

Traditional Masonry: The Perfect Choice

For most low-rise public buildings, loadbearing masonry fits the bill

For a vast number of modern public buildings, a traditional brick structure is exactly the type of building desired. Yet today we're being told that masonry is too expensive to use, except perhaps, as a veneer on the exterior walls. Is this really true? The short answer is "No." To understand why, read on.

Multifunctional Masonry

Traditionally, a wide range of buildings, including schools, municipal offices and other civic facilities, were built of loadbearing masonry. The exterior walls, sometimes with the help of interior corridor walls, supported the floors and the roof. At the same time, these walls provided the enclosure – which included thermal and moisture protection, as well as fire resistance and acoustic separation. All the while, these buildings provided the appropriate look and "feel" – a sense of permanence and safety – that the occupants desired and the public expected.

Over the past few decades, however, building owners have gradually shifted to steel framing as the preferred structural system, ostensibly as a way to save money. While steel may be a less expensive structural system, it can't provide all that a loadbearing masonry system can.

A structural steel frame provides only that – the structure. It holds up the floors and roof. All the other functions of a wall – weather resistance, fire protection, thermal and acoustic comfort – must be added to the steel frame. Each of the other critical elements comes at additional cost – and requires additional trades on the job site - driving up the *total cost* of the facility. In fact, when you look at the building *as a whole*, it's actually *more* expensive to use a steel frame system than to build with loadbearing masonry.

In a study by Dan Zechmeister comparing three steel frame-plus-veneer systems to an all masonry system, the masonry (a loadbearing system) proved by far to be the least expensive – from about 9% to 21% less.¹ Why? Because the loadbearing masonry walls do double, triple and even quadruple duty. Loadbearing masonry walls provide the same – and even higher – levels of thermal, acoustic, fire and weather performance as the veneer systems *and* they hold up the floors and roof without need for a separate structural system.

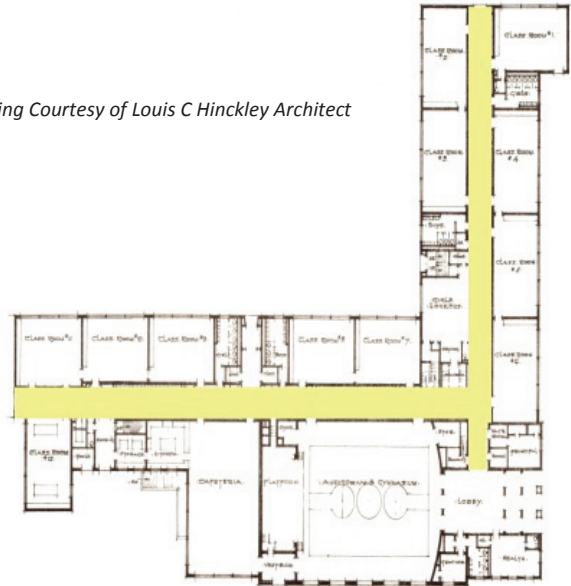
Better Buildings by Design

Loadbearing masonry buildings are also unfavorably compared to steel-framed buildings on the basis of design flexibility. The fixed floorplan, often requiring a loadbearing central corridor to reduce floor and roof spans, is perceived as a limiting factor. But is it really? Take a look at these three floor plans:

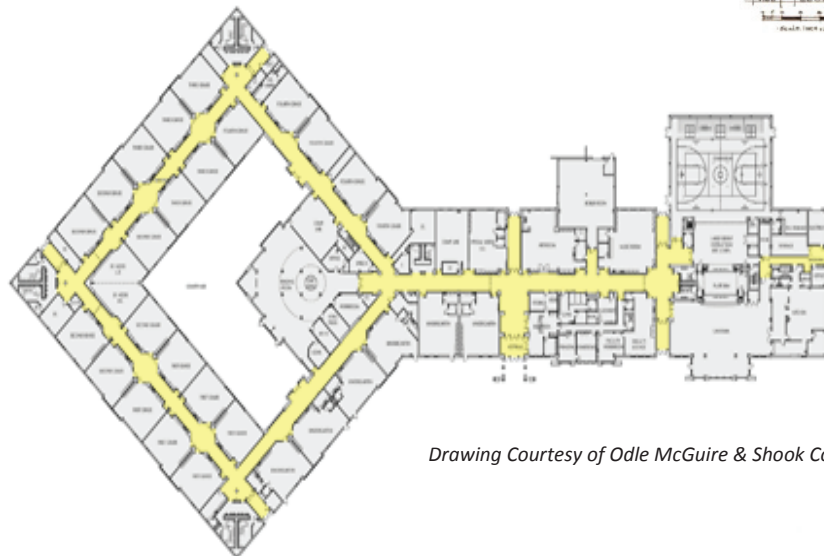


Drawing Courtesy of Fanning Howey Architecture & Engineering

Drawing Courtesy of Louis C Hinckley Architect



FIRST FLOOR PLAN
Scale: 1/8" = 1'-0"



Drawing Courtesy of Odle McGuire & Shook Corporation

They're all for schools but the floorplans vary significantly, yet they all could easily be built out of loadbearing masonry. All *do*, in fact rely on a centralized corridor, but it's hardly a limiting factor. Rather, the corridor provides freedom of movement through the structure, and permits quick, safe evacuation. Even the larger spaces in these schools – the auditoriums, cafeterias and gyms - lend themselves to masonry construction using tall, loadbearing masonry walls to support clear-span trusses. In the vast majority of cases, loadbearing masonry will work, and will often be simpler, faster and more cost-effective. It won't box you in.

