

# HD Demystified

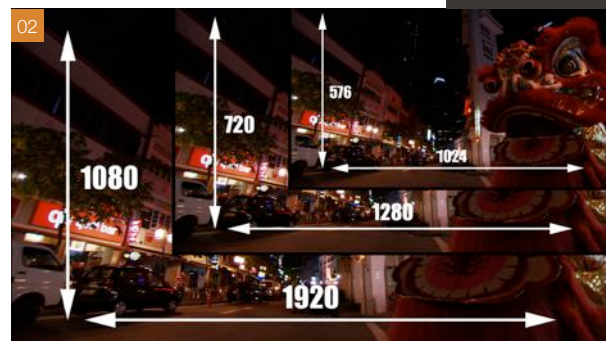
Working in high definition (HD) is a mystery to many, and industry professionals are hedging their bets on this misunderstood format. Cinematographer Brad Dillon and Editor Rob Tinworth set out to debunk the myths.

**There's no doubt HD is here to stay.** Integrating it into our work is essential and we want to be among the documentary pioneers known for doing HD well in Asia. We realised we needed to make HD clearer for the benefit of producers and directors looking to move forward with the technology.

Presently, there's much confusion over the terminology that's being bandied around, and views differ on frame rates and types of formats to define what's HD and what isn't. However, many techniques



01-02: Frame comparisons are shown here; between interlaced and progressive images (1), and various shooting formats (2).



you need to shoot and edit with a 25p or 50i frame rate. If you're working for a NTSC country like US, Japan or Philippines, you need to shoot and edit at 29.97p or 59.94i.

**Rob:** The important thing to note for your edit is that the days of fronting up in an edit suite with a PAL digibeta tape and being pretty sure that it will playback in the decks are gone. Before shooting begins, the editor or post-production house should confirm that they can playback your format.

The other likely problem is how SD archive material is incorporated into your HD documentary. An often-used technique is to create a split-screen effect, so that the SD material plays in a smaller box within the larger HD frame. The alternative is to 'up-res' your SD material; a process that blows up archive shots and interpolates extra information.

### Myth: HD is like film

It's a phrase many have heard before and have probably read a lot about. Everyone's searching for the 'film look' from HD. It's kept film manufacturers working hard to come up with reasons as to why people should keep shooting on the considerably more expensive 16mm or 35mm film. HD cameramen are deep in conversation with colourists, and are working hard on their internal camera set-ups to get them as close as possible to the gamma curves of desired film stocks. HD is definitely bridging the gap between film and video.

But it's also possible to generate a video look from a HD camera, though it may not be desirable if you're trying to justify a larger budget to your client. The main factor determining the look is whether you are shooting 'interlaced' or 'progressive'.

**Brad:** Until recently, SD cameras shot in an interlaced mode, and it has been described as having a very electronic look; something obviously shot with a video camera. The interlaced format indicates the number of fields scanned per second. With PAL, it's 50 fields, and with NTSC it's 60 fields. Several high-definition cameras will allow you to shoot in a progressive mode. The progressive mode is where the 'film look' comes into play. Ever since I began shooting HD, I have never had a job that wasn't required to be shot 'progressive'.

There have been some elements within particular shoots that have had to be shot 'interlaced', but by and large, 'progressive' is the way to go.

If you are planning a HD job, remember to book equipment and crew that facilitate the progressive mode. From a cameraman's perspective, it is more challenging on the eye and demands more concentration to shoot 'progressive' rather than 'interlaced', but the results are much more satisfying.

There are times when shooting 'interlaced' is necessary. For instance, if you're looking to create slow-motion images in the edit, the interlaced mode records more of the motion information. We have successfully slowed material down to 25% in the interlaced mode. It produces clear and beautiful slow-motion images when viewed on a professional big-screen HD monitor. There are cameras that can shoot 60 or more progressive frames per second just for slow-motion.

I have also used 'interlaced' when shooting helicopter aeriels. Focus with HD is extremely critical and it's difficult to pick when you are working long lens with the subject and camera in motion.

During a shoot, you may find yourself switching between progressive and interlaced modes, or sometimes changing the frame rate. It is recommended to dedicate separate tapes to each mode/frame rate and label the tapes clearly with all useful information.

