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Gunther Wegner

Timelapse Photography

From Photo to Film

- ▶ **Equipment, subjects, settings**
- ▶ **Perfect day/night transitions**
- ▶ **Processing with LRTimelapse and Lightroom**
- ▶ **Timelapses with a moving camera**
- ▶ **Starscapes, Milky Way, Polar Lights**

I hope that you enjoy this book, and that you will also discover the fascination of timelapse photography!
If you would like to ask me any questions or wish to provide feedback about this book, please write to me at:
info@gwegner.de – *I look forward to hearing from you!*



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Gunther Wegner

Timelapse photography

From photo to film

- ▶ Choosing the **right equipment**.
- ▶ **Preparation** and **subject selection**.
- ▶ **The basics of shooting**: best choice of camera settings, intervals, exposure times and dark times.
- ▶ Tips for choosing the right **intervalometer**.
- ▶ **The Holy Grail**: perfect day-to-night and night-to-day transitions.
- ▶ Processing and rendering with **Lightroom** and **LRTimelapse**
- ▶ **Deflickering** of sequences.
- ▶ **Timelapse with moving camera** (*motion control*).
- ▶ Recommendation for choosing the right **motion control equipment**.
- ▶ Timelapses of **astronomical landscapes (Milky Way, Polar Lights)**.
- ▶ Timelapses in one image (**star trails, compositions**).
- ▶ **Bonus**:
appendix with **checklists** and **cheat sheets** for copying or printing out. Tips about **monetization, video editing** and choosing the **right music**.

About the author

I am Gunther, photography coach, blogger, photographer and specialist in timelapse photography.

I was born in 1974 in Porto Alegre (Brazil), where I spent eleven years of my childhood before my parents decided to leave this beautiful country and return to Germany. I now I feel very much at home in Hamburg and its surrounding areas, where I have now lived for more than 10 years with my wife, Diana. Of course, I still love to travel, and I am drawn back to South America time and time again within the scope of the photography expeditions which I organize there, for example.

I discovered my passion for photography as a young boy. I started with analog slide and black and white photography, including my own laboratory, in my parents' cellar. When things became digital, I discovered a whole new fascination for photography which has remained with me ever since.

I started my German photography blog gwegner.de in 2007, with photography tips and tricks, recommendations, equipment test reports and much more.

In 2009 I discovered the fascination of timelapse photography, which gave me the opportunity to add a 3rd and 4th dimension to my photography.

I began to develop the *LRTimelapse*¹ software, which is now a well-known worldwide leader with which timelapse sequences can be edited in a way that was previously reserved for exclusive and expensive productions.

¹ <https://LRTimelapse.com>



I initially carried out these photographic activities as a hobby in parallel with my actual profession: after completing my degree in business informatics, I started to work as a project manager in a software company, and worked as a consultant for major companies. Other management positions followed in different companies, before I took the plunge into self-employment in 2012 in order to turn the activities which I really loved into a career.

Since then I have dedicated myself to subjects involving photography, timelapse, video and travel as my main profession together with my dear wife Diana, who shares my wanderlust and enthusiasm.

And now we are setting off on a journey into the fascinating world of *timelapse photography* together! ;-)

My work in film

If you would like to get to know me and my work as a timelapse photographer somewhat better, I would recommend watching my documentary, **gwegner.de on tour: photography, timelapse and more on Bonaire..**

In this, you can accompany me to the beautiful Caribbean and experience how I record timelapses, scout for locations and more at: <https://gwegner.de/travel/bonaire/>

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3 The basics of shooting

Now that we have talked so much about equipment, let's turn to some things that are even more important. Choosing the right subject for shooting your timelapse is certainly at the top of the list.

It would be a mistake to neglect choice of subject and image composition in a timelapse that you are putting so much hard work into. Because once the timelapse is running, there's usually no going back.

