

HIGH DEFINITION BUDGETS AND WORKING PRACTICES

by

Director of Photography

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A working paper

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HD production and post production is evolving rapidly. This guide is not exhaustive but simply my view based on my experience.

The best solution for your production will have more to do with the experience and capabilities of your production team than technical considerations of the format.

Working on film has evolved over 100 years. There are many good habits and a few archaic practices. Video has been around for 50 years and in Europe we have been shooting single camera dramas on video for 10 years.

This document is based on my 20 years working on video, 5 years on digital cameras and 18 months experience with the Sony f900 camera, shooting many projects, including two HD features.

*any comments regarding this document or
your own HD production experiences can be sent to mike@hd24.com*

More details regarding High Definition can be found at my independent website

www.hd24.com

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An outline of HD costs

Costs you avoid when shooting HD

Film stock.

Film processing.

Transportation costs of film stock to lab, lab to telecine and telecine to studio.

Telecine transfer.

Dailies viewing equipment and personnel.

Provision of time for the DP and director to watch dailies.

Costs of special handling to avoid airport xrays of raw stock and unprocessed footage.

Higher neg insurance premiums.

Neg cleaning.

Higher shipping charges of heavy film rushes.

Specific costs you avoid when editing HD

Cost of synching rushes.

Delays to production in waiting for rushes to be synced in the offline.

Cost of telecine of finished film to video .

Cost of telecine for digital intermediate.

Cost of internegs for special effects work.

Additional Savings when shooting at 25p instead of 24p

For European productions use of readily available offline suites.

Speedier online as some standard def equipment can be used.

Overall greater confidence because you are working with a commonly used frame rate and timecode. In short, fewer mistakes than working on 24p. Basically TV rates rather than feature rates.

Larger range of cameras and vtrs that are 25p only capable.

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shooting with HD

Sets can be struck immediately after a successful take. No waiting for the neg processing

No significant stock cost implications of rolling camera for additional takes or versions.

Fine tuning of lighting is faster if both gaffer and DP can see a reliable HD monitor.

Large HD monitor in the studio can be used by design team to test colour themes, paints and fabrics. This is done "live" where different lighting setups and filters can be explored quickly and decisively.

Time saved when camera is kept rolling for a retake. Also, the 50 minute tapes reduce the downtime caused by frequent reloading. Don't shout "cut" shout reset!

In-sync rushes immediately available for replay, down conversion or distribution.

ImmEDIATE offline editing at studio or on location is possible.

Live, reliable compositing available.

Playback tracks can be recorded on channel 3 or 4 and so synchronised with rushes

Feasible to use cabled audio to camera and so avoid use of clapper (except for steadycam). The clapper is replaced by continuity person taking notes of timecode via radio link.

Timecode lists of scenes reliably and quickly identify takes in the offline or for when the director views vhs rushes. The timecode stays with the original picture forever.

For low budget or second unit work two people can carry a lightweight tripod, camera, two zooms and a days supply of batteries and tapes. For second unit work, variations of a shot can be recorded without much, if any, cost penalty. This offers the editor greater choice.

The camera can change between pre programmed "looks" within a minute (similar to changing film stock).

A specific colour in a scene can be selected and altered in hue or saturation without affecting any other colour. This frees the DP and director to create an atmosphere without having to visualise a post production colour grade.

Same depth of field as 35mm requires much less light. High depth of field under low light makes using ambient light a possibility (but not necessarily always desirable!).

Virtually fool proof recording. Video recording is very reliable and stable. The recording on metal tape is very robust and withstands xrays metal detectors and extremes of temperatures. A digital master ready for transfer to 35mm film DVD or any TV standard.

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Availability of all takes.

Most simple effects can be explored in the quite of an offline and conformed in the online.
This includes some moco moves and split screen.
Low cost problem solving ie removal of microphone or distracting background elements, like reflections or matt box vignetting.

The use of split screen is incredibly easy as long as the camera is absolutely locked off.
The super stable, pixel perfect image suffers no gate weave or processing vagaries that can make split screen a fiddle in film.

