

Project Management Case Study: How Modular Construction Impacts The Dynamic

By David Atwood, Chris Hoell, LEED AP, and Kevin Hallahan, PE, LEED AP
Published in the June 2010 issue of *Today's Facility Manager*
06/17/2010

In 2007, Shire Pharmaceuticals constructed new office space for a laboratory facility. As the project approached completion, a change was made that required several of the new offices to be demolished; thus, new mechanical and electrical equipment had to be installed.

This costly change led Greg Lewis, Shire's associate director of facilities planning, to research a more cost-effective solution to this scenario in the future. Based on Lewis's research, modular construction would provide his team with the ability to reorganize office space as needed to fit with ongoing corporate changes. The decision was made; Shire's next office construction project would be modular.

Shire began its foray into modular construction with movable walls which could be moved and rearranged by the in-house facilities team. For this relatively young and growing company, modular office space would provide an ideal level of flexibility and adaptability for changing staff levels and other future unknown variables.

This project was the first experience with modular construction for the project architect, engineer, and client. With thoughtful and early planning, the project team gained insight into how each role needed to change to work with this relatively new product and installation process.

The first step for the project management team was to understand how Shire might rearrange the wall systems in the future so the architect and engineer could design an appropriate level of modularity into the system. The team then analyzed how past changes occurred at Shire's facilities, and then asked many "what if" questions about future organizational possibilities. The answers led to the creation of three design scenarios:

Scenario 1: Two standard offices can combine to create one senior vice presidents' office.

Scenario 2: Three standard offices can combine to create two vice president's offices.

Scenario 3: Three open office area workstations can combine to create two standard offices.

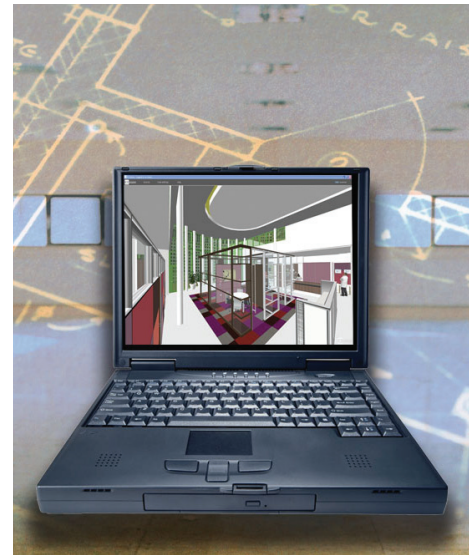
The modular wall product was then tailored to provide the most efficient utility delivery system and maximize flexibility. Several different panel types were assembled. In each scenario, the considerations were complex and ran the spectrum from:

- adding or removing a door or wall;
- coordinating the addition or subtraction of lighting controls and power;
- providing the appropriately located supply and return air diffusers;
- providing the code required number and location of sprinklers in each space;
- lining up partitions with existing window mullions; and
- ensuring the vice president and senior vice president offices incorporated a thermostat (which were placed in one of every three offices).

Other items that needed to be coordinated included supply and return ducts, light fixtures, and ceiling grids. The design scenarios were also carefully coordinated with mechanical zones to streamline future changes.

The goal of this intense process was to enable Shire's facilities department to manage any possible future changes in-house. The design team determined that a three office "control zone" would maximize Shire's flexibility and therefore yield 100% flexibility within these specific, predetermined banks of offices.

The project team then tested the three scenarios repeatedly—architecturally, mechanically, and structurally—and with each hiccup would return to the design, make revisions, and test again. The extensive up



front planning time was balanced by the construction and installation consuming slightly less time than they would during a traditional construction process, as the walls arrived on site, pre-manufactured, and only needed to be installed. In total, the design/build for the 20,000 square foot Shire project took 10 months to complete.

The early involvement of the modular product manufacturer's representative was key to maintaining the fast track schedule. The representative worked with the team to identify the differences in the installation sequences and to understand the ways the modular components interface with the conventional construction.

The contractor needed to plan ahead and work with the wall manufacturer to ensure the walls were shipped with the electrical wiring pre-installed. The contractor also needed to coordinate with the engineer to be sure the junction boxes were located appropriately to connect to pre-determined lengths of electrical wiring as part of the modular panel system.

The project team also had to give careful consideration to the placement of items that should not be relocated without consultation, such as fire extinguisher

Project Management Case Study: How Modular Construction Impacts The Dynamic *(continued)*

cabinets or horn strobes for the fire alarm system. The solution was to locate these items in the few column enclosures or fixed walls in the space.

With the completion of its first modular facility, Shire will be able to reorganize its space in the future without the need of an architect, engineer, or outside contractor. The walls, tel/data, power and HVAC are all configured so that the in-house facilities department can easily and quickly move areas of the office space and transform it as needed. The clear benefits of the modular approach are this flexibility and adaptability for future change, as well as the minimal disruption for staff and clients as space changes are made. While there is

a small premium on the cost of the modular products, it will pay for itself and justify the slight premium after only one space change is completed in-house.

Atwood is general manager of Integrated Interiors, a commercial architectural/engineered products and construction services company based in New England. Hoell joined Payette in 2007. Hallahan is an HVAC engineer with Vanderweil.