

WORDS & IMAGES LEE FROST

# MOTION STUDIES

Using exposures of several seconds to record motion is a popular photographic technique, but what happens when seconds become minutes? With the aid of a ten-stop neutral density filter, **Lee Frost** shows how it's possible for you to create amazing motion studies in the middle of the day – and transform everyday scenes into beautiful fine-art images

**D**ESPITE BEING KNOWN PRIMARILY AS A colour landscape photographer, I've had a darkroom for almost as long as I've owned a camera and several of my photographic heroes are black & white masters.

Among them is Michael Kenna; a British photographer renowned for his evocative, hand-printed landscapes that often rely on unusually long exposures to record the passing of time. A more recent exponent of this genre is Austrian Josef Hoflehner – a rising star in the fine-art world.

I spent hours admiring the work of these greats, wishing I could produce images with the same haunting, ethereal quality. Then, in the winter of 2007, while leading a landscape photography workshop in the Lake District, I had one of those epiphanic moments when a dream becomes reality.

I'd like to say it was all my doing, but it wasn't. During a particularly wet and windy afternoon on the shore of Derwent water, a member of the group with me – let's call her Joy, (actually, her name really is Joy!) reached into her backpack and pulled out a neutral density (ND) filter, thinking a long exposure might help her to create something interesting in the gloom. We're not talking about your usual two-stop or three-stop ND filter here, but the mother of all ND filters; an ND filter so dark you can barely see through it in full sunlight; an ND filter so dense that it turns day into night.

A light bulb flickered to life in my head. Maybe this was the answer – the key to finally unlocking

the mystery of those, erm, mysterious images I'd admired for so long? The only way for me to find out was to buy one and try it out for myself.

Several months on, I can honestly say that the humble ND filter has been life-changing – the best £60 I've spent in a long time. Well, almost.

Never before has such a simple accessory had such a profound effect on my imagination or my work. It sowed the seed of an idea that had been laying dormant for years and set me on a fascinating creative journey that I'm still enjoying. In fact, I feel like it is only just beginning.

The basis of this motion technique lies in the neutral density filter's ability to increase exposure times from just a fraction of a second to several minutes, in normal daylight conditions. As a result, anything moving will either be blurred beyond recognition or disappear altogether, causing everyday scenes to be totally transformed.

My initial experiments with the filter took place on Alnmouth Beach in Northumberland, where I created some simple images recording the ebb and flow of the tide and the gentle drifting on the clouds overhead. The views had nothing of any significance in them – just a foreground of sand ripples, the sea and the sky, but by using exposures of four or five minutes, those simple scenes were transformed into images of great beauty and mystery.

I found that the effect was most pronounced when a stationary element was included in the composition to contrast with the milkiness of the

**Alnmouth, Northumberland**

I love the way the drifting clouds have recorded on this image, like charcoal smudges across the sky, while the sea has turned to milk. 232 seconds at f/16 (ISO 50).



## BEADNELL, NORTHUMBERLAND

It was so windy that I only got two shots, but I knew the big waves would look great!  
Canon EOS-1Ds MkIII and 16-35mm lens.  
60 seconds at f/5.6 (ISO 50).

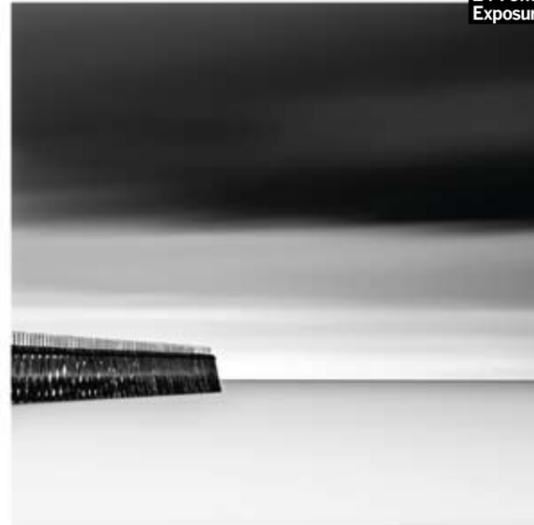


**PROTIPS**  
**WATCH THE TIDE**  
Some locations work best when the tide's fully in, others when it's not, so buy a tide table and make repeated visits to specific spots, to work out where the tide needs to be to get the best results



