

Arch 463
ECS
Fall 2016

Name _____

Quiz #4

"KU Architecture Students Do Double Skin"

For this problem you are an awed architecture student. You've had the opportunity to visit the new student-constructed lecture hall/crit space at Kansas.

Your job is to comment on the strengths and weaknesses of the building and to explain the functions of two of the technological systems used to provide human comfort in the building. The text and illustrations that follow are from the November 2015 issue of *Architectural Record*.



South façade.

The Forum at Marvin Hall

Study Hall: University of Kansas architecture students design and build a sophisticated expansion of their school.

There's a disconnect that runs through your mind when you set foot inside the Forum, an addition to Marvin Hall, the School of Architecture, Design & Planning at the University of Kansas in Lawrence. The new building, which contains a 121-seat lecture hall, is an elegant box with a double-glass-wall façade. It employs an automated vertical louver system, controlled by a rooftop weather station. Inside, there's a lush plant wall brimming with ferns and begonias.

Surprisingly, this sophisticated structure was designed and constructed in a little over a year by a group of KU graduate architecture students in the celebrated Studio 804 design-build program, founded by Dan Rockhill in 1995. Many of them had never picked up a hammer before the project began in the fall of 2013.

Built in 1908 of rusticated limestone, Marvin Hall has several classrooms, but none hold more than about 16 people. For years, architecture students traipsed across campus to other buildings for larger classes. Longtime dean John Gaunt (he stepped down earlier this year, 2015) dreamed of building an addition on a small site directly behind the school, and in 2004, he even made a rough sketch of a glass box with horizontal louvers. But, given the usual budgetary constraints, Gaunt's plans seemed unlikely to go anywhere.

Meanwhile, after completing a string of sustainable houses in Lawrence and in Kansas City, MO, Rockhill and Studio 804 students began to design and build increasingly ambitious buildings, including two at KU: the 2011 Center for Design Research and the 2013 Ecohawks Research Facility. Both have been certified LEED Platinum.

Gaunt saw his opening. He knew if Studio 804 were to build the new hall, it would cost substantially less than if he hired a conventional contractor. After all, students work without salary, and Rockhill has a knack for procuring donated materials. Gaunt asked Rockhill, “Can you do this?” Without hesitation, he replied, “Yes.” According to Gaunt, who helped raise the necessary funds, the project’s final price was \$1.5 million.

To make sure the project would stay on schedule, Rockhill initiated a “particularly cumbersome” approval process involving university committees and state agencies, a few months before the course was set to begin. Then, under Rockhill’s leadership, the studio’s 18 students fleshed out Gaunt’s concept to design a 3,000-square-foot glass-enclosed addition. They broke ground in October 2013. For the next 10 months or so, Rockhill and his students worked six days a week constructing a building that combines cutting-edge technologies

with a rustic heavy-timber frame. With the exception of some mechanical and electrical tasks, they did all the work themselves, from pouring concrete to installing 300-pound glass panels. The result is well designed and seems professionally built. The addition is elevated on concrete columns, in part because of an existing ground-level mechanical room. But the strategy also helps it rest delicately on the tight site, set against Marvin Hall’s sturdy rear façade. The entrance is through the older building’s jury room, which has been converted into a commons. Two window openings now frame glass doors; one leads to the auditorium, the other to a new jury room. Glue-laminated Douglas fir posts and beams evoke Marvin Hall’s own interior structure and create a turn-of-the-last-century warehouse feeling.

The Forum’s perimeter comprises two separate walls of insulated glass set 3½ feet apart. Vertical louvers of western red cedar fill the cavity in between. The louvers automatically close or open to reduce heat gain and provide controlled daylighting. The façade also has motorized dampers. When closed, they trap heat within the cavity, cloaking the building in a “warm blanket,” Rockhill says. They open to prevent heat buildup. Other sustainable features include a rooftop solar array, a 1,100-gallon cistern that stores rainwater for irrigating the interior plant wall, and LED lighting. LEED Platinum certification is expected.