**Rob:** The decision to shoot 'interlaced' or 'progressive' makes little difference to the actual editing process. You can place interlaced material next to progressive material on the time-line and it will play back without rendering. But the pictures will look different, especially when there is movement within the frame, or if the shot is panning. It is possible to de-interlace material to make it match, but it does not look as good as the 'progressive'. You need to think carefully about the look that you are trying to achieve. Otherwise, confusion will arise.

It happened on a recent documentary. The team (not Brad!) changed the frame rate from 29.97p to 23.98p halfway through the shoot for a 'film look'. Add the fact that we had material from another source, and we were working with frame rates of 24, 25 and 30 in both interlaced and progressive modes. It was technically possible, but it resulted in a messy combination of looks that makes for a jarring viewing experience.

### Myth: Working with HD is slow

**Brad:** I've been in many situations while working on HD documentaries where you have to react to things happening spontaneously in front of the lens. Quite often, that is the nature of the job.

When you have a packed schedule, requiring varied and interesting pictures, speed is essential. This is common with all formats. With HD, it is possible to work well and at pace. Given the opportunity, take extra care to make sure your HD footages look every bit as good as they should. Pay attention to all the little details that HD picks up.

However, on-location shoots do allow you to slow down a little with HD and pay extra attention to details.

**Rob:** The first consideration when off-line editing HD is whether you want to be editing in SD or HD. There are pros and cons to each. On my last project, the production company dropped almost 200 40-minute tapes on my desk (for a one-

<http://www.1021.tv/hd.html>

### Myth: HD is universal

The great dream with HD was that one format would emerge to replace PAL, NTSC and SECAM. The unfortunate truth is that we have ended up with even more video formats. However, in the broadcast world, two main standards have emerged - '720' and '1080'. The numbers refer to frame sizes, but for now, if you shoot 1080 images, then you're covered for all HD broadcast markets.

**Brad:** With no universal HD format, the first question you need to ask is: "What frame rate do I want to work in?" Depending on which market you are working for, you will have a certain frame rate to adhere to. So if you're working for global PAL markets, which form about 80% of the world's broadcasters, including UK, Australia, China, Singapore, Hong Kong and India,



03-05: Precise lighting of the subject and screen become more critical when chroma-keying with HD.

hour documentary). Depending on the codec, even compressed HD takes up to four times more drive space than SD. The decision was taken to off-line in SD. This allowed the advantage of being able to share the media with the director and production team, so that when the director was abroad, I was able to give him the documentary media on a small firewire drive. This allowed him to see the rushes and re-link my time-lines. Editing in SD keeps drive space low and allows flexibility. The down side is that the pictures don't have the same impact when clients sit in on the edit.

For the *Lion Dance* project, we edited in HD. This took us no longer than an SD edit as the suite was able to work with HD in real-time (which means that you do not need to render effects or play-outs).

Not every suite will work with HD in real-time. Before you begin the edit, it's best to discuss with the editor on the ideal approach for your project. There are many different workflows. Tailoring one to your needs will save time and production dollars.

#### Myth: HDV cuts with HD

**Brad:** HDV, like mini DVcam, does have its place in the work we do. Sometimes, it may be an advantage to have a small and unassuming camera rather than rolling up with the larger HD camera. For example, there may be situations where you want to rig a camera to a bicycle or a skydiver. Getting these pictures necessitates using a smaller camera.

However, many are tempted to use HDV as a cheap second unit. This is not a good idea. HDV cannot achieve the same quality as the larger cameras because the lens usually disappoints, and the format is highly compressed to fit HD content onto mini-DV tapes. There is a considerable budget difference between HDV and HD cameras for a good reason.

**Rob:** Intercutting HDV with HD is similar to intercutting DVCAM with DigiBeta. Colour and details will never match. With HDV, you have the disadvantage of heavily compressed material that results in a lot of grain for uniform colours like the sky, for example. Additional compositing or effects work will make these artefacts even more noticeable.

One thing that needs to be clarified before shooting begins is the amount of non-HD material allowed by broadcasters. Documentary deliverables often allow only a small percentage of SD footage – which comprise mostly archive materials.

#### Myth: Working with HD is a breeze

**Brad:** Focusing can be tricky in HD. If you're off by just a bit, your footage will appear as though you've missed it by a mile. I set out to film with as little depth of field as possible because that would create the effect of having pictures 'jump out of the screen', and focus viewer attention on important elements in the frame. This method of shooting means focusing is even more critical.