## NORTHUMBERLAND COAST

Piers, jetties, sea defences, rock formations and stationary structures and features in the tidal zone make ideal subjects for motion studies. Canon EOS-1Ds MkIII and 24-70mm and 70-200mm lenses. Exposures: 94 secs to 15 minutes.



## Measured Darkness

Neutral density filters come in different densities (or strengths) and are designed to increase exposure without causing colour shifts. The weakest density is 0.3 and gives a one-stop exposure increase, a 0.6 gives a two-stop increase, 0.9 three stop and 1.2 four-stop. Most filter manufacturers only produce ND filters up to a 0.9, while one or two professional filter brands such as Lee Filters include a 1.2ND in their range.

Two or more ND filters can be combined to give you a stronger effect, and a polariser can also be used as an ND filter, as it increases the exposure by two stops. However, once you start 'stacking' filters, image quality will suffer – especially if you're using cheaper resin filters.

Only B+W produces stronger ND filters ([www.bpluswfilters.co.uk](http://www.bpluswfilters.co.uk)). B+W offers 1.8 (six-stop) and 3.0 (ten-stop) glass NDs in all popular filter thread sizes up to 77mm. I used the ten-stop version for all the images shown here. These two ND filters are designed primarily for industrial applications – to observe and document processes that involve extreme brightness, such as steel furnaces and glowing filaments in light bulbs; however, their extreme density also makes them ideal for long exposure photography. I managed to buy a ten-stop B+W ND filter off-the-shelf from a dealer, although it's usually a special-order item, so expect a wait of several weeks. I went for the biggest size of 77mm which is the thread size of my 24-70mm zoom. I also purchased a couple of stepping rings (77-67mm and 77-82mm) so I can use the filter on other lenses.

"Stormy days proved to be ideal because dark clouds drifting through the scene during exposure record as dramatic streaks across the image"

blurred water and the softness in the sky – a partially submerged rock with waves gently washing over it, or perhaps some weathered old groynes gradually disappearing into the sand.

I also found that I preferred the images I'd shot in 'bad' weather. Stormy days proved to be ideal because dark clouds drifting through the scene during exposure were recorded as dramatic streaks across the image, while on grey, overcast days, any textures in the sky disappeared, which resulted in a much more gentle, almost tranquil effect, which was very pleasing.

In other words, the ND filter worked best in the type of weather conditions where I might otherwise struggle to produce successful images, so as well as being an effective technique in its own right, it was also a great one to fall back on when the weather turned sour – which it often does in the UK.

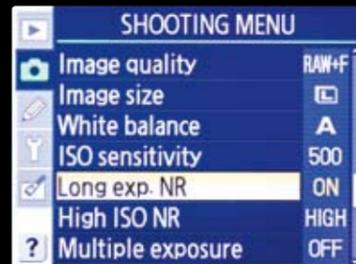
Inspired by these initial images, I set about exploring more of the Northumberland coast, but instead of returning to my usual haunts such as Bamburgh Castle and Embleton Bay, and shooting the same old scenes, I decided to concentrate on areas I had hitherto ignored, or failed to photograph with any degree of success. I went wherever I might find slipways, jetties, harbour walls, breakwaters, piers and rock outcrops – in other words, anything bold and stationary. Ironically, I ended up finding these things in the places I'd normally avoided photographing, because they lacked the drama and impact of other nearby locations.

I've never considered Craster to be anything more than the village in which I'd park before walking along the coast to Dunstanburgh Castle, and yet on a grey, drizzly day in October, its old concrete harbour entrance made the perfect subject for one

of my motion studies. I found the same in Amble – the pier isn't the most attractive structure, but when exposed for five or six minutes on a damp, overcast day, it became a thing of beauty!