Unlike classic photography, where you can simply take a few photos from different perspectives and then pick out the best picture sometime later on the computer, here you have to get it *right* first time.

I therefore recommend taking a few **test shots** without a tripod to begin with in order to get the image composition right. You are much more flexible and mobile when taking test shots by hand than you are if you put the camera straight onto a tripod. Once you have found the correct position by shooting handheld, you can place the camera on the tripod accordingly.

The topic of image composition covers a wide area and would certainly go beyond the scope of this book, particularly since it isn't just about timelapses but has to do with photography and filming in general.

Figure 3.1: *Left: Static timelapse recording from one of my participants above the clouds on La Palma. You should remove any hand strap to prevent it from flapping in the wind and shaking the camera.*

There is a great deal of literature on this subject, and I even devoted an entire chapter of more than 100 pages to the subject of image composition in my book *Diana lernt Fotografieren (Diana learns photography, available in German)*¹⁶. These basics are not only interesting for beginners, but also for more advanced photographers who wish to develop their composition skills. And of course, they apply to demanding classic photography as well as timelapses and films.

Figure 3.2: *Blue Hour in Speicherstadt, Hamburg. Powerful image composition is just as good for your timelapse recordings as it is for individual photos.*



¹⁶ <https://to.gwegner.de/dlf>

3.1 Interesting timelapse subjects

As well as classic image composition, there is something else to consider in timelapse photography. As opposed to *conventional* photography or videography, it is not just about considering what it looks like now when you are evaluating a scene for a timelapse. On the contrary, as well as making a photographic assessment of the scene, you also need to look into your *crystal ball*:

“What will the image detail that I have chosen look like in half an hour, an hour, two hours? What is going to change? What will remain constant?”

In time, you will gather experience and learn to tell the difference between good timelapse subjects and those which are not as suitable.

On the other hand, many timelapse enthusiasts forget the photographic/aesthetic aspect in the heat of the moment because they are too busy concentrating on the timelapse aspect (*the crystal ball*). However, this is the most important thing! Just like conventional photography, it is a case of composing the scene and actively taking care of image composition and offset in depth.



Figure 3.3: *Uyuni Train Cemetery, Bolivia.*

Nikon D5300, 18 mm, f/16, 1/15s, ISO 100

A foreground is just as important in timelapse photography as it is in conventional photography. Perhaps even more important, because it often remains static, whereas other aspects of the image change over time. These contrasts are exactly what makes a good timelapse!

To begin with, recording moving clouds is a classic which you should definitely try out, of course. It is the most obvious and simple subject. But you will probably also quickly realize: Moving clouds can become boring fairly quickly.

Wandering shadows, ships arriving or departing, urban traffic, putting up a tent etc. can all be more interesting. They are also subjects which are relatively easy to record.

Let's put the high art of day-to-night, night-to-day or astro-timelapses on the back burner for now - we'll talk about those as soon as you have a good understanding of the basics!

Tip: Finding a subject without a tripod

Before you set up your camera for a timelapse, take a few pictures by hand without a tripod. This gives you better mobility. Take your time and examine these test shots before deciding where and how to position your tripod. If possible, set up the tripod very low to incorporate the ground as the foreground.

Once you have found a suitable image composition, ask yourself the question:

“Would this subject produce an appealing photo? Would I hang it on the wall at home?”

The composition of a timelapse is at least as important as it is in landscape photography. Perhaps even more so! Don't just rely on the timelapse effect!

If your image composition is only average, the timelapse effect alone won't be enough to conjure up a fascinating result!

Once you have selected a subject, the next thing to do is set up the camera. The quality of a finished timelapse film definitely depends on the camera settings that you chose while shooting. Mistakes that are made here will be difficult to correct later, if they can be corrected at all. This is why we are now going to go through the camera settings with a special focus on timelapse photography.