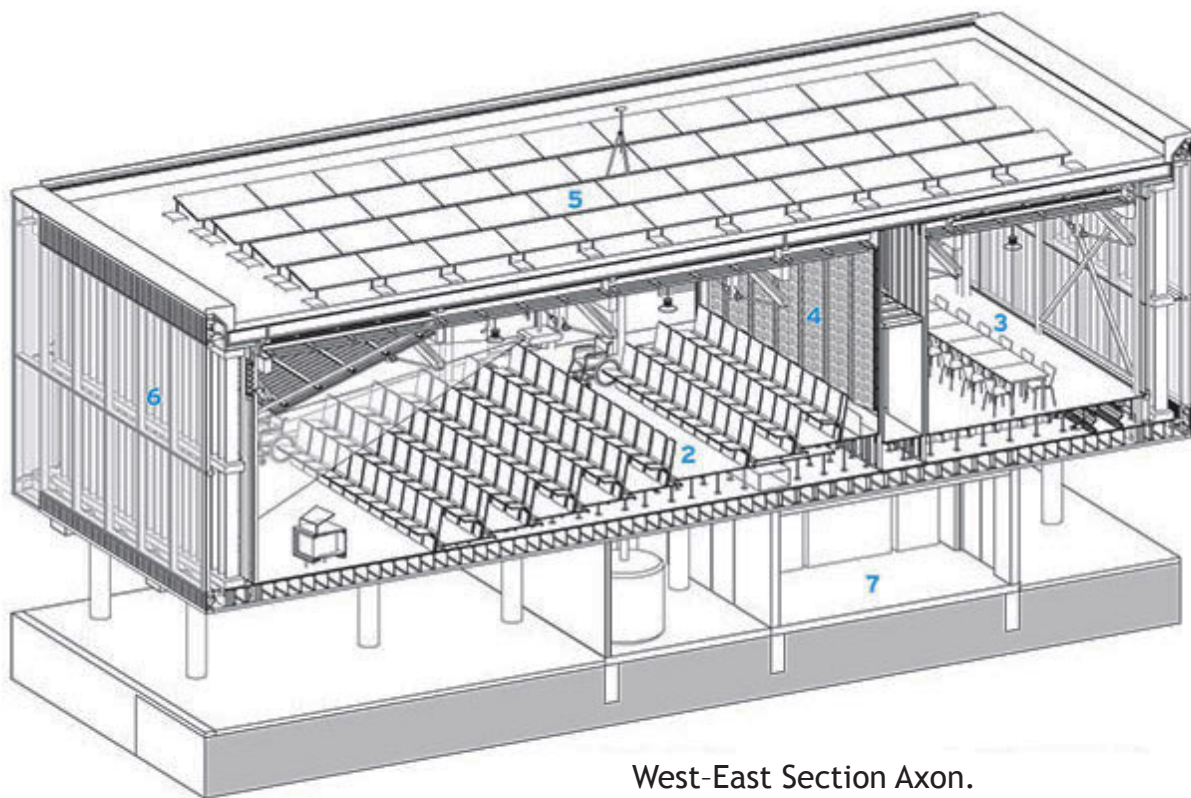


Auditorium/Lecture hall.

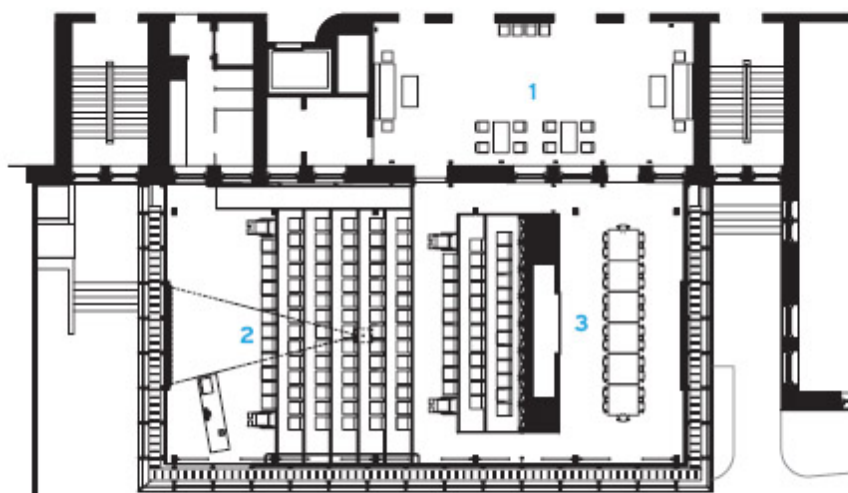


Jury room/Crit space.

— David Hill, *Architectural Record*, November 2015



West-East Section Axon.