Spurred on by this initial success, I headed down the coast to Blyth; a big, industrial port town and the last place I would normally go in search of inspiration. This just goes to show how looks can be deceiving though, because to date, Blyth has, by a long way, been the source of more successful images for this project than anywhere else. Along a single half-mile stretch of beach on the outskirts of the town, there's a magnificent pier, an old pipeline, some rotting old timber posts, a concrete jetty and rows of concrete groynes, all of which are partially submerged into the sand at some stage by the tide, making each one a perfect subject for this sort of long exposure image. ▶

**PROTIPS** **STRETCH THE IMAGINATION**  
 The panoramic format can work very well with this technique, but stitching a series of frames is impractical, due to the duration of each exposure, so I prefer to crop a single frame into a panoramic.

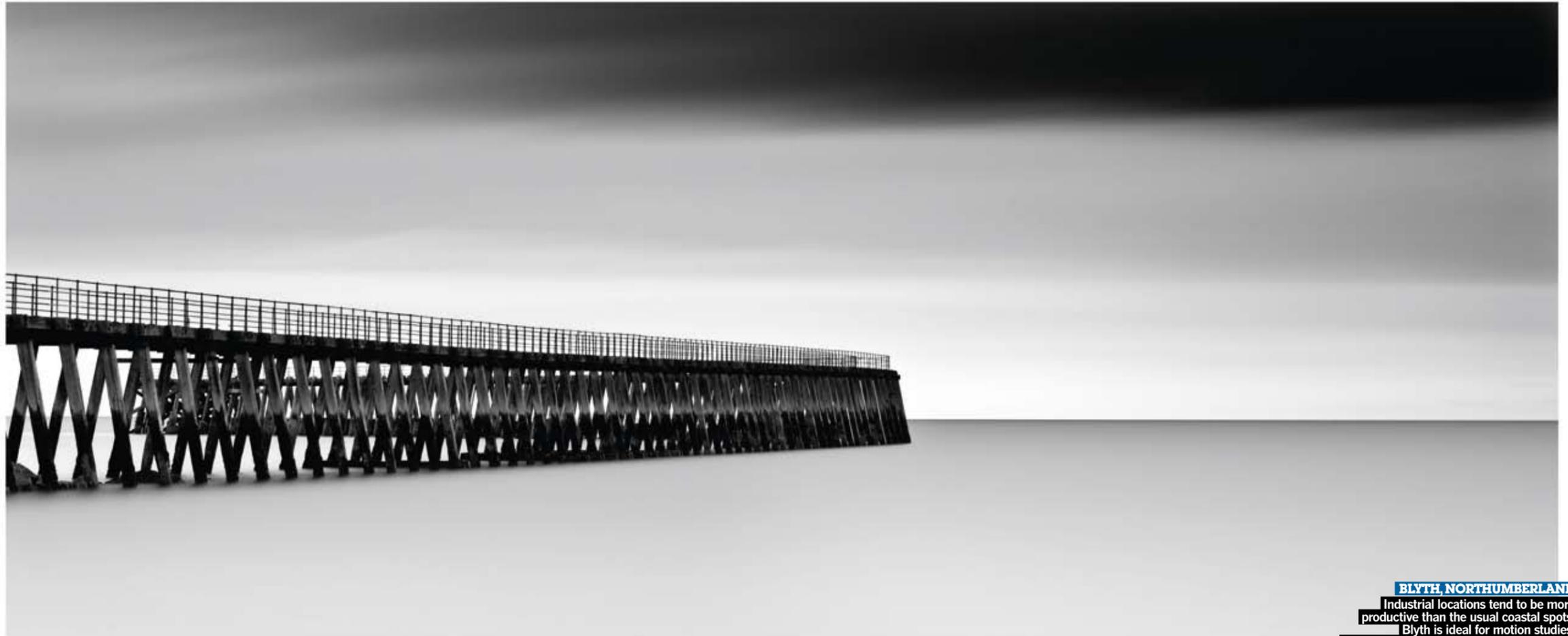


## Noise Reduction

Long exposures lead to increased noise in digital images. This is caused by the pixels in the sensor heating up, which makes them appear white, or 'hot' in the image. The longer the exposure, the more hot pixels you're likely to see. One way to avoid this is to turn on your camera's noise reduction function so that it kicks in when the exposure ends and the image is written to the memory card. The only problem is that if you use noise reduction, it takes as long for the camera to write the image as it did to expose it, so if you make a five minute exposure, when you close the camera's shutter, it will take another five minutes before you can view the image and histogram on the camera's preview screen.

Impatient as I am, I can't be bothered to wait around for several minutes between taking each shot and seeing it, so I leave noise reduction turned off and take my chances. None of the images you see here have been subjected to noise reduction, and they look fine to me!

If you're also impatient (five minutes is a long time when you're waiting for it to pass!) but do experience problems with noise in your long exposure shots, you could always try using noise reduction software in post-production, such as Noise Ninja or Noiseware.



**BLYTH, NORTHUMBERLAND**  
 Industrial locations tend to be more productive than the usual coastal spots. Blyth is ideal for motion studies. Canon EOS-1Ds MkIII and 70-200mm lens. Exposure: 180 seconds at f/11 (ISO 50).

