned (just over a year) in the handover report delivered to Saicca on 1 April, 1959. A number of photographs show the first houses completed (the ones in blocks B1 and B4) in a mostly undeveloped neighbourhood. The company went bankrupt in 1960, and the work was newly launched in 1966, though the area was subdivided into three lots, perhaps to prevent eventual new construction slowdowns. The assignments went to Bracco (block B3) (AST, 4), Borini (buildings south-west of block B2) (AST, 3), and Simet (buildings north-east of the same block) (AST, 2), each making use of trusted civil engineers, developing their own structural designs (Fig. 1).

The adoption of a reinforced concrete structure in place of the original masonry system was probably due to the advantages brought "to the organization of the construction siteschedule" (Guerra & Morresi

1996), even with an ineluctable increase in manufacturing costs. Besides, this choice was not incompatible with the Capitolato Speciale d'Appalto (special tender specifications), which, as mentioned, was characterised by a substantial flexibility, not to say indifference, towards different technical choices. In fact, it envisaged the possibility of using either load-bearing masonry or a reinforced concrete frame for the vertical structure, whilst the horizontal ones were to be joist slabs with hollow tiles.

Once adopted for the houses erected in 1959 by Saicca (in the first construction phase), this choice was never again questioned by construction companies Borini, Bracco, and Simet (second phase), as can be seen from an adjustment made to the specifications, among the few relevant for the purposes of this paper, where the only accurate reference to the organization of the masonry structure in the original design, the tapering pillars, disappears. Another specification, in this case perhaps due to the difficulties emerging throughout phase 1, was the floor and roof precast slabs ("reinforced hollow tiles or prestressed concrete joists"; ATC, 19447) to be site-cast.

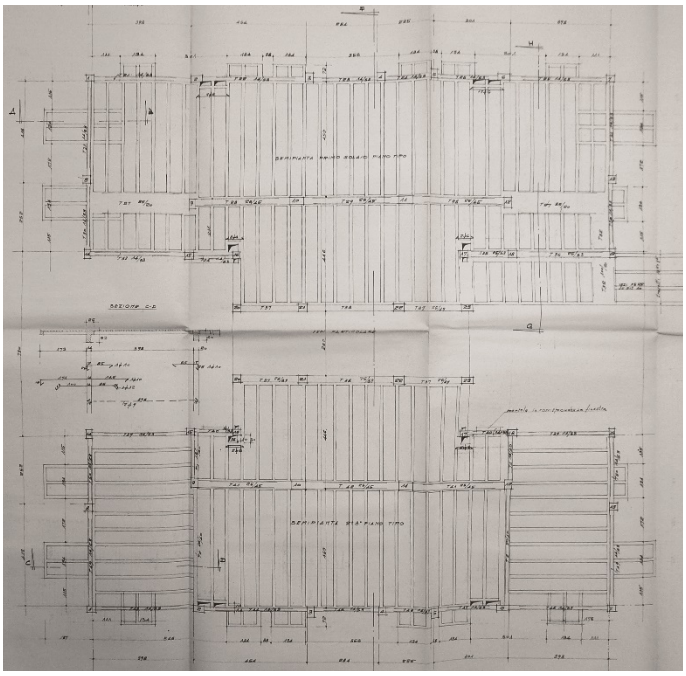

Figure 5. Floors' bottom structural plan (detail 1:50) adopted in blocks B1 and B4 by Saicca (AST, 1)

