3 Design problem: flight of stairs and wheelchair ramp

Stairs and wheelchair ramps are important aspects of buildings as they enable people with physical disabilities and the elderly to gain access.

You need to consider certain design aspects when you design a flight of stairs with a wheelchair ramp. First, you need a design brief with specifications. This will guide you through the task. Then you need to make orthographic drawings showing the front view, side view and top view.

You have to design a solution to solve the problem. Draw a suitable plan using a first angle orthographic projection.



FIGURE 17 Study this building

3.1 Design brief

You are going to design a wheelchair ramp with an adjoining flight of stairs. Your ramp should be suitable for the use of elderly people and people who are disabled or in wheelchairs. The entrances of many public buildings are badly designed because they have not been planned properly. This makes it very difficult for elderly or disabled people to get in and out of these buildings.

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A good design will specify the number of steps, the height of the risers and the width and gradient of the ramp. Both the stairs and ramp must have a safety rail. The surfaces must not be slippery. This would be especially dangerous in rainy or icy weather.

3.1.1 Ramp specifications

A ramp is an inclined surface, roadway or stairs, that connects different levels.

A good gradient for the slope of a ramp is 1 : 16 to 1 : 20. We need to consider both the slope and length of a ramp when we think about whether it will be suitable for elderly or disabled people. Wheelchair users with disabilities that affect their arms find it difficult to wheel themselves up slopes.

Most people who are able to walk and people in wheelchairs can manage a slope of 1 : 16. Many people cannot, however, manage a slope of 1 : 12 for a stretch of 9 metres. According to official wheelchair ramp specifications, we should design ramps with the least possible slope. The maximum slope of a ramp in new constructions should be 1 : 12. Note the following specifications:

- The maximum rise for any run should be 760 mm.
- The width should be 950 mm to 1 200 mm..
- The handrails on both sides of the ramp must be 850 mm to 900 mm high. Both ends must be rounded and extend 300 mm beyond the top rail and 70 mm of the bottom of the ramp.
- The surface, ramp and landing should be firm and not slippery.
- The ramp should include a few long easy steps.

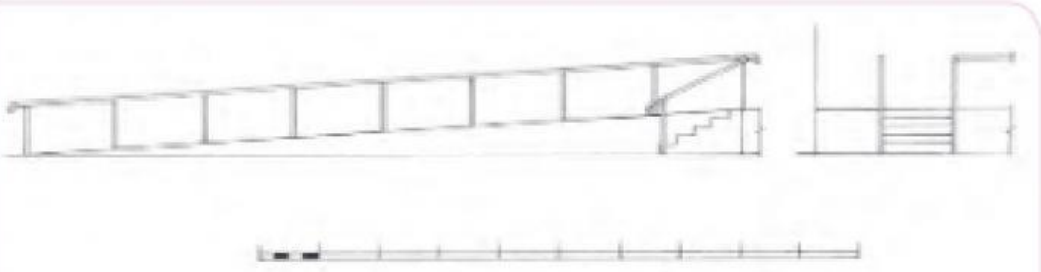


FIGURE 18 Your ramp and staircase drawing should look similar to the drawing above

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3.1.2 Stair specifications

The specifications for the stairs are as follows:

- There should be uniform risers of 150 mm and a uniform tread of 300 mm.
- The stair edges should have bright, contrasting colours.
- The maximum height of a set of stairs between landings should be 1 200 mm.
- The steps should have an unobstructed width of at least 1 200 mm.

Now that you have done your research and have all the specifications, it is time to put your skills to the test and move on to the next step.

3.2 Three-dimensional sketches using isometric projection

You are going to sketch your stairs and ramp in 3D, using isometric projection. Refer to the full page isometric sketch of a stadium ramp in Introduction: Tools for Technology at the front of the book. Use this section to help you with your isometric sketch.

3.3 Draw a plan for the stair and ramp

Refer to the full page orthographic projection of a stairs and ramp in the Appendix at the back of this book on page 184. Use this section to help you with your plan.

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Submit your drawing to the platform after using the online geometry drawing board.

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