The Milk SA guide to dairy farming in South Africa

4.1 Dairy animal herding and handling practices

A. Animal welfare

The welfare of animals on a dairy farm should always be of utmost importance to everybody involved with handling the animals. In essence, animal welfare is the application of practical and sensitive animal husbandry practices to the livestock on the farm.

The following five aspects will ensure the welfare of animals:
- Free from thirst, hunger and malnutrition.
- Free from discomfort.
- Free from pain, injury and disease.
- Free from fear.
- Animals can engage in relatively normal patterns of animal behaviour.

Dairy cattle are social animals with a natural desire to gather together in herds. They should always be handled with care and in a calm, easy manner, following a regular routine. There is no place on a dairy farm for sticks, whips or electric prodders.

Patient, unhurried herding will usually have positive consequences, such as:
- Reduced fear.
- Less injuries.
- Easier observation and treatment.
- Improved animal well-being and productivity.

As far as is practical, animals should be protected from adverse weather conditions causing heat stress or cold stress. They should also be protected from other stress factors in their environment, such as severe noise and air pollution, unhygienic conditions around water and feed troughs, pestering insects and muddiness around them. Animal handlers must be familiar with cattle behaviour and should acquire handling techniques through training, experience or mentorship.
They must be sensitive to the basic needs of cattle and must gain skills that include the ability to:

- Work in such a manner that stress is minimised.
- Work in harmony with the natural behaviour of cattle.
- Recognise the early signs of distress or disease and immediately take correct action.

B. Handling facilities

Any work with cattle involves some level of risk. The effects of injuries caused by animals can be severe; it could result in a worker being unable to work for months. This implies personal discomfort and high financial cost to the farmer. Make use of a treatment stall on the farm to reduce the risk of injuring yourself, and involve the veterinarian during activities such as pregnancy examination, vaccination, medication, deworming and artificial insemination.

Equipment used for restraint and handling of animals should be effective without causing unnecessary stress or pain to the animals, and should be designed for maximum safety of the handler. Detailed plans for handling facilities can be obtained from extension officers.

Handling facility requirements

- Handling crush, weigh box and head gates: no sharp edges.
- Gates and gate latches: must work properly.
- Concrete alley ways: clean, non slippery.
- Correct size: width of the animals.
- Big enough to handle your animals safely and with ease.
- Work areas of staff: floor surface clean and dry, no litter.
- Safety equipment and fire extinguishers: in working order.
- First aid kit.
- Good lighting.
- Waste disposal: medical and other waste separately.
- Repair any equipment that is broken or noisy.
C. Handling of cattle on a public road

The key requirements for moving livestock along a public road are summarised below.
1. You must obtain a permit.
2. Livestock must be deemed free of diseases before entering a public road.
3. Walking livestock should travel only on the route specified on the permit.
4. You may only walk with livestock on public roads between sunrise and sunset.
5. Livestock must be yarded at night in a secure holding paddock or approved freestanding break.
6. Grazing or walking livestock must be adequately controlled at all times.
7. There are restrictions on the use of public roads, including camping, use of water, timber, fences and equipment.
8. You must apply for a livestock permit in advance and must notify the relevant livestock authorities of any variation in the journey.
9. Approved livestock warning signs must be displayed when livestock are walking or grazing near or on a roadway.
10. The mob size allowed on a public road will depend on factors such as seasonal conditions, water availability and other conditions.

Using livestock warning signs
Approved black and yellow livestock warning signs, available from your local livestock authority officials, must be displayed when livestock are walking or grazing near or on a road.

Move animals on public roads during daytime.
Signs must be:
1. Displayed when livestock are being walked with, or are grazing along or within 300 metres of a public road, except where a livestock-proof fence separates the animals from the road.
2. Positioned in such a way that motorists are warned of the presence or likely presence of livestock a reasonable distance before it would first encounter the livestock.
3. Clearly visible to motorists who approach livestock from either direction.
4. Positioned in such a way that there is not more than 5 km and not less than 200 metres between the sign and the place where a vehicle would first encounter the livestock.

Handling of cattle on public roads
Apply for a stock permit in advance. Notify the authorities if you take a different route.

- No sick animals.
- Walking stock: specify route, walk between sunrise and sunset, control carefully.
- Black-and-yellow stock-warning signs.
- Herd size: depends on season and water.
- Keep in kraal during the night.
- Make sure of route, camping site, water, wood, fences and equipment before you move cattle.

