

Being Sold On HDR? – Consider This First

SUMMARY

High-contrast settings are quite common in architectural photography. These are scenes in which the dynamic range (i.e. the difference between the brightest and darkest parts) is simply too great for the camera to capture adequately in a single exposure. Among the several approaches addressing this problem, HDR/HDRI is quite popular among some photographers –especially those using it as a substitute for lack of adequate equipment.

Alas, there are several problems with HDRI that make it a less than ideal solution for photographing architecture –both exteriors and interiors. Such issues are so serious that major clients and publications are now summarily rejecting HDR photographs. Since you, the buyer, will probably be offered such images at one point or another, the most prominent problems with said technique are expounded here, so as to enable you to make an informed decision when considering such offers.

WHAT IS 'HDRI'

Short for High Dynamic Range Imaging, HDRI (also commonly called simply HDR) is a group of techniques used to try to capture subjects or scenes with an extremely high range of contrast or tonal gamut that exceeds what a camera can capture in single exposure. The overall method involves the capture and subsequent computerised merging of several photographs taken with different exposure settings in order to produce a final image that contains as much of the original tonal range as possible,

NON-BIAS DISCLAIMER

In the interest of truth and to forestall accusations from HDRI advocates of cooking results in an attempt to make the technique look bad, it must be stated that, with the exception of **Plate 2** (which was shot for personal use), **ALL** the HDR images presented here were made during **paid** assignments –i.e. there was a real, excellence- and profit-driven interest in producing quality images.

Because HDRI just didn't cut it, only **Plate 5** ended up being sent to a client –as it was the only one sporting a natural, clean look; the rest of the HDR images were archived with the purpose of demonstrating how *not* to make photographs of high-contrast scenes.



PLATE I. The term 'HDR' often conjures up images like this one: flat, shadow-less, over-saturated pictures that look more like surreal paintings than true representations of a subject. In architectural photography, HDR images –if used at all– should never be readily recognised as such.

and that aims to present a scene 'as the human eye would see it'. This is, succinctly, the basis of the HDRI concept.

A quick demonstration of how and when HDRI is used is presented in the 'An HDRI Primer' sidebar: the final image (**Plate 5**) might look acceptable and even appealing, but we must bear in mind that this is a relatively simple scene dominated by only one light source –sunlight; the photography becomes more complicated in interior images where there's a mixture of two or more light sources, each with a different colour hue (**Plate 6**). Since many



PLATE 2. HDR images attempt to capture the entire tonal range of a scene, so that there are no details lost to blocked shadows or blown-out highlights. Unfortunately, while they solve that one problem, they create several more in the process.

interior images are naturally high-contrast (e.g. a room with bright sunlight pouring in through its windows), photographers lacking the know-how and the equipment required to bring the contrast down are recurrently turning to HDRI as the saviour that will deliver them.

However, in addition to being a false messiah, HDRI is also an unpredictable and finicky beast exacting pounds of postproduction time for every ounce of convenience given at the time of shooting... and then taking a toll on image quality to boot.

NEED A MAP?

Now, HDR image generation –a subject in its own rightis only half of the high dynamic range equation. The other half, namely the reproduction of these pictures, currently happens to be the most problematic.

Currently, most output media, such as monitors or printers (whether digital or offset), cannot satisfactorily reproduce the dynamic range contained in HDR images. To address this problem, a set of techniques known as **tone-mapping** have been developed, in an effort to effectively compress the large amounts of tonal value data available into a range that can be reproduced in conventional media whilst retaining the look of the original HDR 'photograph'.

Technical bits aside, the issue that is most important to you is that **an HDR image's final look is determined by how it is tone-mapped**. Thus, while it is true that a small proportion of HDR pictures are unsuccessful due to errors at the time of shooting, it is usually the tonemapping that is responsible for those off-putting, jarring 'HDR looks'.

Furthermore, there is not a single tone-mapping method that works equally well for all images and this makes automatic tone-mapping difficult to implement. Indeed, since each picture is unique there is no panacean algorithm¹. The fact that each photo has to be individually 'tweaked' has a direct impact on postproduction time and, consequently, on the final amount the photographer bills you.

WHAT IS 'IMAGE QUALITY', ANYWAY?

In essence, image quality boils down to a few simple things:

- Optimal Contrast.
- Optimal Colour.
- Optimal Detail and Sharpness

When any of these is lacking we say that the quality of an image has been degraded or lost.

