

## ADAPTIVE REUSE OF PRECAST CONCRETE BUILDINGS

Precast concrete is a high performance building material offering many attributes and benefits, one of which is use versatility. Use versatility includes adaptive reuse, deconstructive reuse, and recyclable. Adaptive reuse is the process of revising an existing building for a purpose other than which it was originally built or designed. It is one way to breathe new life into old buildings, and at the same time, can conserve their historic value and local resources. High performance structures should provide for changes in use since frequently the functional use of a structure expires before the structure's physical service life. Precast concrete structures are ideal for adaptive reuse by providing longer spans with larger open spaces and fewer interior columns allowing for easy building renovation as future occupancy needs change.

Deconstructive reuse is the ability to disassemble and reuse various building components in a project expansion or for a different project altogether. Precast concrete components are individually engineered and are ideal for this purpose. An example of deconstructive reuse is relocating non-loadbearing wall panels for a future industrial building expansion. Another real example is when four high school football stadiums in Georgia were created by disassembling a large stadium that was originally built for the 1996 World Olympics in Atlanta.

More recently, FIFA World Cup 2022 in Qatar used precast concrete components to build eight World Cup soccer stadiums. Now that the World Cup games are completed, some of these stadiums will be turned into mixed-use residential and commercial centers. Others will be completely converted into five-star hotels, shopping centers, sports medicine hospitals and more. Some of the stadiums will be partially disassembled and have their capacities reduced by up to half.

The excess seating riser components, representing over 170,000 seats, will be donated to underdeveloped countries in need of sporting infrastructure allowing the culture of soccer to be promoted and to a greater extent the love of sport throughout the world. This

deconstructive reuse was only possible with precast concrete and would have been virtually impossible with a cast-in-place concrete structure.

Once a precast concrete structure has reached its physical service life, the architectural cladding panels can be removed from the building and cut into landscape panels or garden pavers. Large pieces can be used in defining sides of trails, making small retaining wall structures, or staircase steps for outdoor trails. Structural precast elements can be recycled by crushing the concrete and separating the reinforcing steel. The crushed concrete can be used as road-base or as coarse aggregate for new concrete mixtures.

The adaptive and reconstructive reuse of existing precast concrete buildings and the ability to be recycled at the end of their service life can significantly contribute to sustainability by diverting waste going to landfills and even have a positive effect on climate change mitigation.