IMPORTANT! Remember to take along the permit (removal certificate) issued to you by the owner, previous owner or agent of the owner when moving cattle from one place to another.
D. Transport of cattle

Another aspect regarding the welfare of animals on a dairy farm is the transportation of livestock. The vehicle itself must be equipped for transporting cattle and should be serviced, cleaned and washed before use. The driver must have a valid driver’s license. The truck should never be overloaded, as too many animals packed into a small space will lead to unnecessary stress or even injury. Give the animals feed and water before you start loading them and make sure that they have suitable bedding in the truck.

Follow these guidelines for livestock transportation:
- Do not mix adult horned animals with others, as injuries may occur.
- Do not transport diseased, injured or disabled animals, unless special care is taken to ensure their comfort.
- Do not load cows with distended udders that are full of milk. Milk them out beforehand.
- Do not transport adult and juvenile animals together, as the young could get hurt. If they must be together, ensure separation by partitions or pens.
- Unweaned calves traveling without their mothers, must have access to milk at regular intervals.
- Weaned calves should not be transported for more than 12 hours at a time.

There should be sufficient loading and unloading ramp capacity on a dairy farm, so that trucks can be loaded and unloaded quickly. All flooring and ramp surfaces should be non-slip to avoid injuries to the animals. Do not yell, beat or whip animals and do not use prodders to get the animals moving. The animals are probably stressed and handling should take place as calmly and quietly as possible.

- Driver must have a valid driver’s license.
- Vehicle must be equipped for transporting cattle.
- Vehicle must be cleaned before use.
• Sufficient loading and unloading capacity is essential.
• The truck should never be overloaded.
• Slope of ramp must be less than 30°.

• All flooring and ramp surfaces should be non-slip to avoid injuries to the animals.

• Do not beat or whip animals.
• Do not use prodders to get the animals moving.
E. Proper handling of dairy animals

Use the following guidelines for the proper handling of dairy animals:
• Minimise stress to animals – calm animals are easier to handle and move.
• Gain understanding of basic animal behaviour, such as flight zone, point of balance and herding instinct.
• Move animals in small groups, rather than large herds.
• Never beat or shout at cattle unnecessarily – they remember bad experiences.
• Be extra careful when handling cattle that are isolated and away from their herd mates, cows with newborn calves and cows on heat.
• Never trust a bull or turn your back on it.
• Prevent injuries to people and to animals by using well-designed handling facilities and well-designed equipment.
• Wear suitable protective clothing and footwear.
• Never put a child or an inexperienced, incompetent worker at risk with handling cattle.
• Never overcrowd a holding pen; make it only half full.
4.2 Dairy animal breeding concepts

A. Reproduction planning and goals

It is very important to do proper reproduction planning and to have specific, achievable goals stipulated for your dairy herd. Herd reproductive performance and efficiency have a great impact on the overall success of the farm.

Dairy farmers must match the genetics of the herd to their resources and environment to produce high-quality calves for future milk production.

Reproduction planning needs good records to determine the following:
- The potential of the herd.
- The performance of the herd.
- The production level of the herd.

Having this information will help you determine if changes are needed and how best to make those changes. Always consult your veterinarian for herd reproductive examinations and guidance to maintain or improve herd reproductive performance.
B. Breeding seasons

Natural or artificial breeding in the dairy herd, and consequently calving, can take place throughout the year, or it can be limited to a specific part of the year decided upon beforehand. In most dairy herds all-year-round breeding is practised.

If you want to change from all-year-round breeding to seasonal breeding, it is advisable to move gradually, to avoid dramatic mishaps, such as a sudden decrease in calving rate. Although the timing of the calving season is ultimately determined by the date on which the cows conceive, breeding will not take place until cows are coming on heat regularly. Most people agree that at least 80% of cows in a herd should calve down in the first six weeks of the calving season.