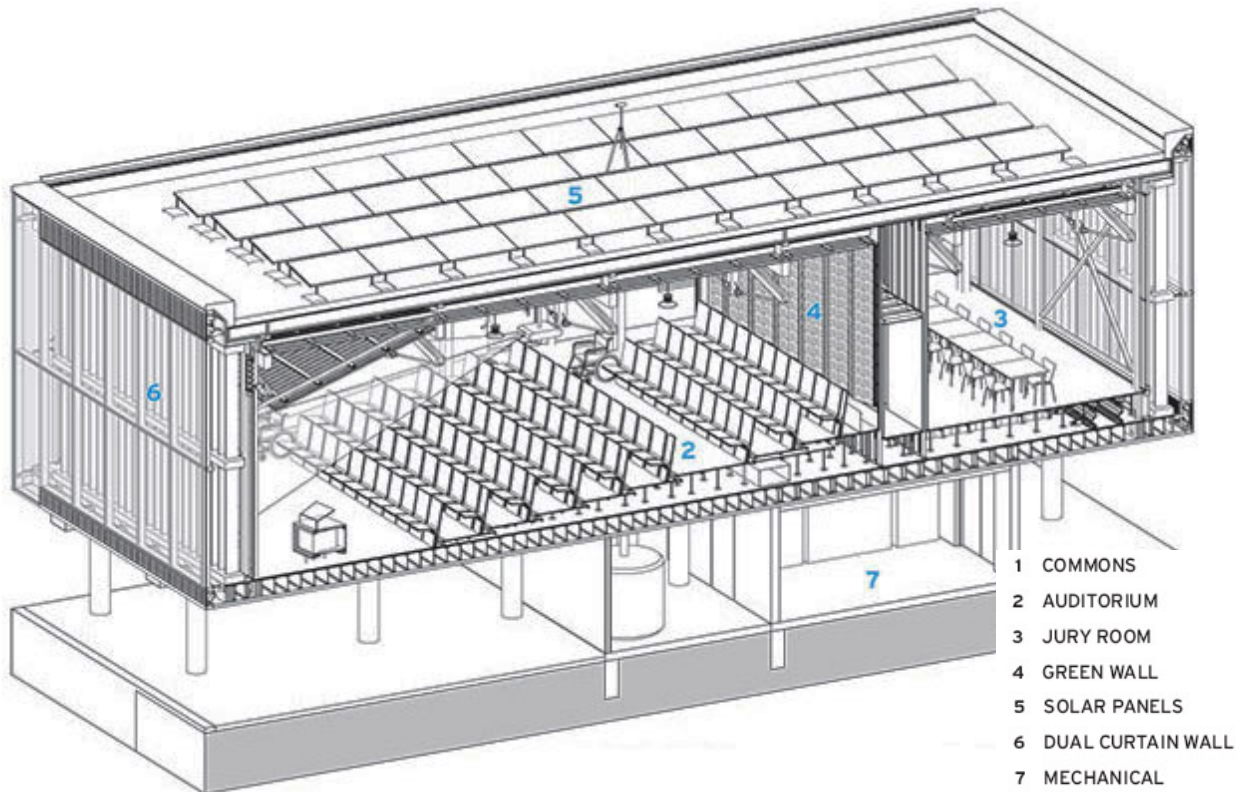


- 1 COMMONS
- 2 AUDITORIUM
- 3 JURY ROOM
- 4 GREEN WALL
- 5 SOLAR PANELS
- 6 DUAL CURTAIN WALL
- 7 MECHANICAL

FLOOR PLAN



3 pts 1. **Highlight** three (3) things that address energy-efficiency and that you think are very successful in the design and construction of the buliding and **explain** why.

