

Correcting lens and perspective distortion

When you photograph buildings, or any scene with strong vertical lines, your image will show, to varying degrees, distortions due to the lens and arising from the angle of view. When you print the photograph these distortions are immediately obvious and can ruin an otherwise good print. They can also make building a panorama from several distorted photographs very difficult, even if the distortions are slight.

There are specialist cameras and lenses you can use to avoid these problems, but unless you're a professional photographer, these are probably outside your budget. Fortunately with digital image processing, we can correct most or all of these distortions. There are quite a number of ways to do this, and for different image editing software applications there are different approaches.

This article shows how to do this using Photoshop CS2, PaintShop Pro 8, Fireworks (4, MX, MX2004, 8) and earlier versions of Photoshop and PSP using plugins from theimagingfactory.com.

The origin of the problem and some definitions

Lens distortions

Lens designers face major problems trying to image straight lines in the real world onto film or image sensor as straight lines without curvature or other distortions. For normal cameras they're also limited by manufacturing costs. So most consumer or 'prosumer' grade lenses are a compromise and may display two sorts of distortion - barrel and pincushion. Figure 1 shows how these show up.

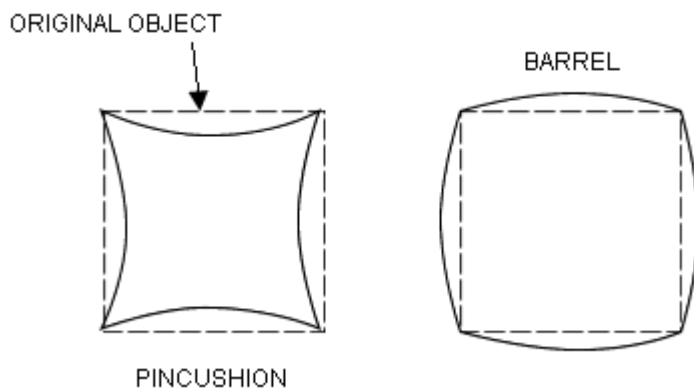


Figure 1. Barrel and Pincushion distortion

These distortions are quite often apparent when using a zoom lens, at either extremity of its range (wide angle or telephoto).

Perspective distortion

When you look up at a tall building, its top is a lot further away from you than its base. So the building will appear narrower at the top than at the bottom, from where you stand. We take this for granted in everyday life and our eyes accommodate it (except perhaps in Manhattan!), but when you see it in a photograph it's more obvious. This kind of geometric "distortion" is usually called *Keystone* distortion. Figure 2 shows the two sorts of keystone distortion.

Thanks for your interest in the "Correcting lens and perspective distortion" article by David Nicholls. To purchase the full article [click here](#)