Low cost secondary grading ie for uncontrolled colour spill for example, or additional control of exterior scenes as in "O Brother where art thou?"

Speed changes. ie fitting the length of a timelapse sequence to a piece of music or narration.

A offline that is generally closer to the finished film, even including basic credits.

Digital projection offers a quick way to evaluate scenes on a big screen at any point in the edit.

HD frame grabs can be distributed electronically for publicity or continuity purposes.

If your project is for TV or if you are unsure your feature will make distribution then there is no need to transfer to film until necessary

Slight frame resizes or stretches are simple.

For very low budget films it is possible to record up to 4 tracks of audio on camera and track lay in the offline, leaving only a basic mix for the audio dub.

Reduced archive space. Your feature film rushes in a carry-on sized case.

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The *not so good* aspects of shooting HD

Soundrecordists are reluctant to rely on the camera recording sound.(See separate notes).

Using the 1st generation HD lenses, the resolution of wide shots is lower than for mid or tight shots.

The f900 camera is a little noisy if a supplementary fan is not installed.

The viewfinder is black and white and lower resolution than what is being recorded.

Maximum frame rate of full quality HD is 30fps. Lower quality HD can record 60fps.

Long duration exposures are possible on the Panasonic HD camera only.

The large 24 inchHD monitor is bulky and heavy.

The people whose opinions you have trusted over the years may not fully understand HD.

Companies who have significant investments in telecine machines and bespoke film equipment may have biased opinions about some aspects of HD.

Bluescreen keying works on HD but requires a little more time to finesse if the project is for theatrical release

Colour depth and resolution is “different” than film.

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The look, the audience

HD is not film, its video. However when it is transferred to film for theatrical release it looks more like film than it does on a HD monitor. In fact it looks so much like film that the average cinema patron cannot tell the difference.

Even some professionals can't spot the difference.

Would you believe that most people can't tell the difference between digital projection and film projection, let alone HD (transferred to film) and film.

In a Glasgow cinema "Toy Story" was projected digitally for months. Not one patron asked any questions regarding the projection for the entire time it was at the theatre. This is not uncommon. In Italy a cinema chain conducted a ad hoc survey of patrons. 80% maintained that they preferred digital projection.

At a masterclass at IBC, I was screening digitally projected HDcam as well as HD transferred to 35mm film. The audience became confused with what they were seeing as I had assumed that they would notice the difference between a (old) digital projector and 35mm film.

At the end of the day the audience cares about the story, script, performances and visual interpretation. For a variety of projects, but not all, HD can enhance the script more cost effectively than film.

Scores of features have already been shot on HD. Hundreds of HD cameras have been built by companies who have made thousands of professional camcorders. Thousands of HD tapes have been shot. HD films have won awards for best cinematography and best film. Spy Kids II was shot on HD without the \$100M ILM safety net. It is a box office hit with little fanfare that it was shot on HD.

Twenty years from now you will be more disappointed by the things you didn't do than by the ones you did do. So throw off the bowlines. Sail away from the safe harbour. Catch the trade winds in your sails. Explore. Dream. Discover.

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Shooting at 25p instead of 24p in PAL countries.

Why do we shoot 24p anyway?

24 fps was the minimum frame rate to make sound work and reduces the strobing that was rife in the early days of the silent movies. In fact each frame is presented twice in the theatre by the use of a spinning disk in the film projector, so in the cinema you are actually usually looking at 48 fps.

What normally happens when a feature is shot at 24fps.

The faster the frame rate the less strobing. (Future Digital projection standards may be 48 or 60 frames per second) Perhaps 24fps has had its day?

24 fps is converted to the NTSC television standard of 30 fps by repeating some frames to make up to 30fps. This has been happening for years and is called 3/2 pulldown. It introduces a particular kind of strobing that NTSC viewers have become accustomed.

So what usually happens to your 24fps feature film when it is converted to PAL television standard for the viewers in the rest of the world to see?