3.2 Camera settings



If you operate your camera in one of the automatic exposure modes (e.g. **A/Av**, **S/Tv** or **P**-mode), small changes to the scene such as highlights, shadows or moving objects can lead to a major change to the exposure settings of the camera.

This isn't usually noticeable in a single photo, and can also be easily corrected during post-processing if necessary. On the other hand, in a timelapse sequence that is being played back at fast speed, the continuous, automatic readjustment of the exposure often creates an undesirable wild *flickering effect*.

The camera also has a tendency to set rather short exposure times in its automatic modes - after all, it assumes that you want to take pictures by hand. Timelapse sequences, on the other hand, benefit greatly from long exposure times, as you will see. You can only

control the exposure time, ISO and aperture individually if you work in **M**-mode.

You usually achieve the best results if you shoot your timelapses in manual **M**-mode and leave the automatic exposure meter out of the equation.

“*Timelapses are recorded in M-mode*”

3.2.2 Auto-focus

The auto-focus should **always be switched off** for timelapse recordings. I cannot think of a single recording situation in timelapse photography where it would make sense to switch on the auto-focus. On the contrary - with the auto-focus switched on the camera would refocus before every picture, and apart from the fact that it would drain the battery, a bird flying by, a car driving past or a pedestrian would change the focus and therefore lead to *unsightly effects* in the finished timelapse.

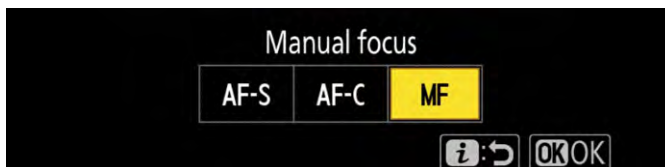


Figure 3.4: Switching off the auto-focus is essential for any timelapse recording.

And even if that doesn't happen: A sequence of several hundred images will probably contain several images where auto-focus does not work.

Then, depending on the camera settings, the camera will either not trigger at all (creating an unsightly interval jump in the timelapse) or it will record an image that is out of focus. Both can ruin the entire sequence.

“*The auto-focus is always switched off during timelapse shooting!*”

You should therefore always bear the following in mind when you are recording a timelapse:

Focus before taking the first shot and then switch off the auto-focus!

3.2.3 Image stabilizer

And, while you're at it: Please switch off the image stabilizer as well! In some cameras, in which the stabilizer is situated in the respective lens, the stabilizer is switched off automatically when you switch off the auto-focus, but it's safer to also switch off the image stabilizer on the camera yourself.



Figure 3.5: The stabilizer must also be switched off, preferably in the camera and also at the lens (if present).

Particularly with cameras in which stabilization is carried out via the sensor, i.e. the stabilizer is inside the camera body (IBIS¹⁷), the stabilizer must be switched off independently of the auto-focus!

Switching off the stabilizer is very important, since an active image stabilizer would lead to movement and shaking¹⁸, and the sequence would almost certainly be no good.

“Image stabilizers of any kind must be switched off during timelapse recording!”

¹⁷ IBIS = “In Body Image Stabilization”

¹⁸ The stabilizer doesn't know that the camera is on a tripod, and will attempt to stabilize something in spite of this, which will then lead to shifting between the shots and shaking during long exposure times.

3.2.4 Aperture

In the past, timelapse photographers have thought a lot about the settings and functionality of the aperture. The reason for this was that the aperture was the biggest cause of the so-called *flickering effect*.

The aperture is a mechanical component which is closed to the set value at the moment of recording in the majority of cameras. However, because of friction effects the aperture does not always shut exactly, but with certain tolerances.

This isn't noticeable in single photos. But it does matter in sequences of images that are taken one after the other. These tolerances are the reason for the dreaded aperture *flickering effect*.

In order to demonstrate how *aperture flickering* occurs, I took a timelapse of the aperture of a camera which is recording a timelapse. I made a video¹⁹ of this which you can look at, and I'm sure you'll be puzzled.