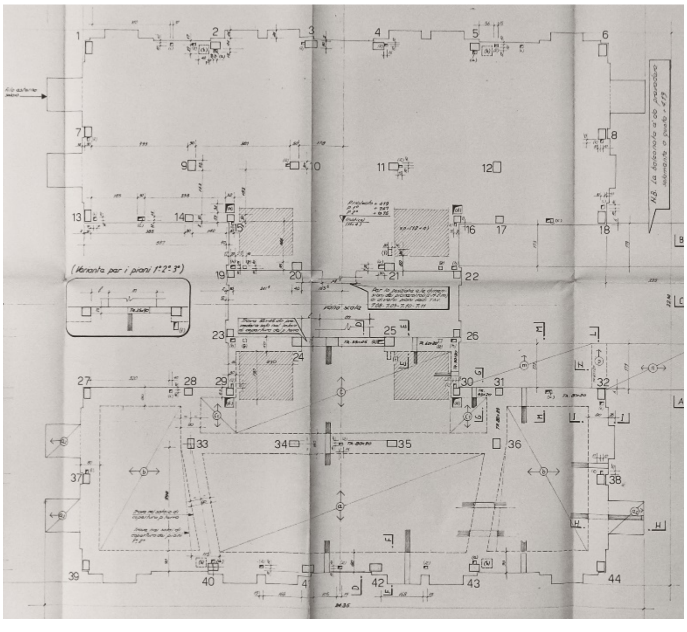

Figure 6. Bottom structural floor plan (detail 1:50) adopted in blocks B2 by Borini (ATC, 14563).

The evolution of the reinforced concrete technique that took place in Italy over nearly ten years from the first to the second phase, which within a few years would lead to the replacement of the early twentieth century standards then in force with the first modern ones, seems to reflect in the peculiar features of the frame types developed by the different construction companies, though within a general conception that was indisputably traditional in character.

The load-bearing structure is indeed still essentially one-way, like that of the first-ever early twentieth century reinforced concrete buildings, in which frames were laid out only in a longitudinal direction, often ignoring the misalignment of columns between parallel frames, and were connected by floor slabs, which represented the only stiffening transverse element. The longitudinal frames thus replaced masonry walls in one direction, whilst the other was dependent, though not as efficiently, upon the in-plane stiffness of horizontal diaphragms.

The Le Vallette housing complex reintroduces this structural organization, adopted in the first-ever framed constructions, working 'by subtraction' on the old style masonry box, without undermining the logic behind it. In this sense, the construction site "is still a nineteenth century site, with the insertion of reinforced concrete in the masonry work, without any substantial transformations" (Poretti 2012). In this case the insertion is almost literal, in that the reinforced concrete frame was lowered into an initially masonry-based grid, with a somewhat "eclectic" operation, conducted regardless (it could not have been otherwise) of the original location of the brick pillars in the building envelope (Fig 4, bottom).

Nonetheless, the reinforced concrete frames of phases I and II are different, and almost seem to relate to successive steps of the aforementioned evolution process. Two general considerations, which cannot be discussed in detail in this paper, clarify this statement (Figs 5, 6).

First of all, it is interesting to notice how the very graphic features of the Saicca drawings, as opposed to the more modern ones produced by Borini (as well as Simet and Bracco), are somewhat 'old style'. The beams and columns represented, with their double lines, point to the classic chamfer at the corners applied by the first-ever Italian licensees of the Hennebique patent (Iori 2001).

Secondly, and certainly more significantly, the technical solutions implemented by Saicca highlight a less-than-ignorable distance from those adopted by

Borini, especially considering the few years separating the two. One example, perhaps the most illuminating among the many that might be considered, concerns the beam sizes, so strictly correlated to the spans to be covered, and almost completely shy of solid sections (a solution not fully justified by the use of precast joists), as to seem more like the architraves of a masonry wall, the one, indeed, replaced by the reinforced concrete colonnade, rather than the horizontal bending elements of a rigid frame. Nothing could be more different to the simple and rigorous lay-out of the hidden beams of the Borini design.

4 FROM LOAD-BEARING TO NON-BEARING WALLS

In the changeover from the original masonry design to the reinforced concrete frame, and in the consequent transformation of the façade walls from load-bearing structures to a non-bearing supported enclosure, two issues that already existed took on a new meaning and called for specific reflection. It was, in fact, necessary not only to define a construction solution for the cavity walls, which were no longer bonded with load-bearing masonry, but also to resolve the more complex relationship between the masonry envelope and the concrete frame. These were by then recurring issues at Italian and Turin sites of the 1950s and '60s. In this case, they were resolved by the firms involved, and in very different ways.

It may be interesting to note how the two issues have certain analogies with those arising in the transition from a masonry to reinforced concrete structure, even in terms of the construction setup of the outer stone wall surface (Poretti 2008). In fact, the latter was traditionally considered either a stone facing bonded to a backing masonry, and exerting a common action under load, or a thin, independent and self-supporting veneer, though anchored to the backing wall to restrain lateral movements. When a discrete frame replaces the continuous backing wall, "the self-support by means of superimposition to the thin veneer" (Poretti 2008, p. 35-36) may no longer be possible for certain parts of the building, and calls for different solutions.