AN HDRI PRIMER



PLATE 3. Under bright sky conditions, the base exposure keeps detail in the sky and areas illuminated by the sun, but areas in the shade are too dark to make out details in them.



PLATE 4. Setting the camera to expose for the areas in the shade brings in the detail in them, but blows out the clouds and grossly overexposes the sky and sunlit areas.



PLATE 5. By using HDRI techniques, all areas can be properly exposed and details within them maintained. In this particular case, five photographs were taken at different exposure values and then merged in post-production into one final image, which was tone-mapped so as to have a 'natural' appearance –i.e. there's no 'HDR look' and, except for subtle clues, the photo looks as if it was taken in a single shot.

I This should also make all of us wary of camera manufacturers' factitious marketing hype about their latest cameras' fancy 'HDR Modes': because of the uniqueness of each image, such features are mostly useless.



PLATE 6. High-contrast scenes are common in interior photography, and quite often their complexity is compounded by the presence of different light sources, each with a unique colour hue. Such was the case here where we have sunlight (blue) from behind the camera, fluorescent (greenish), and incandescent (yellow/orange). HDRI succeded in capturing the entire tonal range, but it completely failed in colour rendition: by capturing both the full tonal range *and* the entire colour range present, HDRI yielded a garish colour mess (note the unnatural magenta cast in sunlit areas), not unlike the kind that is extremely time-consuming to correct in postproduction. Some photographers might 'solve' this problem by converting the image to black & white, but this ham-handed approach isn't always acceptable, nor will it mask other problems introduced by the tone-mapping, such as the smudgy-looking wall on the left side of the frame.

Controlled supplementary lighting (i.e. flash) and colour correction gels, not HDRI, is the optimal way to tackle scenes like these if we want the final photographs to be accurate and pleasing.

WHAT HDRI MEANS TO YOU

The main reasons why HDRI is not an optimal approach or solution to produce first-rate architectural photographs are the following:

- Unrealistic-looking images, even some of those with a 'natural' tone-mapping. This contravenes one of the chief tenets of architectural photography: an *accurate, true to life* representation of a building.
- Little to no consistency in results. Even images taken at the same location and in like conditions can turn out looking differently once processed (see the 'The Sins of HDRI' sidebar, Plate 11).
- Colour accuracy is compromised. Colour and white point balancing can be very difficult –even impossible– with HDR images (Plates 2 & 6).
- Tone-mapping introduces artifacts. Halos (Plate 8), tone reversal (Plates 6, 9 & 10), noise (Plate 8), oversaturation (Plate 11-A), flattening, and webbing are common with certain tone-mapping operators. Postproduction time and fees increase when artifacts need to be corrected (or masked).
- Lack of control. Indeed, much control over the final look of an image is surrendered when HDRI is used instead of more predictable, efficient and naturallooking methods such as strobe lighting.
- HDR images can look flat. For perplexing reasons beyond the scope of this publication, some photographers seem to develop a phobia towards *any* dark (or bright) areas in a photograph, and they aggressively try to even out the tonal values in their HDR images (some even affirm that such is HDRI's *raison d'être* (!!), go figure). Frantic efforts to bring out *every small*

bit of detail in areas that are naturally light or dark produce images in which the subjects do not stand out due to lack of contrast (see the 'What Is Image Quality, Anyway?' sidebar).

Please, do note that these points refer to the 'good' HDR photos: namely, those tone-mapped so as to present a 'natural' appearance, and not to the grungy, psychedelic images like **Plate 1** –which, being already unsuitable for use in commercial or advertising applications, we do not even bother to discuss here.

AN IDEAL SOLUTION TO HIGH-CONTRAST SCENES

In the interest of truthfulness, it must be said that there are indeed ways to craft HDR images that are natural-looking, appealing, and usable in commercial applications and advertising; however, not only is the investment in time and effort rarely cost-effective, but even select HDR images very seldom match the quality of those crafted with more tried-and-true, traditional methods. Of these, strobe lighting is just about the best one for recording high-contrast scenes in a natural and dazzling manner (see the active demonstration of the flash advantage in the sidebar 'The High-Contrast Showdown').

Given all the issues with HDRI, you will definitely be better off hiring a professional photographer who has the wherewithal to offer you something more accurate, efficient and elegant than HDRI to create the images that your business depends on.