Advanced Building Performance

For the appropriate building type, loadbearing masonry construction provides a range of benefits that are essential to the occupancy use:

Fire resistance. Building codes require institutional buildings to meet stringent fire codes. By itself, loadbearing masonry provides a high level of resistance. Other systems need multiple subassemblies to get to the same levels and meet the code. In the process, they drive up the complexity – and the cost – of the facility as a whole.

Sound transfer. Increasing the density of the enclosure materials is the most cost effective method of controlling sound transfer through building assemblies, and solid masonry easily wins out over steel-framed systems. To achieve the same acoustical performance in a steel-framed structure that you can get with an all-masonry wall requires specialized sound control details. These come at a significant added cost, and as a result, aren't always done.

Durability. Building durability comes in many forms, all of which favor loadbearing masonry wall systems:

- **Mold resistance.** Mold needs moisture, warm temperatures and a food source. While masonry may get wet, it will never provide a food source for mold. According to Chris Huckabee, a well-known Texas architect who has built more than 1,000 schools, the use of porous and paper-based substrate products used in non-masonry exterior wall systems have given rise to many, if not most, of the mold-related issues that building owners face today.²
- **Impact resistance.** In high traffic areas where walls are subject to impacts, masonry far out performs impact-resistant drywall.
- **Weathering resistance.** Masonry is unaffected by moisture, whereas steel will corrode unless it is protected by a coating. Huckabee classifies masonry as a "forgiving material" – one that is not destroyed by moisture, regardless of the climate conditions.
- **Sustainability.** Loadbearing masonry is a highly sustainable building material.
- Masonry uses regional materials that reduce the environmental impacts associated with transporting building products long distances.
- Masonry optimizes the energy performance through thermal mass.

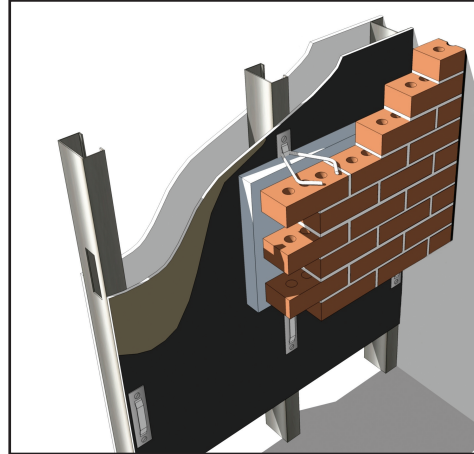
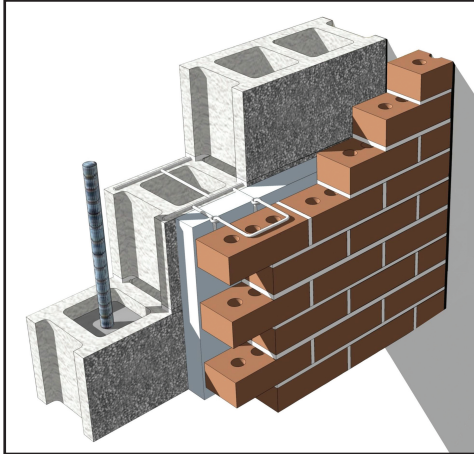
These two advantages provide an opportunity for additional LEED points (and greater public support) when the project developer is seeking LEED certification through the U.S. Green Building Council.

The Bottom Line – You Don't Need to Compromise

Loadbearing masonry provides a durable, high performance building inside and out – at the same or lower cost than an equivalent building built with a structural steel frame. You don't need to compromise on what matters– durability, fire resistance, thermal comfort, moisture protection - because they're "built in" from the beginning. If you want masonry interior walls in specific areas – like the corridors in a high school – you've got them as part of the structural system. There's no need to treat them as an expensive "add-on" or to settle for a less durable, lower performing alternative in order to save money.

Compare costs accurately. When comparing loadbearing masonry to a steel-framed system, it's critical that decision makers evaluate whole systems.

The metal studs in a steel-framed wall serve only as a backer for cladding, not as the loadbearing structure. The steel-framed wall shown below on the right is not a complete system; it is only the infill between a gridwork of steel posts and beams, which would also be required. The CMU-backed system, shown at left, is capable of supporting short-span floor and roof loads, serving as a complete wall system.



When comparing any steel-framed system to a loadbearing masonry system, the cost of the cladding and metal-stud backer, must be added to the more substantial costs of the main structural elements, including:

- the cost of a steel post and beam skeleton
- cost of connections, which must be precisely fabricated
- cross-bracing required to stiffen the frame
- complete cost of the foundations required to support the steel skeleton
- the added cost of generating the shop drawings required by the steel fabricator

When these added costs are accurately factored in, the loadbearing masonry proves out in:

- lower initial construction costs
- lower maintenance costs
- lower life-cycle costs

¹ Zechmeister: "Loadbearing Masonry's Bottom Line" (2008: The Story Pole, vol. 39, no. 1; Masonry Institute of Michigan, 24725 W. Twelve Mile, Ste 388, Southfield, MI 48034.)

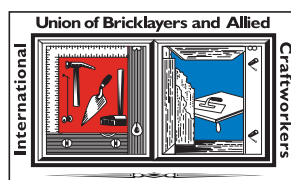
² Huckabee and Montgomery: "Are You Building a School or a Liability?" (National Concrete Masonry Association, 13750 Sunrise Valley Drive, Herndon, VA 20171.)

Maintaining the Highest Construction Standards



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