Something similar occurred in the case of Le Vallette, both in the transition from masonry to reinforced concrete design, and in the different solutions that the firms involved in phases I and II of the construction. In fact, while in the masonry design (at least the one based, in accordance with the 'Antonelli' system, upon pillars) the facing of the cavity wall was bonded with the load-bearing brick system, thus conceptually comparable to a structural layer, in the reinforced concrete design, it becomes a de facto independent curtain wall, for which suitable solutions are required to guarantee its stability (indeed, it is these solutions that distinguish the proposals of each construction company).

In the built version, the cavity walls preserved the thicknesses envisaged in the masonry design (40 cm, 52 at the pilasters) and were made of two half-brick masonry walls. The specifications, regardless of their successive versions, always state that the 8-cm backing must be made of hollow tiles, and the 12-cm facing (to be protected with "a transparent and waterproof coating"; phase-II specifications) of common, solid bricks, which means, before the 1980s standards (UNI 8942, issued in 1986, in particular), without cores at all. Nevertheless, we can see from certain decayed areas of the façades that the bricks actually used are different. In the houses built by Saicca, bricks with horizontal cells were alternated (we do not know to what extent) with solid or semi-solid ones required to change the wall direction at the pilasters. Houses built in the second half of the 1960s, instead, reveal the use of bricks with vertical cells, comparable to semi-solid bricks. The architects insistently asked for the colour to be kept consistent for the entire supply, but, unsurprisingly, suspension of work at the site would lead to the use of bricks that at first sight are similar but appear different when viewed close-up. The ones used in phase I are redder and irregular, while the ones used in phase II are of a lighter colour

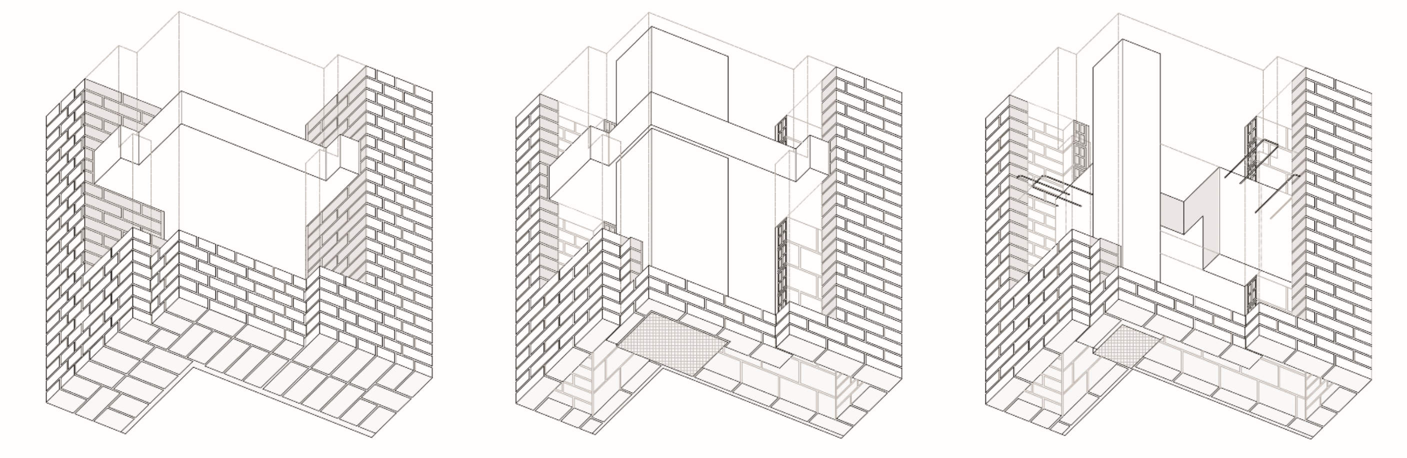

Figure 7. Relation between masonry walls and r.c. structures. The original design load-bearing masonry (solid) walls with joist slabs (left) and the r.c. frames with cavity walls actually created, in two versions adopted respectively by Borini (centre) and Saicca (right).

and more regular. Moreover, certain areas of the façades, in the buildings of phase II, show noticeable irregularities, with level courses not exactly horizontal, which are indicative of all the difficulties of a construction site managed in the name of cost savings (certainly very different to the ones the same architects were engaged in, in the very same years, for private housing), at a time (in the sixties) when it was increasingly difficult to find good bricklayers, and it was common for firms to make use, instead, of piecework by unspecialized labourers.

