Well-planned barns and pastures, and innovative use of high- and low-tech gadgets can make life on the farm much easier. If you have any helpful "husbandry hints," *Alpacas Magazine* would like to hear from you.

Husbandry Hints

Bill & Sherri Duey

Closed-Circuit TV Monitoring Systems for Alpaca Barns

Close monitoring of your alpaca herd can be critical. Modern technology now provides the tools you need to watch over your alpacas from home, work, or while traveling.

Electronic security camera monitoring systems are very affordable, and most systems have excellent quality features. A complete single-camera system can be purchased for less than $300. You can even purchase a system for less than $500 that will allow you to monitor your alpacas from a remote site via the Internet.

Closed-circuit television camera systems (CCTV) are designed to monitor an area visually and audibly. They can be black-and-white, color, or even infrared for nighttime monitoring.

Alpaca ranchers have a particular need to check in on their alpacas during pre-birthing, birthing, and post-birthing phases. With a camera system, ranchers can watch what is going on without stressing the expectant dam.

You may find a CCTV system can help you monitor other alpaca herd health issues, as well. Keep a close eye on animals in "sick bay," or watch your herd during hot or cold weather extremes. With the proper equipment and installation, you can even monitor your alpacas from anywhere in the world via the Internet. Yes, you can be away from the ranch and still check on your alpacas.

CCTV systems can also be a component of your herd security program. Outdoor cameras mounted on tall posts or on the barn can scan large

This CCTV monitor is a stand-alone unit with a high quality picture. On the top is a receiver/switcher used to receive wireless transmissions and rotate the pictures from several cameras.

areas and can be used to visually monitor your herd. Some cameras offer a pan/tilt/zoom feature that allows you to remotely control the camera to aim and zoom it in on a particular subject for viewing.

This article will help you understand some of the CCTV camera system terminology. You will be able to clearly communicate with a professional installer OR be able to select and install a system yourself. As we continue through the article, you will see how to add features such as wireless technology, remote monitoring through use of an Internet site, and recording devices.

A basic CCTV camera system includes the following:
a. **Camera**
b. **Power supply** that plugs into a wall outlet and has a power cable connected to the camera

Cameras come in a wide variety of types and price ranges. This one is black and white, weatherproof, with a wide angle lens, infrared, and night vision capability. It works great in a barn, under a shed roof, or in an outside pen.

c. **Monitor** (can be a computer monitor, television, or dedicated camera monitor)
d. **Cable** connecting the camera to the monitor (or a wireless transmitter and receiver)
Additional features:
e. **Wireless technology**
f. **Remote viewing**
g. **Recording**

Cameras come in a wide variety of types and price ranges. You will need to consider the following options in order to match a system to your needs:
- Indoor or outdoor (weatherproof)
- Black-and-white or full color
- Wireless or hard-wired (cable from camera to monitor)
- Daylight-only capability or day and night capability
- Fixed lens or pan, tilt, zoom (PTZ)

cameras (these can be aimed and zoomed from the monitor).
- Wide angle (92 degrees), standard or variable focal length
- Standard resolution or professional-grade resolution

Power Supplies plug into a wall outlet (110-voltage in North America; or 220-voltage in other parts of the world). This transforms the power to either 12- or 24-volt, and has a cable that runs to the camera.

Monitors are the devices used to view the picture. A monitor can be a TV set, a personal computer, or a dedicated stand-alone system monitor. You will need to choose between a color monitor and a black-and-white monitor. The number of horizontal lines of resolution (LR) defines the quality of the picture. The higher the number of lines, the better the picture quality. A standard VHS movie tape is about 240 LR. A standard TV is about 380 LR. A high-end camcorder is about 400 LR. A DVD is about 500 LR. Good quality black-and-white stand-alone CCTV monitors should have at least 420 LR, and the best run between 700-1000 LR. Good color monitors should run 380 or more lines of resolution.

By having extra camera mounts and running extra cable, you can change the camera locations throughout the year. For instance, after cria season, you can move a camera out of a nursery stall and use it for general pen monitoring. Here a nursery stall camera has been temporarily moved ouside to monitor a pen of junior herdsires.

Wireless systems are now available that can be used if it is difficult to run wires between the camera and the monitor. This 2.4GHz transmitter is capable of transmitting a signal to a monitor over three thousand feet away. The antenna is placed in front of a window to ease transmission out of the metal barn.