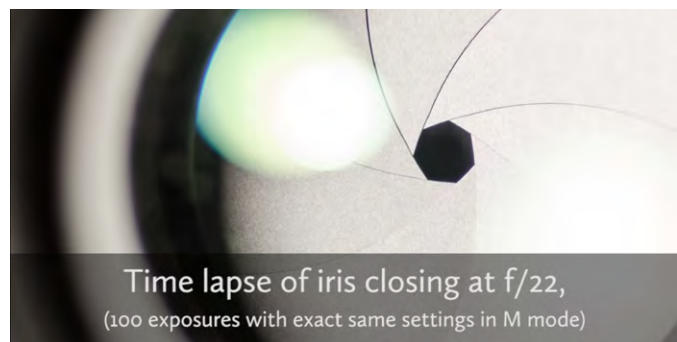


Figure 3.6: Video of aperture flickering occurring.

¹⁹ <https://to.gwegner.de/flicker>

I experimented with many tricks during my first years of timelapse photography in order to control this effect - all more or less riddled with compromises.

The good news is: Nowadays this topic is less of an issue, because *LRTimelapse* has provided *visual deflickering* which can eliminate all traces of aperture flickering perfectly and without losses for several years.

Since then, timelapse photographers don't need to worry about this topic any more, and can work much more creatively and flexibly with the aperture without loss of quality.

Independently of this *flickering effect*, the aperture setting also has other effects on your images which you should certainly be thinking about. Such as the fact that sensor dust is much more visible with a closed aperture than it is with an open aperture. I will explain this in the following box.

“*You can now make flexible use of your aperture, but don't close it too much in order to avoid sensor spots!*”

Attention: Sensor spots!

Unfortunately, the flexibility that you have when making aperture settings also has its limits. If you close the aperture too much, dirt on your sensor will appear as unsightly spots in your timelapse. You should therefore avoid working with very small aperture settings ($f/11$, $f/16$, $f/22$).

Although such spots are often easy to remove in individual images by means of *stamping* during picture editing, they are often almost impossible to remove in timelapse sequences consisting of hundreds of pictures, since the stamping usually becomes clearly visible when the timelapse is played back! Try doing it by yourself, if you have such a sequence.

You should also think about cleaning your camera sensor at regular intervals and avoid using small aperture settings.

Figure 3.7: Dirt on the sensor can become visible with a small aperture setting, and can render the timelapse unusable.

Nikon D600, 24mm, $f/11$, 1/100, ISO 100



3.2.5 Exposure time

The exposure time is a vital control variable for timelapse photographers, since it has a decisive influence on the look of the timelapse.

As already explained in [section 2.8 – Neutral density filters \(page 62 ff\)](#), long exposure times are one of the most important success factors for aesthetic timelapses.

Now you might be thinking:

“Everything goes so fast when a timelapse is played back - after all we are talking about 24, 25, 30 images a second - shouldn't the exposure time be irrelevant?”

As a matter of fact, no, it is exactly the opposite: The exposure time is a very important aesthetic aspect of timelapse photography. Particularly when rapid movements are made, there is a clear difference between long and short exposure times:

“Recordings with long exposure times have a much more natural and harmonious effect.”

By the way:

Relatively long exposure times are also used in normal filming, as explained in the following box.

“To drag the shutter” or, what you can learn from professional film-makers

Anyone who has worked with professional filming will know that camera people try to keep the exposure times at 1/40th or 1/50th of a second and not significantly less. This is called *dragging the shutter*. Why do they do that?

24 images per second are normally displayed in a cinema film. The longest exposure time that the person behind the camera can therefore use when filming is 1/24th of a second. With longer times, they wouldn't be able to fit 24 images into a second any more.

In spite of this, they have to choose between using an exposure time of exactly 1/24 of a second or significantly less. As a rule, they won't choose an extremely short exposure time, but will use about half of the maximum exposure time, the so-called *180-degree* shutter time.

