

Photo courtesy of Michael Taylor,
Townsend Architectural Group

Concrete makes for a strong, durable structural material, and is often coupled with structural steel for support of the roof of the building. Concrete can be stamped to take on the appearance of many different materials.

Structural Options: Concrete

[It's strong, but is it right for your church?]

By Alisa Manjarrez

It is used for skyscrapers and long span bridges because of its resilience and low maintenance, but there are advantages and disadvantages in using concrete as the primary structural material for church construction. When making building decisions for a church, one must decide upon the driving force of the building project: will it be driven by budget or by the finished product? Specifics on building size, architectural details and finishes help determine this answer. A fair number of design/build contractors with church experience aim to achieve God's vision for the church while still helping the church maintain good stewardship of the resources available to them. For example, although concrete is affordable, in highly architectural churches, concrete may not fit all the requirements.

When it comes to finding the best value for the most durable worship facility, concrete

may be right for your building. CharestCorp, a church builder based in Fresno, California, is the West Coast representative for the National Association of Church Design Builders (NACDB). Vice President of Construction for CharestCorp, Cal Bowlen, notes, "You will not find a better value [than concrete] for churches or any building 10,000 square feet or larger." A building at least that size would include a small worship area, bathrooms and an entry foyer.

The most common uses of concrete are poured in place, CMU (Concrete Masonry Unit, also known as concrete block) and tilt-up buildings. Tilt-up concrete panels are large panels of concrete all pulled into place like straight-edged puzzle pieces which "tilt up" to create a building. A knowledgeable church design builder can discuss the suitability of the structural material for churches. Concrete is an excellent choice for

large recreational rooms, and it is perfect for sound control in heavier traffic areas.

Although climate varies in all parts of the nation, concrete is impervious to most weather conditions. The state of California is broken up into four seismic zones with codes that meet environmental concerns such as earthquakes. Bowlen states, "If the concrete is properly designed, you can use it anywhere. It doesn't shrink or rot, and if properly sealed, water cannot get inside the building."

In the past, concrete buildings were seen as boxy, warehouse buildings (think Costco), but now concrete can be stamped to resemble stone or even brick. New innovations in design and wall finishes have literally changed the face of concrete so that a concrete building can look like any other building. Form liners are panels of plastic or fiberglass that serve as a mold for concrete. After it hardens, it creates cost-effective



Photo courtesy of Michael Taylor, Townsend Architectural Group.

Insulated Concrete Forms (ICF), such as this one using the ARXX System, are excellent at providing sound control.

architectural details such as wavy lines, geometric shapes, rope-like textures or any other desired textures. Metal furring on the inside walls can create angled shapes for the building when required for acoustical needs or insulation.

Concrete has also been known to be an efficient flooring option. It is especially appealing to younger generations, as it can easily create a "raw" look. Moreover, the design possibilities in concrete flooring are wide-ranging, due to the fact that the flooring can be stamped to look like stone or brick, and in any stain imaginable. At the University Vineyard Church in Fresno, California, CharestCorp chose to put in a concrete floor because of its versatility; it is easy to clean, and it could be stained in a manner that keeps it looking new and modern.

As far as costs and installation are concerned, an advantage that concrete has over other structural materials, especially when using concrete tilt-up panels, is that the construction schedule is pushed ahead at a high speed. It accelerates construction time by 30 percent to 40 percent, compared to conventional steel or wood. Due to the strength of the material, it is often beneficial to use pre-engineered steel columns and roof structure in conjunction with tilt-up panels to create a clear span building. There is a common misconception that concrete tilt-up structures are more expensive than metal buildings. This is not always true. If you add the costs for the exterior and interior finishes to the metal building's cost,

comparing the length of construction and total project cost, concrete can be more efficient, durable and economical.

In actuality, the costs of metal buildings can be quite comparable to tilt-ups. Metal buildings have no finish inside; you must add framing and insulation. Insulation costs are a major concern to address in church building. You can trust that your qualified design/builder will take your unique needs and financial capabilities into consideration when deciding on the core structure of your building. Depending on the type of interior and exterior finishes that would best address the architectural requirements for your church, insulation could drive the costs up substantially in a concrete building. Tilt-up concrete panels can be insulated on the inside walls, but requirements for a worship facility could alter the budget significantly. However, for a warehouse look, insulation can be encapsulated into the wall panels, which is a less expensive route. Again, it is all about the finishes that best fit your vision and how the design details line up with the cost factors. Make sure your design team is looking at both sides of the equation to achieve an appropriate solution for your facility.

For the Holy Cross Church in Porterville, California, parish members were looking for a traditional exterior and interior, but needed the strength of concrete. Insulated Concrete Forms (ICF), specifically using the ARXX System (see www.arxxbuild.com) were used predominantly for sound control issues. According to Jason Biaggio of Townsend Architectural Group in Porterville, California, "This is extremely important in ecclesiastical or educational uses because the ambient sound level, sound transmission and acoustical clarity are so important." For this reason, ICF systems are commonly used for movie theatre construction.

In the ARXX System, the center core of the building is concrete to provide overall strength for the facility. The concrete in the system also provides greater fire resistance (two-, three-, four-hour ratings based on cell thickness) and requires

fewer support columns inside the building for a more appealing interior. ICF systems wrap the concrete walls in two layers of foam, which enables the core to stabilize the temperature of each room. Consequently, it can reduce the design size of HVAC equipment up to 30 percent which can result in lower heating and cooling costs in the long run.

While ICF systems have definite advantages, they are not always the most cost-effective solution for church facilities. Ask your design builder if this is the best option for you.

"As church design builders, we have found that there is a wonderful marriage between pre-engineered metal structures (with a metal roof) and concrete tilt-up panels," explains Bowlen, "It is by far the most economical construction that is durable and long-lasting."

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