Cables are used to connect the cameras and monitor. There are several types of cable:
- RG59U Coaxial (a.k.a. "Coax") Cable is used for most CCTV systems. It uses what are known as "BNC connector ends" for use with the cameras and RCA- type adapters to connect to home TVs. It comes in 25, 50, 100, 500, 1000, and 2000-foot lengths. It

costs about USD$15 per 100 feet.
- All-in-One Cables combine power supply, video, and audio wiring in the same cable. They come in 70-foot rolls and are joined together with couplers to make longer runs. These cost about $15 per 70 feet.
- Power Supply Extension Cables are used to connect a power supply at a 110-volt outlet to a camera. These cables power the camera and come in 30-foot ($8) and 100-foot ($15) lengths. Experts recommend that you not run these cables in excess of 200 feet because a voltage drop can occur and cause damage to the camera.
- Trenching and cable installation can get expensive if you have to make long cable runs, trench through utility-laden areas, or have lots of rock or concrete between your monitor and camera systems. The cable can be "knifed" in, similar to how telephone lines are installed underground. CAT5 cable is the best cable to use for underground installations. You will need a pair of "baluns" to convert the signal at the camera from coax cable to the CAT5 cable and then back to coax cable near the monitor. CAT5 cable allows you to make black-and-white signal runs up to 1,600 feet. A pair of baluns cost about $70. Trenching is about 50 cents to one dollar per foot. CAT5 cable costs about $100 per 1,000 feet.

Husbandry Hints Suggested CCTV Monitoring Systems

The Basic System: $195
High-Resolution (a.k.a. "Hi-Rez"), Weather- and Bullet-proof, Black-and-White Camera: $70
Power supply, converts 110-volt to 12-volt: $10
Monitor, black-and-white, 5.5-inch screen, one to two camera inputs: $100
Cable, 70 feet, all-in-one cable, power and video: $15

Wireless System: $569
Hi-Rez, Weather- and Bullet-proof, Black-and-White Camera, Infrared: $100
Power supply, converts 110-volt to 12-volt: $10
Monitor, black-and-white, 14-inch security type, one input: $180
Cable, RGU59, 25 feet: $9
Wireless transmitter, 2.4 GHz, 1500 feet, per camera: $150
Switcher, receiver, four channel, up to four cameras: $120

Remote Monitoring System: $ 450
Hi-Rez, Weather- and Bullet-proof, Black-and-White Camera, Infrared: $100
Power supply, converts 110-volt to 12-volt: $10
Monitor: uses your PC
Cable, 70 feet, all-in-one cable, power and video: $15
Remote monitoring hardware/software package: $325

Wireless Transmitters Capabilities and Pricing

Through Obstructions	Line-of-Sight	Cost/Each
150 feet	300 feet	$100
1,500 feet	3,000 feet	$150
5,260 feet	10,520 feet	$240

Wireless Systems are now available that can be used where it is difficult to run wires between the cameras and the monitor. You will need to add a wireless transmitter and receiver for each camera. (**Note:** you can use one receiver/switcher for up to four cameras as the receiver in place of individual receivers). The chart above shows typical prices for 2.4 GHz transmitters and their capability of wireless service through obstructions such as walls and trees or within a direct line-of-sight.

You will also need a 2.4 GHz receiver for each camera, which costs about $80 each OR you can purchase ONE 4-channel receiver/switcher per four cameras for $120. A four-channel receiver/switcher works great. It allows you to transmit four separate camera signals to it. The device can be set on manual or automatic. In automatic switching mode, it gives you the choice of which cameras to rotate through viewing. You can adjust the speed of the viewing rotation and even stop the rotation and view any one camera you choose.

Remote viewing involves selecting specific hardware and software designed to allow you to connect your personal computer (PC) to the camera system. Some systems require the use of an available USB port in your PC. Other systems utilize an available card slot in the PC. Be sure to select a system that is capable of handling the maximum number of cameras you plan to eventually have in your system. You can easily add more cameras later, but if you undersize the hardware device for the remote monitoring, you will be limited to the number of cameras for which it is designed.

Recording devices are usually a component of the remote viewing system or are added on for an additional charge. Some systems are stand-alone DVD recorders. Others utilize your PC and record directly onto the hard drive.

Motion sensors at the camera location trigger some systems. Motion detectors trip the camera recorder on and record activity until the motion stops or until a preset time has elapsed. These systems are typical of home security systems. A recording device may not be needed if you are only interested in "real time viewing." Recorders are needed if you are using the system as a true security system and not just a monitoring system to see your alpacas or barn when you want to. The recorders allow you to view recorded video from a previous period of time. These can get expensive. If you do not see a need for the recording feature, try a system without it. It will save you money, and you can always add the component later if you do encounter a need.

A number of online companies specialize in supplying CCTV equipment. Their Internet sites supply great information, and some have staff to answer questions that you might have about your specific installation needs. If you are installing the system yourself, be sure to use all safety precautions when working with electrical systems.

Security system companies in your area are a great resource if you are looking for turnkey installation. Call on them to look at your ranch and visit with you about what you need in a CCTV system to monitor your alpacas.

A CCTV monitoring system will give you great peace of mind. You may even catch your alpacas having a big party in the barn without you!

Bill and Sherri Duey operate Southern Iowa Alpacas, located in the hills 60 miles southeast of Des Moines. They have incorporated innovative features into their alpaca ranch and conduct seminars on business planning, animal selection and ranch setup. You may view their website at www.southerniowa-alpacas.com or contact them directly at alpacas@southerniowaalpacas.com.