

Design Guidelines for Stairs

How do you approach designing a set of stairs for your project? In previous articles we have written about methods for building stairs and steps in a variety of configurations using Allan Block. These documents were construction focused detailing a specific type of stair that can be installed. Now, every project will have unique criteria and limitations based on the layout of the site and retaining wall. This document aims to provide a design guidance and other considerations when stairs are required for the project.



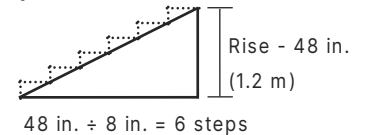
Things to Consider:

- Stairway Layout
- Reinforcement
- Maintenance
- Step Configuration and Materials
- Integrating vs. Separating Steps from Retaining Wall

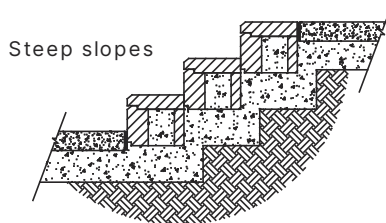
Step Configuration & Materials

The first step is to determine the number of steps needed. Measure the total rise of your slope in inches (mm) and divide by 8 in. (200 mm) - the approximate height of a full size block. (Check with your local Allan Block Dealer for exact specifications)

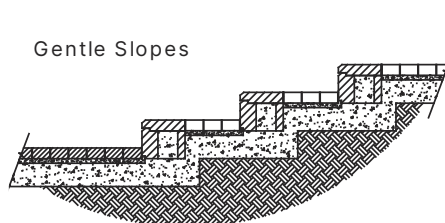
Example



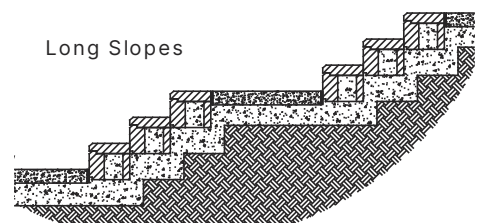
It is also a good idea to match your steps to the natural grade of the slope.



On steep slopes, keep the blocks tight together to maximize rise to run ratio.

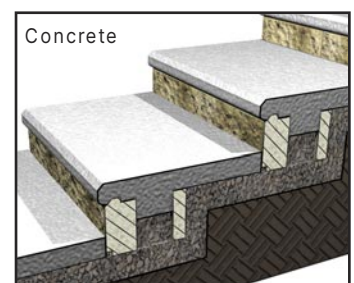
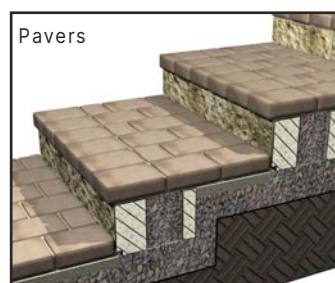
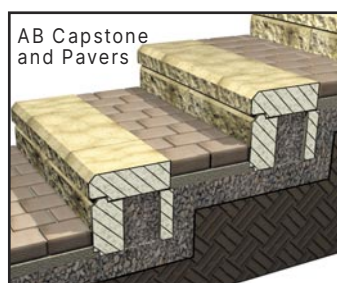


On gentle slopes, add pavers or other materials to increase the depth of the tread and length of the run.



Landings can soften long stairways and is better at tying a set of steps together.

Next, determine what materials to use for your treads. Allan Block's patented front lip provides a built-in edging that works well with AB Capstones. Combine with pavers or poured concrete to achieve the desired depth of your tread.



Stairway Layout

Allan Block wall systems offer a variety of design options. Create a stairway with flowing curves or straight lines to match the aesthetic. Go natural by curving the sidewalls for softer transitions. More traditional? Use straight sidewalls and corners for a crisp appearance. The easiest way to create a stairway using corners is using the AB Corner Blocks. To accommodate the setback of the blocks being used in the wall, some cutting will be needed. See AB Tech Sheet #298 at allanblock.com for more details.

Common Stair Layouts:

Parallel – Having the stairway run parallel to the retaining wall will allow for a more gradual incline with or without landings - based on site layout.

- Minimize/Eliminate need to cut block, increase build speed.
- Easily build steps concurrently by integrating stair risers into retaining wall courses.
- See Tech Sheet Parallel with Round Curves #796.



Recessed – Recess the stairway perpendicularly into the retaining wall to minimize footprint.