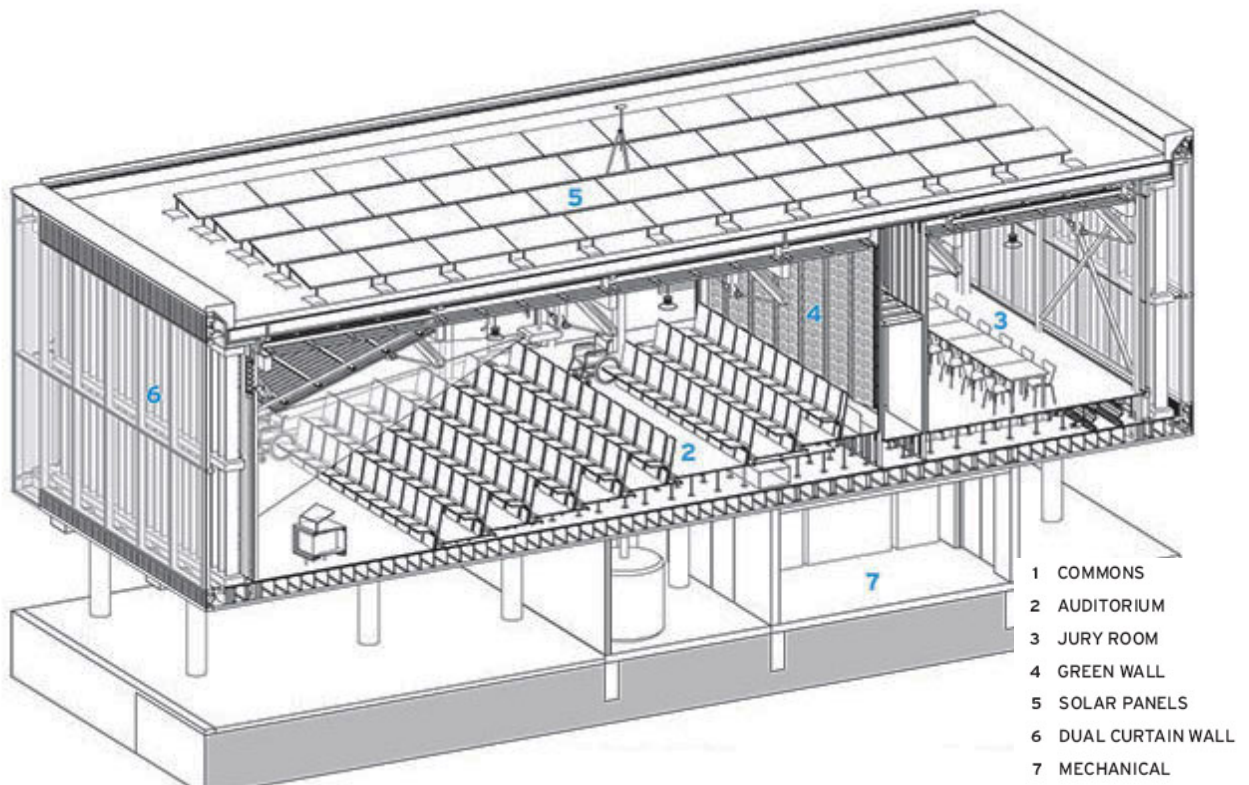


1.

2.

3.

3 pts 2. **Highlight** three (3) things that address non-energy related sustainability issues and **explain** their roles in sustainability.

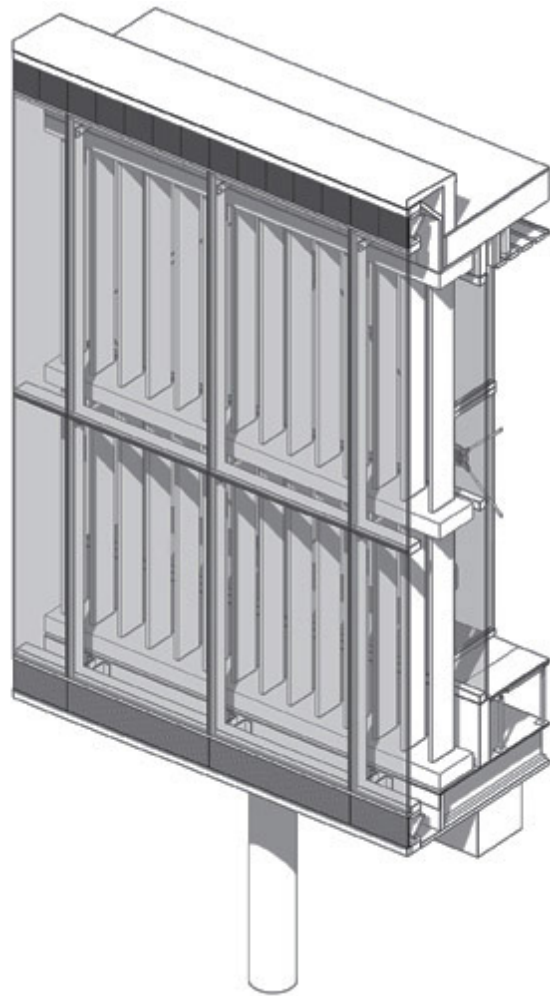


1.

2.

3.

2 pts 3. Explain the south-facing double glass wall's ideal damper and louver operation during a 3pm lecture on a sunny day in late August. Illustrate and explain how it would work in the section to the right.



2 pts 4. Make a case for using displacement ventilation and thermal zoning in the auditorium and jury room. Illustrate and explain how it would work in the section to the right.