Let's take a look at both extreme scenarios. In the first example, we would use an exposure time of 1/240th, i.e. one tenth of 1/24th.

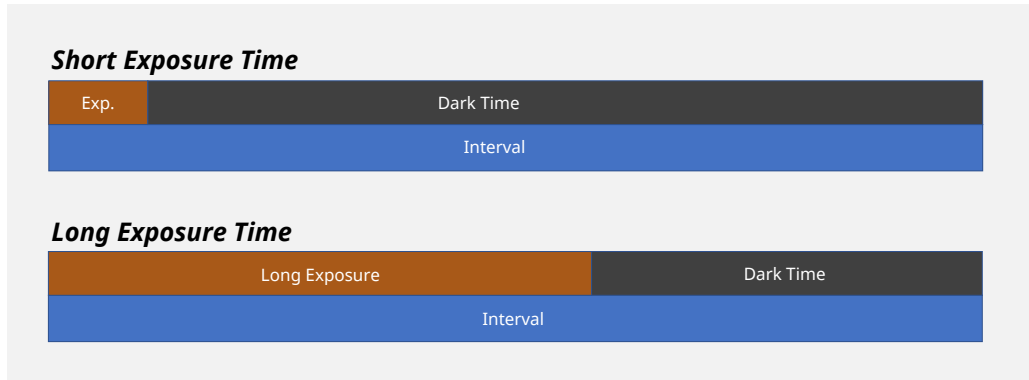
We would not expose for 9/10ths of the duration of an image, and the actual duration for which the shutter would be open would be very short. The film would *miss* the majority of the movement.

In the second example, we would have an exposure time of 1/25th of a second, just a small amount less than the 1/24th exposure time. The film would record the majority of the movement, but a certain motion blur would occur.

Movie enthusiasts swear by the third version, the so-called *180-degree shutter*. According to the *180-degree shutter rule*, you'll get the best looking film with an exposure time of approx. $1/(\text{Frame Rate} \times 2)$. For film recordings that would be an exposure time of approx 1/48th of a second. This will look *excellent* at a playback speed of 24 *fps*.

The rule of thumb is that the exposure time shouldn't be less than half the duration of an image. Longer exposure will mean more motion blur, and shorter exposure results in a so-called *staccato effect*. The film will be “jerky”.

Back to our timelapses. What does this information mean to us?



Timelapse photographers are also faced with the question of how long the exposure time should be compared to the timelapse interval (which we will come to in [section 3.3.1 – The interval \(page 99 ff\)](#)). However, in comparison to film the recording interval is much longer in our case, and we therefore have even greater freedom in the visual design of our result with intelligent exposure time selection.

Figure 3.8: Short exposure time vs. long exposure time with the same interval.

The only technical restriction here is that the chosen exposure time must fit into the interval, i.e. the exposure time must be shorter than the interval plus a certain **minimum dark time** which the camera needs to store the photo and be ready to record again, among other things.

The *dark time* is therefore kind of the opposite of the exposure time (i.e. interval minus exposure time) and therefore the time during which the camera isn't recording anything.

According to the *180-degree shutter rule*, we would choose an exposure time of 2 seconds with a recording interval of 4 seconds (resulting in a dark time of 2 seconds).

Note about the 180° “Rule”

The *180-degree shutter rule* is only a guideline, and is not written in stone. It's more a case of the following principle:

Long exposure times look more aesthetic than short ones. In practice, I frequently use much longer times than the *180-degree rule* would recommend in order to smooth out movements in my timelapses more effectively.

That means that we often take *shutter dragging* to the limit in timelapse recordings, and realize real long-term exposures.

And it's usually also necessary: Because of the relatively long intervals, you could get significant changes to the subject from one shot to the next. This particularly applies to movements in water, or people moving in front of the camera. In other words, to all movements that are too fast for a timelapse.