- Easiest to build with limited modifications to the block.
- Use for all wall types.
- Flexible tread depth to match slope and fit where space is limited.
- Cut bottom notch deeper for flush sidewalls, see Tech Sheet #896.
- See Tech Sheets Perpendicular with Corners #896 and Perpendicular in the Wall #996.



Protruding – When you have the space, use it. Create a variety of stair layouts and landings in front of your retaining wall.

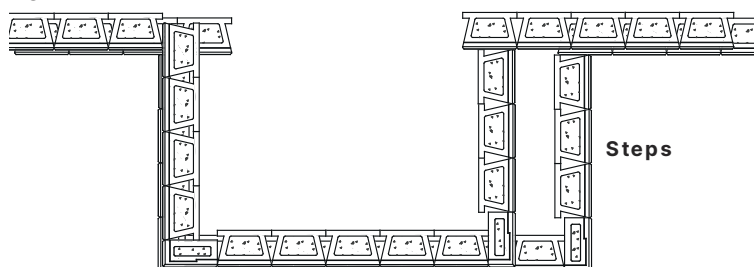
- Ideal for short walls.
- Integrate steps with retaining walls to reduce construction time.
- Add curves to easily create simple landings.
- If needed, you can add geogrid reinforcement to steps on the same course as the retaining wall.



Integrating vs. Separating Steps from Retaining Wall

Can I make the steps integral to the retaining wall? When utilizing the design flexibility of the Allan Block Retaining Wall Systems you can! **Reduce design time** and create the steps with your retaining wall. This can minimize or even **eliminate the need to cut block** and allow the construction on the steps simultaneously with the retaining wall to **speed up build time**.

Integrated



Note: Be aware of local code requirements. IBC 1011.5.2 details the max riser height limits, as this may affect step design. Allan Blocks are nominally 8 in. (200 mm) tall. First course of blocks should be buried similar to wall - 4 or 6 in. (100 or 150 mm) based on standard installation.

You may have a situation where the height of your retaining wall does not align conveniently with the natural grade of the slope. Alternatively, the retaining wall may already exist or may need to be built immediately due to an unforeseen site complication. You still have a choice how to add a set of stairs to your project and they don't have to be tied into the retaining wall to be effective and look nice.

Separating the steps from the retaining wall provides more flexibility to add landings to break up the grade of the stair. Allowing you also as the designer to better customize the riser height and tread depth to match local code requirements. Keep in mind however, that this flexibility must be managed with the design dimensions of the stairway as cutting block may be required to install properly.

When abutting an existing wall do not mortar the connection, see our Technical Newsletter - Q2 2022 article for additional details.

Reinforcement

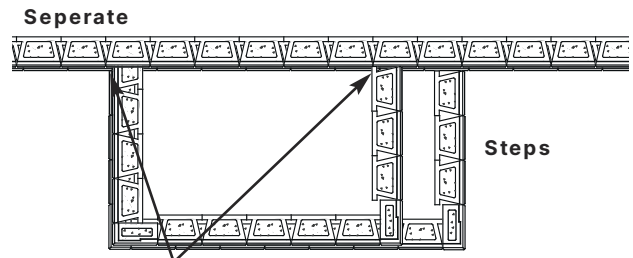
It is always a good idea to add reinforcement to stairs to create a solid structure and add stability. When integrating stairs into the wall, try to maintain the same grid spacing in your steps. The same geogrid strength used in the retaining wall can also be used in the stairs.

Maintenance

Just like your retaining wall, proper design and installation are only the initial steps for stairways. Proper maintenance will allow your project to last throughout the product lifecycle. Allan Block has a Tech Sheet detailing how to maximize the life of your retaining wall titled, Caring for your Retaining Walls #797, which applies to walls and stairs built with Allan Block. Establish a maintenance plan and schedule for your project, below are suggestions to include:

- Make a thorough annual inspection of the wall.
- Correct any settling or grading problems around the wall.
- Maintain the landscape surfaces around the wall.
- Take notice of any wall movement - settling, bulging or rotation, and then apply proper corrective measures.
- Control any random weed growth as necessary.
- Avoid using salt-based deicers around the wall; use sand instead.

For more information on stair reinforcement, please contact engineering@allanblock.com or 800-899-5309 x3.



Note: Having steps built separate from the retaining wall may require cutting block to fit depending on design dimensions.



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