WHAT HDRI REALLY MEANS TO YOU

Investment and revenue lost to poor image quality.

THE SINS OF HDRI

They are many. This high-contrast interior image shows the most common: halos, noise boost, and tone reversal.



PLATE 7. As a frame of reference, there are two light sources in this high-contrast scene: the tungsten bulbs atop the island and sunlight streaming from large windows towards the right of the frame. Seven photographs at different exposure settings were made and then blended into a single image which was subsequently tone-mapped with the aim of rendering a natural look. Well, the picture definitely does not look natural: this might be due in part to the extra contrast added in an attempt to make it look less flat, but mostly because of the artifacts introduced by the tone-mapping. These artifacts are all across the image, but they have been circled in some spots so as to define them below.



PLATE 8. Halos and noise boost. Halos are bright glows around dark edges; they are a dead giveaway that an image was fudged.

Noise boost results from tone-mapping algorithms mistaking residual digital noise or fine grain for details worth augmenting.



PLATE 9. Tone reversal happens when areas of the image have swapped overall brightness levels. Also called *contrast reversal*, it is often accompanied by halos.



PLATE 10. Tone reversal artifacts are unsightly: they make large areas of an image look smudgy, as evidenced in this close-up and in the archway in **Plate 7**.

THE SINS OF HDRI (CONT'D)



PLATE II. Lack of colour consistency and **unnatural looks** are the final nails on HDRI's coffin. Even though these HDR images were all generated from the same series of source files, the tone mapping yielded results that are grossly different in terms of colour accuracy and saturation, as well as white balance; thus, it's practically impossible to tell what the real colours of the objects in the photo are, or which image presents the scene as it was in real life.

THE HIGH DYNAMIC RANGE SHOWDOWN: FLASH AND HDRI GO HEAD-TO-HEAD

When pitted against tried-and-true approaches for recording high dynamic range scenes, HDRI is recurrently found wanting. Here it lost completely to strobe lighting (flash¹).

For this comparison, two different images of the same kitchen were made:

- 1. A single exposure of the scene illuminated with studio strobes placed in strategic locations to not only bring the contrast down, but also to obtain an image that looked accurate, natural and elegant.
- 2.An HDR image obtained from a series of seven photos made at different exposure settings that encompassed all the dynamic range of the scene. Processing this series yielded the images seen in **Plate 11** above: the best from these (**Plate 11-A**) was selected as the HDRI 'hero photo'. (Note: whilst **Plate 11-A** had received some desaturation during HDR generation, the yellow tones were still too strong; thus, it was desaturated further –by ~20%– to be presentable enough to compete, and that's why the very final version (**Plate 12**) looks slightly different).

¹ Whenever 'flash' is mentioned in the current context, we are *never* referring to the built-in, on-camera flash the average shooter would use, but to one or more *off-camera* flashes fired remotely into the scene from directions at an angle with the camera axis. Because on-camera flash flattens subjects and introduces unsightly reflections, it's hardly ever used in architectural photography. Indeed, photos taken with on-camera flash make HDR images appear glorious in comparison.

THE HIGH DYNAMIC RANGE SHOWDOWN: FLASH AND HDRI GO HEAD-TO-HEAD (CONT'D)



PLATE 12. The Winner: Flash. Strobe lighting yields the most natural result, with an accurate colour rendition –i.e. the colours on the photograph are the *real* colours of the objects–. In addition, being able to carefully position and modify lights, allows the photographer to add those subtle but critical accents –such as the smooth highlight on the archway– that give images a classy finish. Last but not least, strobe-lit images are more cost-effective, since they require much less postproduction time than HDR pictures.



PLATE 13. The Loser: HDRI. Even after much pixel pushing and adjusting in postproduction, the resulting photograph leaves much to be desired: the colours are all off; in spite of two rounds of desaturation, the image still looks jaundiced; and even though contrast was boosted, the HDR picture still looks flatter than the one lit with strobes. Much postproduction time would be needed to bring this image to a level closer to that of **Plate 12**, and even then, the only guarantee of colour accuracy is how much the photographer remembers of the scene. The lack of quality makes it obvious why the paying client never even got to see this image, and why major clients and publications are summarily rejecting HDRI by default nowadays... and why you should as well.