When talents are involved, HD can be



HD decks (above) are designed to look and feel like their SD counterparts

cruel. That's where attention to make-up pays so that they won't look bad. My practice is to shoot talents with a slight pro-mist filter to soften signs of age, bad skin or even tiredness. Other considerations are lighting and exposure. HD cameras have a large tonal range of nine exposure stops and incredible resolution. Therefore, HD sees a lot more than what you perceive when looking into a viewfinder or at a substandard monitor. HD picks up every last detail, even those you don't want it to, so take a few minutes before the shoot to adjust your viewfinder's contrast/ brightness/ peaking and get it to look as clear and clean as possible.

Like all video cameras, you still need to watch out for overexposure by controlling highlights. HD can handle more than SD, but once footage goes to total white, there's no bringing it back, not even with a quality colourist. Care has to be taken as well in not

overexposing the talent as HD cameras react poorly to overexposed skin tones and facial features.

**Rob:** With the number of HD codecs, there are now even more workflows. Mainly, they are not too different from SD. However, with the plethora of frame rates and formats, careful coordination is required to avoid confusion. On-line and off-line facilities should know what each is doing, and your audio studio should be in the loop as well. Talking to everyone involved in pre-production will ensure they all work in the same codecs and frame rates.

#### Myth: HD gear is big

**Brad:** The set-up for my F900 HDCAM kit is about the same size as my DVW-709WSP DigiBeta kit when fully built with either telephoto or wide-angle lens, chrosziel matte box, lens filters and camera batteries. The HD rig is only slightly longer and weighs about 5kg more than the Digi with the additional brains inside the shell and the down converter. Even so, the weight displacement is evenly spread out and makes for a comfortable feel even when it's on the shoulder. The rest of my kit is the same as that for the Digi SD kit. I've got the same heavy-duty Miller Arrow 50 tripod to provide good stable long-lens pictures. The HDCAM also works fine with the Steadicam, Mini Jib and Dolly systems that I use for SD shoots.

**Rob:** In many cases, HD decks have been designed to look and feel exactly like the SD gear. This means you will be familiar with deck functions. It also means you have on hand a string of portable solutions for on-location edits.

On the *Lion Dance* shoot, I hooked up my JH-3 to a standard laptop so that we could see the immediate results of the key. This convenient set-up provides a low-cost environment for directors or producers to log and digitise HD tapes. Few people realise that you can plug a HD deck into a laptop with no additional hardware.

#### Myth: HDCAM doesn't key

HD contains a lot of information. Engineers have come up with ways to compress information without anybody noticing it in the images seen on tape. With HDCAM, it's done by compressing colour. This has led to concerns that it is impossible to key with HDCAM.

**Brad:** When chroma keying with HD, I found that lighting accuracy for the subject and the blue/green screen creates a good clean key off it.

When shooting blue screen elements

on *Lion Dance*, we ended up re-shooting the keying element because we could not clearly key each area of the talent's costume. Second time around, I pumped more light into the screen, fully opened a low barndoor backlight and set it up to lift the light level under the arms of the talent's costume as she was waving her hands. The result was a great key.

## Get shooting...

As people start to appreciate the quality of well-shot edited and produced HD images, we see pre-production discussions leaning toward the possibility of projects being shot in HD. The advantages are numerous: future proofing, bigger markets, and the look on your clients' faces when they see how great the pictures look.

HD can seem complicated, but it doesn't have to be intimidating. Good planning usually sets the right foundation. Starting well in advance of the production commencement date pays off for everyone involved – from the shooting and post-production to the delivery and financial health of the production account.

HD has more than four times the resolution of SD. Get it wrong, and it's really wrong. But when it's done right, it's absolutely stunning. ♦

#### Brad Dillon

Award-winning Australian cinematographer Brad Dillon is based in Singapore and works across a range of genres on both HD and SD projects for international productions.

Cinematographer and Director of *Most Wanted Pictures*, Dillon invested in HD in 2005. After extensive research and feedback from global industry professionals who worked with HD, Dillon has chosen the F900 HDCAM to meet the needs of international broadcasters in PAL and NTSC markets. The camera has the ability to shoot all available frame rates in full HD 1080 resolution.

#### Rob Tinworth

Rob Tinworth is the owner and editor of ten:one, a boutique post-production house in Singapore. He has won several awards for his documentary and feature work.

To contact Dillon and Tinworth for further information, please refer to [www.1021.tv](http://www.1021.tv) for contact details.