

## Activity 3.1.3 Commercial Wall Systems

### Introduction

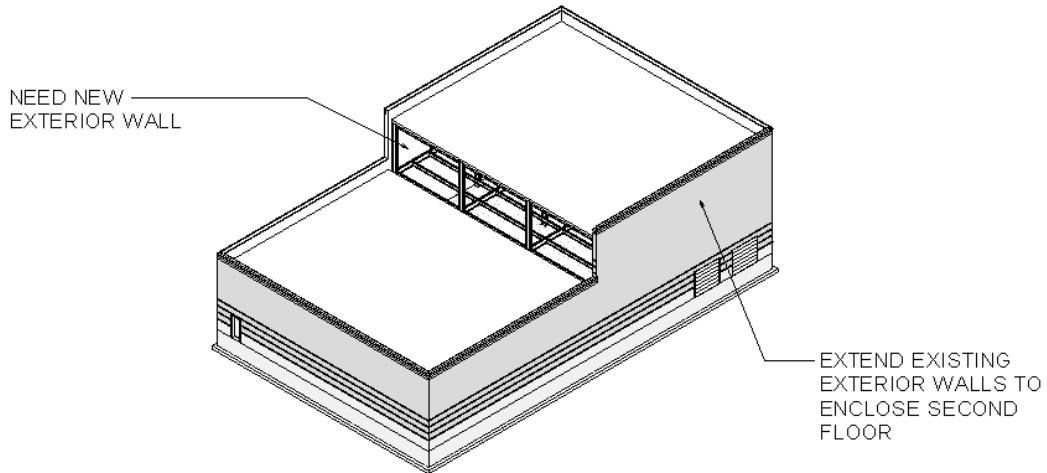
Commercial walls must typically withstand greater loads and heavier abuse than residential walls and are therefore often built with different components. In this activity you will examine the different parts that make up various commercial wall systems. As you identify the components of these walls, notice the similarities and differences in materials and sizes of the structural components.

### Equipment

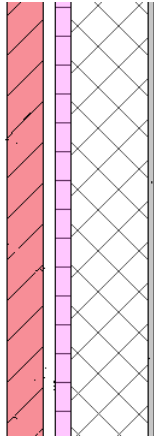
- Engineering notebook
- Internet access
- Pencil
- Printer
- **Keystone Library Renovation Preliminary Building (student version).rvt**

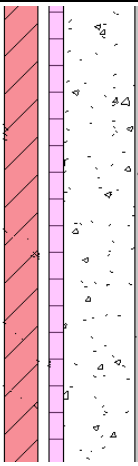
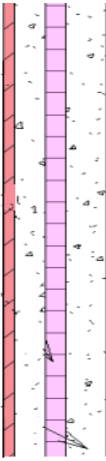
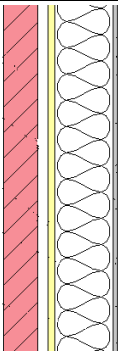
### Procedure


In order to enclose the second level of the Keystone Library, the existing exterior walls will be extended using the same existing construction to the required height. However, a new wall must be constructed at the second floor on Column Line 3. Assume that the new wall will be on the exterior side of the column line and will extend from the second floor level to the height of the adjacent walls on Column lines A and D. The new wall must also provide an exterior brick veneer to match the existing exterior brick. Note that, according to the design drawings, the renovation design calls for a total wall height of 38'-6". This exceeds the maximum wall height per the Noblesville Code of Ordinance (which you discovered in a previous activity). However, the city has granted a variance to the county library system to allow the library to exceed the limit and has approved the building height as shown in the construction drawings.



1. Research each of the following wall systems for use as an exterior wall on the second floor at column line 3 in Keystone building.
2. Label the components of each wall (including at least exterior finish, insulation, and interior finish) on each sketch.
3. Give the specifications for the wall components such as materials, thickness of component, and type of insulation.
4. Give at least one advantage and one disadvantage of each wall system for use in this application.

Wall Type	SKETCH	Advantages and Disadvantages
Concrete Masonry Unit (CMU)		<ul style="list-style-type: none"> <li>● Advantage: Durable, Fire Proof, Sound Absorbing</li> <li>● Disadvantage: Takes longer to build and requires a lot of skilled work</li> </ul>

<p>Cast-in-Place concrete</p>		<ul style="list-style-type: none"> <li>• Advantage: The wall can be built in the place it will be set up, same advantages as above,</li> <li>• Disadvantage: Cost more</li> </ul>
<p>Tilt-up Concrete</p>		<ul style="list-style-type: none"> <li>• Advantage: Fast building time</li> <li>• Disadvantage: Could have troubles tilting the concrete up, requires machinery</li> </ul>
<p>Light Gauge Metal Framing</p>		<ul style="list-style-type: none"> <li>• Advantage: Less expensive, light weight</li> <li>• Disadvantage: Less compression strength</li> </ul>

Curtain Wall		<ul style="list-style-type: none"> <li>● Advantages: Looks cool, lets sunlight in</li> <li>● Disadvantage: Very weak</li> </ul>
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5. Select a wall type for the Keystone Library application and justify your choice.
6. Include the new wall construction in the building 3D architectural model.
7. Create a section view (in the architectural software) through the new wall. Label all building components.

## Conclusion

1. Explain why the materials used in a residential wall system are different from a commercial system.

Residential buildings have different uses and purposes than commercial buildings. Also residential buildings have different codes about what material to use. Such as, residential homes will likely use wood and commercial buildings will use concrete because it is safer.

2. Why is concrete a popular commercial construction material?

Cheap, low maintenance, safe, and overall convenient to use.

3. What factors affect the selection of the exterior façade of a commercial structure?

It depends on the look that they are going for and the aesthetic appeal they are looking for. It could also depend on the weather or climate.