Wherever I find myself, the picture-taking process remains pretty much the same. I use a tripod-mounted Canon EOS-1Ds Mk III, fitted with either a Canon 24-70mm or 16-35mm lens and, in addition to the ten-stop ND filter, I use a Lee Filters hard-edged ND grad to tone down the sky – either 0.6 or a 0.9 (two and three-stop respectively). If you omit the grad, more often than not, you'll blow the sky, losing the shapes, textures and tones that can make such a difference to the look and feel of the final image.

Because it is almost impossible see through the ten-stop ND filter, I fit my Lee filter holder to the lens first, compose the shot and align the ND grad. The filter holder is then removed from the lens, with the grad still in position, so that when I'm ready to shoot, I can screw the ND onto the lens and fit the Lee holder, complete with aligned ND grad, onto that.

When I first started using a ten-stop ND filter, I tried metering through it, but the density of the filter sent my camera's metering system nuts; so to avoid exposure error, I take a meter reading without the ND filter and calculate the required exposure (see panel). Finally, the filter is placed on the lens and the shot taken, by locking the shutter open on Bulb (B) using a remote release.

My Canon DSLR has a count-up timer on the top plate LCD when using Bulb, so I don't need to bother to time the exposure. Also, when working at exposures of several minutes, you don't have to be precise to the last second as a few seconds either way will have no effect on the look of the final image.

Digital cameras don't suffer from reciprocity law failure like film did, so when using long exposures, you don't have to worry about increasing the exposure to compensate for the effects. That said, when working at exposures of several minutes, I often find that the calculated exposure is too brief – possibly due to the light-absorbing nature of the filter – so it's usually necessary to increase the exposure by half to one stop. So, if the calculated 'correct' exposure is four minutes, I increase it to six, make the exposure, check the preview image and histogram, increase or reduce the exposure accordingly and then take a second shot.

When taking exposures of several minutes, you'll want to try and get it right in as few attempts as possible, and this is something that will come with practise – after several months of working with the ten-stop ND filter, I rarely need to make more than two exposures to get the results that I want. ■

"I find that the shapes, textures and tones in the sky can make a huge difference to the look and feel of the final image"

## ND filters & how they increase the exposure

To give you an idea how ND filters with different densities affect the exposure, refer to the table below:

