

# Mississippi BUSINESS JOURNAL

## **Architects and engineers coming up with innovative solutions to pandemic challenges**

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Mississippi Business Journal  
Nov 3, 2020

The world was unprepared for the first worldwide pandemic seen in 102 years. Now that the U.S. is in the eighth month of battling the coronavirus disease-2019 (COVID-19), it is leading the world with 8.3 million cases and 221,428 deaths as of October 22. Cases were soaring in many areas of the country, with about 418,000 new cases in the week prior to Oct. 22.

COVID-19 has brought many changes to how people work, attend school and recreate. Architects and engineers in Mississippi have been on the front lines of coming up with solutions to meet the challenges.

The way architects are designing new buildings is changing. For example, new buildings are using the most up-to-date technology available to cleanse the air stream. It is also possible to retrofit buildings to address the concerns of the viral spread, said Robert Farr, II, AIA, Principal, Cooke Douglass Farr Lemons, an architecture and engineering firm based in Jackson.

Farr said the initial response to the pandemic focused on the surface-based virus transmission in buildings. Efforts began to sanitize elevator buttons, counter surfaces, doorknobs, etc. Farr said the industry is now working to make existing and new buildings safer by using anti-viral materials including copper surfaces, touchless entrances, electronic door openings, touchless toilets and touchless faucets.

“Restrooms will be using touchless doorways or doorless entrances in larger units,” Farr said. “Entrances will start to be more automated so that you don’t have to touch the communal surfaces such as door handles. This is going to take time and will be require major modifications in many locations, plus it will be expensive. The simple things are changing faucets out to touchless and automatic toilets valves. The custodial services have adapted to address many of the concerns with touch transmission.”

While addressing surface contamination is important, Farr said the determination that the virus does spread by aerosol transmission has placed the focus on air quality and circulation.

“We are building new air distribution systems in the air stream of a building’s air-conditioning system using ultraviolet spectrum lights placed in the return air stream that kills the virus,” Farr said. “Ionization units in the air stream make the virus attach to the dust particles and fall out of the air stream. Additional HEPA (high efficiency particulate air) filters are being used to catch the virus particle as they go through the filter banks.”

Another adaptation is additional outside air being introduced into the building’s air stream. Farr said while this requires additional energy to heat and cool the exterior air, it dilutes the air on a more regular basis.

Lighting can play a role also by using ultraviolet spectrum lights that kill the airborne and surface virus. Farr said these high-intensity lights can only be used when no one is in the space, but are very effective. They operate at night when offices or rooms are empty of people.

Another major COVID-19 factor is the actual design of buildings is being impacted by the need for social distancing. Farr said wider corridors, larger work areas and more space must be dedicated to each individual.

“There is also the impact of remote work where we have fewer people in the workplace,” Farr said. “Now, social events are where the changes are going to be the most difficult. You can imagine how football stadiums and movie theaters will be responding.”

Just like with other businesses, the way architecture is practiced has had to adapt to a new business model during the pandemic. But architects in general are inherently a tech savvy bunch, so that has not been a major concern, said Shane Germany, AIA, architect\partner at Landry Lewis Germany Architects, Hattiesburg.

“Our office had always had some degree of remote capability,” Germany said. “But with the pandemic, we were forced to fully integrate that into our services, which wasn’t much trouble. Zoom and Microsoft Teams became additional tools for the toolbox to supplement the process. Collaboration is actually quicker and on demand without travel time lost. It has its benefits.”

Hospitals and clinics are scrambling to provide more curbside and telehealth services, so architects have been providing a lot of assistance in accommodating those needs.

“Infection control, ventilation, and physically moving people through the health system is definitely something that is being reconsidered in that sector of design,” Germany said. “This is being done on-the-fly and long term.”

Germany said another challenge has been lumber prices have gone up two to three times what they were pre pandemic, and lead times on equipment and some products are longer than normal. He said that’s just something contractors have to adapt to and gets reflected in bid prices and schedules.

Engineers have also been called upon to address the coronavirus.

“One of the great things about engineering is that it teaches you to analyze and solve problems from a variety of viewpoints,” said Philip Allison, communication manager for the Mississippi State University Bagley College of Engineering (BCoE). “Our faculty and students have shown that almost any engineering discipline can use their expertise to help address the coronavirus. We had a team of mechanical engineering students convert a truck toolbox into a device to disinfect personal protective equipment. We had a team from our electrical engineering department retrofit ventilators so that they could be used as part of the state’s medical response. We also had a multi-disciplinary team from industrial and systems engineering, agricultural and biological engineering and the Center for Advanced Vehicular Systems work together to 3D print face shields.”

Allison said from a class-delivery standpoint, the university has made immediate efforts to keep the classroom environments as safe as possible with physical distancing, facial covering requirements, sanitization of surfaces in between classes, and modification of HVAC systems to provide increased air flow.

“We are also teaching classes through online (both synchronous and asynchronous delivery modes), as well as hybrid formats,” Allison said. “Student groups that normally would do all their work face-to-face are working together on classroom design projects. The university is currently discussing how to continue to provide education through multiple delivery modes for future semesters.”

Allison said they have more students taking online classes as an accommodation for the coronavirus, but they aren’t classified as distance students. Many of them are undergraduate students who still count as “on-campus” students even if they are taking some online classes.

The BCoE has some of the most affordable and highly ranked online graduate engineering degrees in the country. Most students obtain the advanced degree while working full-time. Allison said while they have seen an increase in people asking for information about the graduate-level distance program, it’s perhaps too early for that to have translated into increased enrollment at this point. He said that may change in coming semesters, though.