It is transferred to video by playing the telecine film projector at 25fps. So it speeds everything up by 4%. So a PAL version of *Titanic* is shorter in duration than the NTSC version. The audio pitch is corrected to eliminate the slightly higher pitch of playing a sound track faster. Some telemovies don't even bother doing the audio pitch change.

What normally happens when a feature is shot at 25fps?

You simply project the 25 frames at 24 per second, with an audio pitch correction. No one will notice. Did you ever notice anything wrong with any of the hundreds of movies all shot at 24p that you have seen on television at 25fps?

No audio correction is necessary for the PAL video distribution.

When HD came along Sony were keen to present the camera as a replacement to film so they have promoted 24p as a frame rate. Avid are keener for customers to buy new 24p software than use existing PAL software. Neither Sony or Avid are promoting 25p origination in PAL countries for these reasons. Yet at a recent forum at the British Film institute a panel representing Sony and Panavision agreed 25p was a more appropriate frame rate to shoot in PAL countries.

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Shooting at 25p instead of 24p in PAL countries.

Advantages

Virtually any offline suite can be used in any PAL country.

Your favourite editor can begin work immediately without needing to do the 24p course.

Online suites can use standard definition equipment quickly without troublesome and time consuming conversions between 24 and 25p.

The Timecode is rock solid. There is no conversion to 24p timecode which has been a little unreliable.

Any separate audio recording timecode matches camera. (some recorders can't record 24 fps timecode)

Down conversions to digibeta and VHS are frame accurate and can be viewed and worked on on any PAL equipment.

Hundreds of hours of TV drama is shot and edited at 25p.

Simply transfer all of the 25fps of your movie to film.
When transferring the audio to film the lab will make a .7 semitone pitch change.

HD is video not film. Video is not designed to be shot, viewed or edited at a frame rate that is not a multiple of the local mains power frequency.

My HD reel shot at 25p and projected at 24p has been shown to thousands of people around the world who have been looking at it with a *very* critical eye. Not one has raised an issue of sound pitch or "off speed" effects.

If you need to have a 24p production for political reasons fine, with a little effort it will work. If you are on a low budget consider 25p for the foreseeable future.

NOTE

If you are editing in a NTSC country set the camera frame rate to 23.98
If you must shoot 24 and are editing in a PAL country set the camera frame rate to 24p

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HD Sound: the video perspective for Low Budget Features

My view at the moment is that for low budget work, (unless there is lots of steady cam) single system will enhance the overall production value by the time and money saved on location and in post. (This is the similar way of working that is used throughout Europe on dramas).

For higher budget work, the traditional film style system is being made to work-sometimes without any consideration for the fact that the camera is not a film camera!

The following comments make sense at the moment for budgets below \$2 million. These ideas should be discussed with crew and your post house before they are under contract .

Single system sound is the term used when the camera is used to record the sound.

As I wrote earlier, HD is hardly a well thought out system to shoot drama. It has evolved from a news camera with some research coming from consumer products. But it does work.

Some departments are learning how to make the most of the awkward system without it affecting their investment in existing equipment or lowering the standards of their craft. No one wants to screw up using new technology or go out of business by promoting equipment that could make their existing equipment redundant.

There are few if any benefits to a sound recordist in recording single system sound on HD. Sometimes it is easier, but often it is more difficult. The benefits are to the post production department, not the sound recordist.

Sound recordists frequently replay takes privately. They do this to double check the recording quality and to evaluate and plan their current strategy of mic placement and mic type. Understandably a sound recordist is reluctant to have to rely on the camera crew to keep replaying for him. One solution is for the recordist to both hardwire audio to the camera as well as record on a DAT. He can then use the DAT to replay takes without bothering the camera crew.

If the producer wishes, these tapes could be used as a backup. You would need to decide if a clapper is to be used on every take...but it is very rare indeed for an experienced video crew to screw up a on-camera audio recording.

Unquestionably sound and camera need to communicate more on HD than on film. I try and shoot a test recording whenever the camera has been reset and cables plugged and unplugged. Sometimes, just before we roll, the sound recordist will send tone down the line into the camera and ask the boom operator, camera operator/camera assistant or focus puller where the level is on the meter. When using a video camera the camera department have to have a minute by minute relationship with the sound recordist, rather than a day by day exchange as is often the case on film.