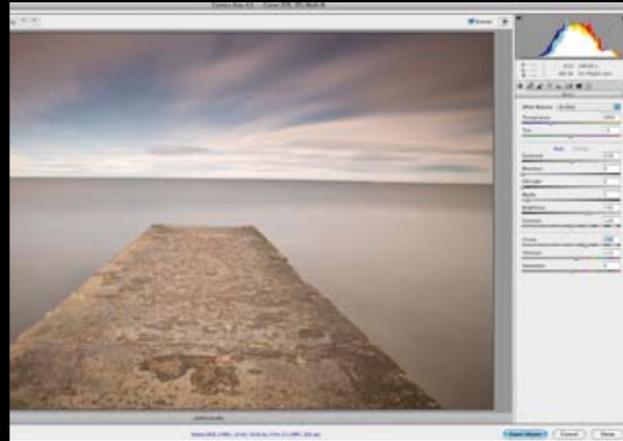
Exposure time	0.6ND (2-stop)	0.9ND (3-stop)	1.2ND (4-stop)	1.8ND (6-stop)	3.0ND (10-stop)
No filters					
1/500sec	1/125sec	1/60sec	1/30sec	1/8sec	2 secs
1/250sec	1/60sec	1/30sec	1/15sec	1/4sec	4 secs
1/125sec	1/30sec	1/15sec	1/8sec	1/2sec	8 secs
1/60sec	1/15sec	1/8sec	1/4sec	1 second	16 secs
1/30sec	1/8sec	1/4sec	1/2sec	2 secs	32 secs
1/15sec	1/4sec	1/2sec	1 sec	4 secs	64 secs
1/8sec	1/2sec	1 second	2 secs	8 secs	2 mins
1/4sec	1 second	2 secs	4 secs	16 secs	4 mins
1/2sec	2 secs	4 secs	8 secs	32 secs	8 mins
1 second	4 secs	8 secs	16 secs	64 secs	16 mins



## Motion studies

### Concept to completion

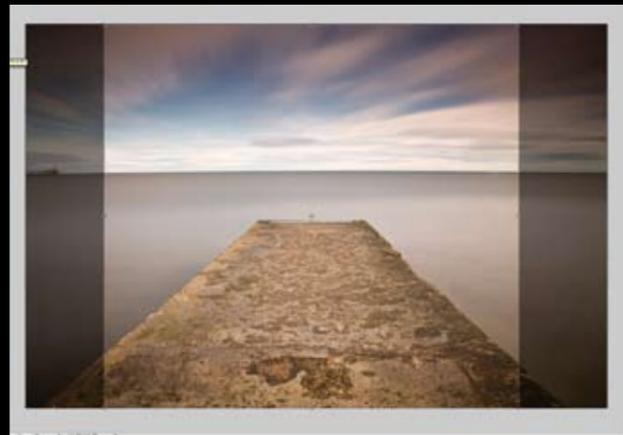
As you can see, the final images bear no resemblance to the originals. I start out with rectangular colour Raw files, and end-up with square black & white photographs – all part of the fun of digital capture! This is no accident, of course – I shoot each image with the intention of converting it to black & white, and I find that cropping to a square format adds a sense of balance and tranquillity to the composition. Also, despite being called a neutral density filter, the B+W ten-stop ND isn't neutral at all, and adds a very obvious warm cast to images, as though they were shot at sunrise or sunset! Occasionally, this colour cast works well, but more often than not it looks odd. Here's a step-by-step guide showing how I get from the original Raw file to the final image.



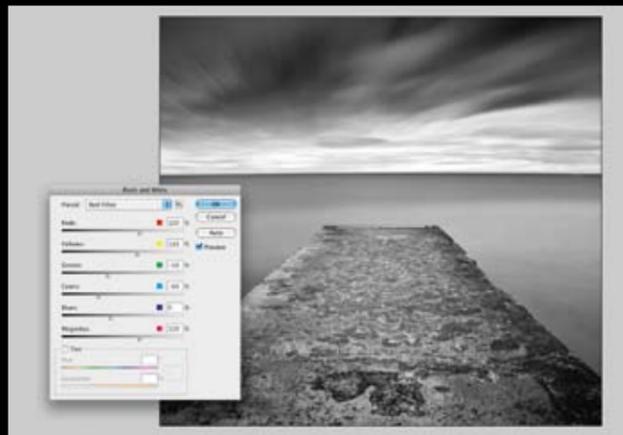
**Step 1** The Raw file is opened in Adobe Camera Raw and adjustments are made to exposure, clarity and vibrance, and colour temperature adjusted to account for the warmth of the filter.