We may find certain clues on the cavity-wall creation methods in the specifications. In the phase I specifications, it is stated that "if the load-bearing structures are planned to be made of reinforced concrete", the two wythes need to be bonded "every 50 cm" (ATC, 15463). It is a rather vague recommendation that could refer to connections made by means of either masonry 'legs' (according to construction methods derived, indeed, from the 'Antonelli' system, then 'transferred' to reinforced concrete construction) or the use of metal ties.

This ambiguity is removed in the phase II specifications, which only refer to regularly spaced (again, every 50 cm) metal ties made "with ø 6 mm reinforcing bars, duly shaped and coated or galvanized" (ATC, 19447), a solution which, moreover, made it easily possible to make the facing wythe with a simple running bond (overlapping stretchers).

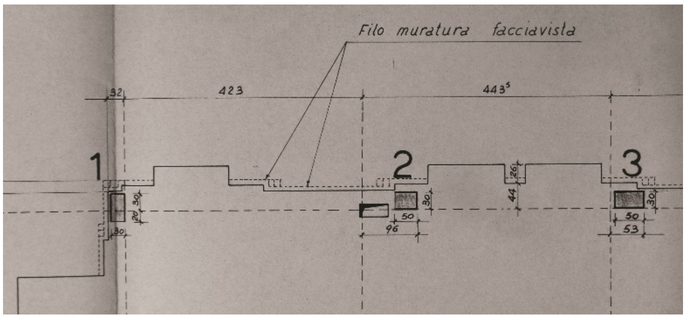

Figure 8. Joist slabs shaped to follow the outline of the façade (Borini's bottom structural plan, detail 1:50) (ATC, 14563).

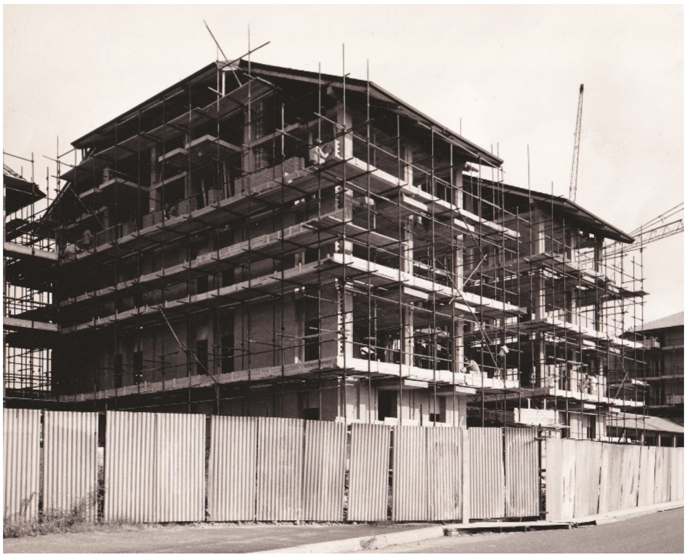

Figure 9. One of the Borini buildings under construction, ca. 1967 (photo by R. Moncalvo) (ATC, 19447).

As for the elements to ensure the lateral stability of the cavity walls, first of all we may observe that their relationship with the reinforced concrete framework is solved in two different ways in the designs of the different companies (Fig 7). In the first solution (implemented by Saicca), the outer facing of the cavity walls is completely separate from the reinforced concrete slabs (Fig. 7, right). In the second solution (adopted by Borini and Bracco), the facing partially rests upon each floor slab, and also leans on the columns. Thus, the reinforced concrete structure bears its weight and restrains its lateral movement (Fig. 7, centre). In both cases, the facing wythe is always supported on the lower edge by a projection from the reinforced concrete walls of the basement (a method which, in reality, we see only in the Saicca and Borini drawings, but was probably, if not certainly, also applied to the houses built by the other two companies). This facing is, in any event, an external curtain (fully or partially self-supporting), and the changes simply involved the way in which its stability was ensured.