It can't be ignored by the camera dept. that the sound is being recorded on camera.

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Having access the sound on the camera is a bonus for the camera operator or DP. If he/she needs to find a new audio cue for a pan or tilt, he can replay the tape and listen on head phones with a minimum of fuss. However, the operator must be trusted to re-cue the tape to prevent recording over a take. Hopefully it will be impossible to accidentally record over a take on future cameras.

Synchronised instant replay, without the encumbrance of video assist is a cost saving for low budget productions.

What better way for the sound recordist to control the noisy camera crew on set for a wild track, than needing them and the camera to record the sound.!

The single system method is very reliable if the camera department is familiar with caring for cables. I would recommend that one of the camera assistants should have video experience.

A DAT recorder is still needed for wild tracks or steadycam, if you do not want to trust a radio link.

The sound recordist needs a return feed to guarantee that the audio is properly recorded. If steady cam is being used the sound recordist should be given the chance to check the audio recording on camera. It is likely that the DP will want to playback the steady cam shot anyway on a HD monitor.

Forget fuzzy radio link pictures from a steadycam, with HD the steadycam replay is full quality. What better way to check a steadycam shot for camera shadows (ect).

If you are using radio mics on one or two artists why not have duplicate receivers on camera? The camera is usually closer to the artists than the mixer. If there *is* clothing rustle or wind pops it will be heard by the sound recordist on the duplicate receiver and a retake can be called. If it's clean going to the dat then the sound recordist can be assured that the dat will save the day *if* there is any interference with the on-camera receivers. If it is a fantastic performance the production has the benefit of two sets of receivers working at capturing the signal. This is a benefit.

Reconsider the use of the clapper board. If you are recording sound on camera do you really need it?

The continuity person is well placed to take notes of the time code, provided if he/she is given a radio link time code reader. An editor will find a take more easily by referring to time code. Time code will be superimposed onto the vhs transfers as well. One type of time code (VITC) stays with the shot all the way through the edit, to the master.

A clapper will be needed for steady cam shots. One option is to rerecord the sound from the dat onto the end of the take, so that it is easily available in the off line and online if the radio linked sound breaks up. It is also available on the vhs rushes.

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Audio Summery for producers of Low Budget Features

Record the sound by cable into camera wherever possible. The quality of the recording on HDcam is higher than the DAT.

If it is impractical to use a cable, use a radio link and record on dat as a backup.

Make sure that the sound recordist provides or is provided with a loom or a snake. This is a group of cables formed into an umbilical. It is standard procedure in the UK on documentaries and enables fast connection of multiple audio signals. There should be backup looms.

Ensure that the sound recordist has a return audio signal from the camera for live monitoring and replay. This is a high quality return signal available from a 5 pin xlr socket on the camera and should be faciliated into the snake or loom.

If there is significant steady cam work ask the rental facility to provide a easy means of attaching two radio mics to the camera.

If the the sound recordist is new to video, he should have a prep day or two with the camera in advance of the shoot.

Consider having a vtr playback machine on site. This can be used to make transfers and can be used as a backup recorder if you are studio based. Then you may consider if you need a backup camera .

Avtr can also be used to make a duplicate recording in a studio environment. The simple way of achieving this is to use a HDSDI adapter on the camera. The connection from camera to vtr is just one cable. Fiber optic links are becomming available that carry video audio camera control and talkback in one thin battle grade cable.

Single system sound enables an editor to get to work immediately. In the case of low budget work this can be a very powerful means on focussing the budget on shooting only what is required. If he production has script, location or continuity problems a on- site editor can quickly edit a scene so a novice director or producer can judge if reshoot or changes to plans are viable. This is one of the many hidden benefits of shooting a low budget feature on HD.

If you are shooting seperate sound and recording pictures at 24p or 23.98p there are complicated issues regarding timecode. Seek eye to eye local advice.