**Step 2** Next, Curves adjustments are made to increase contrast and impact. This is done to taste and depends on the subject and scene. Here, the 'darks' were darkened and the 'lights' lightened!



**Step 3** The image is opened in Photoshop as a TIFF file and immediately cropped to a square, using the Crop tool. You can keep a square format by holding the Shift key while dragging.



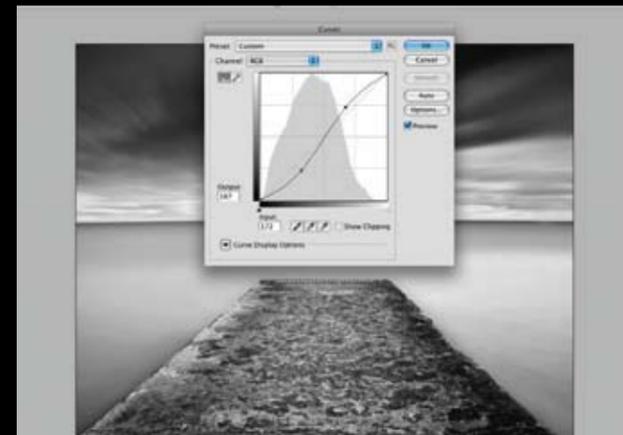
**Step 4** Using Image>Adjustments>Black & White, the cropped colour image is converted to black & white. I choose the Red Filter preset as it gives the image a dramatic tone that suits the scene.



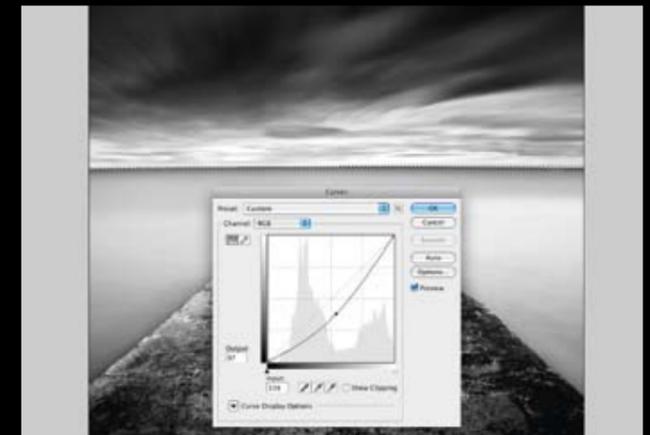
**Step 5** The sea is selected using the Polygonal Lasso Tool and a feathering of 50 pixels, then Levels are adjusted to lighten the tone of the sea and give it a more obvious milkiness.



**Final image**  
As a finishing touch, the canvas size is increased, creating a white border around the image to show it off. Printed on fine art matt paper, these images are ideal for mounting and framing. In fact, I already have an exhibition of them lined-up for the summer of 2009.



**Step 6** Next, the jetty is selected using the Polygonal Lasso Tool, and a Curves adjustment is made to create a soft 'S' shape curve. This increases the contrast in the jetty and brings out the detail.



**Step 7** The sky is now selected and a Curves adjustment is made to create a darker and more dramatic sky – the RGB curve is pulled down to the right from the centre to darken the mid-tones.

**PRO TIPS**  
**BED IT DOWN**  
If you're shooting on a beach, make sure your tripod legs are well bedded into the sand, otherwise they're likely to slowly sink during the exposure, resulting in a type of blur you don't want!