From this point of view, the second solution seems more 'traditional', so to speak, than the first, in that its end purpose was an interaction with the load-bearing structure (though, of course, differently from what the masonry design would have involved). This solution is expressed in incredibly refined terms, a manufacturing precision that pointed to the 'handcrafted' characteristics of early reinforced concrete structures, in the buildings erected by Borini (Figs 8, 9). To guarantee the most 'extended' support possible for the facing wythe on the floor slabs, these are shaped to follow the outline of the façades, at the height of the last tapering of the pilaster section, with a constant recess, with regard to the outside edge, of 6 cm (taking into account the column position, this generates a slab overhang of only 2 cm around the same), namely half of the thickness of the face bricks (referring to the 12 cm stated in the specifications, although preliminary on-site surveys show an actual size of 11.5 cm).

As for the first solution, it inevitably points to a form of connection between the outer side of the façade and the floor slabs. If, indeed, the distributed metal ties between the two wythes of the cavity walls involve horizontal constraints that reduce the slenderness of each, and guarantee their stability, these are unilateral constraints, thus not effective in preventing inward reciprocal movements, especially in points where, at the level of the pilasters, the facing is completely separate from the slabs and the spacing of the two wythes is greater.

Nevertheless, an explicit indication in this sense is only included in the Bracco drawings, which state: "leave ø 6 mm reinforcing bars to anchor the *muroni*": where the word *muroni* ("big walls") (AST, 4) makes it clear that it refers to the pilasters, where, indeed, the note is positioned in the drawing. There is no trace of similar specifications in the drawings of the other companies but, as aforementioned, it is highly probable they were in any event implemented.

Finally, still in terms of lateral stability, we note that the articulation of the outer facing generates a form-resistance, at the pilasters and the opening jambs, which cannot be relied on in limited portions of the façades, which have in part, unsurprisingly, suffered collapses in recent times. Besides, it is possible that, due to the greater local out-of-plane stiffness of the outer facing, this form-resistance could be related to a differential response to thermal-hygrometric variations, with the consequent possibility of triggering cracks (which are indeed recorded, on lower floors, perhaps due to the concurrent presence of greater compressive stresses, and thus more pronounced transverse strains).

5 CONCLUSIONS

Upon investigating the houses of zone G both in general and in their slightest details, they seem to breathe an air of history, along a timeline which, especially in the 1950s, distinguished the specific position of the architects involved in their design on the Italian architecture stage and, more specifically, within the Ina Casa plan; a plan that – in this case as in others already subject of in-depth investigations (Vittorini & Capomolla 2003) – takes on the role of a large canvas that guided architects and included different interpretations of the same topic.

In terms of building history, what emerged is the peculiarity of the reinterpretation of one of the most interesting experiments in nineteenth century architecture, Antonelli architecture, still seen as a vital body from which to extrapolate suggestions for the present, as well as the object of "transpositions" to a modernity which, upon careful analysis (not only in the interpretations of architects but also in the translations of the workers) is highly nuanced.

The retracing of the construction site events, as far as this has been possible to perform to date, leaves the architects in a blurry position, and puts the spotlight on the multiple actors governing, and sometimes hindering, the building process. In the actual translation of the design to a constructed architecture, the compromise applied, representative of a well-defined adoption of reinforced concrete techniques in public housing construction in Turin in the late 1950s, does not mean that the architects ignored an element they considered essential, construction quality, as they underlined in the report published in the *Casabella-Continuità* magazine upon conclusion of the first lot: "we have strictly followed the technology of each element with constant care and attention, as we believe the few pictures of the houses realized to date (no more than this) prove" (Cavallari-Murat et al. 1962, p. 48).

The central matter that the architects and labourers needed to deal with to guarantee quality, no longer simply based upon traditional standards, regarded, as we have seen, the erection of cavity walls, and, indeed, the final part of this paper focuses on this. But besides the specific results, strictly linked to the comprehension of this work, this research aims to contribute to the broadening of knowledge of the architectural heritage of Turin from the second half of 1900s, which in terms of tangible consistency seems still mostly uncharted.

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