You can see an extreme example in [Figure 3.9](#). In this case the camera is very close to the water, and the appearance of the fast-moving water changes between one shot and the next. The waves are in different positions. If you now play back 24, 25 or 30 of such rapidly changing images per second, the result will have a very restless effect.



On the right, I have taken the same shot with long exposure times, which makes the water look much calmer. In spite of this, shooting so close to water is not ideal, and as well as using long exposure times, my advice would be to set up far enough away from water surfaces to prevent the shot from being dominated by the wave movements.

Long exposure times also help with more subtle subjects. Birds and insects, which usually appear as black dots in individual images, are blurred and usually disappear completely from timelapses - avoiding a great deal of stamping work during post-editing.

Figure 3.9: *Two consecutive frames with a short exposure time, with longer exposure time on the right. The difference between the images with shorter exposure times is much greater than with longer exposure times. Timelapses with longer exposure times therefore have a much calmer effect.*



Figure 3.10: Stationary elements are depicted sharply with long exposure times, and moving elements are blurred.

Nikon D750, 24mm, f/2, 1.6s, ISO 320

People walking in front of the camera become blurred if you work with long exposure times. This is a very important point, particularly if you are recording in cities! The long exposure times create an interesting motion blur, from which shots like this benefit considerably. The fact that faces are blurred is a welcome side effect which is also relevant for data protection reasons.

Everything that isn't moving is depicted sharply with long exposure times, and everything that is moving is blurred and therefore less obtrusive in the timelapse.



The following applies to timelapses much more than it does to films: Short exposure times (and the associated long *dark times*) lead to staccato, restless and less aesthetic timelapse recordings and must therefore be avoided.

Figure 3.11: The people who are only visible as hazy shadows in the picture would be visible as unsightly, black silhouettes with a shorter exposure time, and would render the timelapse almost unusable. They scurry by almost invisibly.

Nikon D750, 24 mm, f/2, 1.6s, ISO 320

“Professional looking timelapse recordings require long exposure times!

THE ND FILTER IS THE ANSWER!

It is almost impossible have exposure times that last for seconds during the day without some additional help. This is where the ND filter comes into play:

It restricts the amount of light falling onto the sensor of the camera, and lets you to take pictures with much longer exposure times without changing the other camera settings.



Don't forget: Close the viewfinder!

Always remember to close the viewfinder when you are working with an ND filter, as described in the [section - Close the viewfinder \(page 67 ff\)](#)

A 1000x ND filter with a designation of ND 3.0 (10 to the power of 3 = 1,000) *represents* 10 f-stops, for example. In this way, you can extend the exposure time of your recording by a factor of 1,000.

How these designations come about and exactly how to work properly with the ND filter and the camera settings to use is explained in [section 3.3.2 - Working with the neutral density filter \(page 108 ff\)](#).

Gunther Wegner

Timelapse Photography

From choosing the right equipment, creative subject selection, finding the correct camera settings to editing and output - this book covers all topics which will interest timelapse photographers. The information that is provided here will allow the reader to make perfect recordings which are up there with the best.

The individual techniques are explained gradually, step by step.

Gunther Wegner is one of the pioneers and a globally recognized timelapse expert. He is also the developer of *LRTimelapse*, the leading software for timelapse photographers. In this 480-page book, he shares the in-depth knowledge which he has acquired over 10 years of practical experience. Of course, he also deals with special challenges such as perfect day/night transitions (the *Holy Grail*), the recording of fascinating astronomical landscape timelapses of the Milky Way and the Polar Lights, and timelapses with a moving camera (*motion control*).

Target group

Timelapse photography should appeal to all who enjoy photography and would like to expand their photographic horizons with new techniques.

The book mainly deals with system cameras (DSLR/DSLM). *Adobe Lightroom Classic* and *LRTimelapse* are used for processing.

Leser-Feedback

"The standard reference for existing and would-be timelapse photographers!"