When not in calf, cows have cycles of 18 to 24 days. It is therefore advisable that the breeding season lasts 60 to 90 days, thus allowing cows two to three opportunities to conceive in a 60-day breeding season, or three to four opportunities in a 90-day breeding season. Longer breeding seasons are less demanding on management and more likely to have good conception rates.
C. Infertility in a dairy herd

Cows are generally considered infertile when they are not able to conceive. There are various reasons for infertility and reproductive disorders and there are both infectious and non-infectious causes of infertility. Non-infectious causes of infertility have to do with nutrition, genetics and stress, with the most common being nutrition. Infectious causes of infertility include several bacterial, protozoan and viral infections. Some are important zoonoses agents, such as Brucellosis, affecting animals and man.

All infertile animals should be examined by a veterinarian to determine the exact cause of their infertility. However, to diagnose the cause of infertility correctly is not an easy task.

When herd reproductive problems occur, they can have a major economic impact. Prevention and control are important to ensure productivity, and should be discussed with your veterinarian.

• Consult a veterinarian to determine causes of infertility.
4.3

Breeding practices

There are two ways of getting a cow mated. You can take the cow in oestrus to a bull or you can use artificial insemination (AI). Whichever way is followed, it is important to be able to tell if a cow is ready to be mated or inseminated. Therefore heat observation, where the cows are observed for at least 30 minutes every morning and afternoon in order to identify cows that are on heat, is so important. A cow normally shows signs of oestrus every ±21 days. Between these periods, the cow will not allow a bull to mate with it.

The following are signs that a cow may be in oestrus:
- It is more restless.
- It has a clear, milky or slightly bloody secretion from the vulva (bull string).
- It shows mating behaviour with other cattle.
- The hair on its tail is ruffled, which shows that it has allowed other cattle to mount it.
A. Natural breeding

Despite the widespread popularity of artificial insemination, many dairy farmers still prefer natural breeding. There is a variety of reasons for this, including the common perception that it is easier to manage and less expensive than AI. Farmers often complain about the escalating cost of production. However, most of them underestimate or even ignore the cost of keeping natural service bulls on their farms.

Purchase a veterinary-certified bull (fertile and free from venereal diseases) that will contribute to the genetic improvement of your herd. Reproductive outcomes will be influenced by service bulls’ performance and management. Introduce the bull to your cows or heifers at the start of the breeding season. The breeding season can range from 60 to 90 days. At the end of the breeding season, separate the cows from the bull. Six weeks after removal of the bull, pregnancy tests should be done by a veterinarian so that you can identify any non-pregnant cows or heifers for culling purposes.

Factors that could influence a bull’s fertility:

- Poor semen viability.
- Physical defects or injuries.
- Excitement or inappropriate handling.
- Diseases.
- Venereal diseases.
- Lack of exercise.
- Improper feeding.
- Overworking.
- Using a young bull on too many cows.
B. Artificial insemination (AI)

Artificial insemination (AI) is a highly specialised and technical process and the procedure should only be performed by a skilful, trained person. It is strongly recommended that you attend an AI course before you try doing it yourself. Otherwise, consult your veterinarian or an expert who has experience in performing AI procedures.

Artificial insemination (AI) is an economical way for a farmer to genetically improve his dairy herd, as it allows for the semen of top proven sires to be used to inseminate several cows annually. Estimated breeding values will help to determine what kind of calf you can expect from a specific bull, and therefore it will influence the choice of semen to be used for AI purposes. By selecting the sire, the dairy farmer can improve the production of his herd (milk volume, butterfat and protein percentages), as well as the characteristics of his animals, such as better udders, legs and hooves.

Semen from selected bulls is packed in straws and stored in liquid nitrogen at a temperature of –196 °C. It is very important to handle semen with care and according to the instructions. Only good quality, fertile semen of proven sires should be used for any AI procedure.

A great deal of preparation is needed to ensure that the AI procedure has positive results:

• The cow should be healthy and without infections or diseases in its reproductive tract.
• You must be sure that the cow is in standing heat. Do heat spotting twice a day. The ideal is to inseminate 12 hours after the first standing heat detection.
  - If you detect heat in the morning, AI should be done in the afternoon.
  - If you detect heat in the afternoon, AI should be done the next morning.
• High-quality nutritional feed will enhance the cow’s body condition and ability to conceive.
• Correct and careful semen-handling also has a major effect on conception rates.
• The correct instruments must be available and in good working order.
• The correct insemination techniques must be performed by a skilful, trained person.

AI has some disadvantages – herd management is more demanding, and you need to hire a person to do the AI procedure and the heat observation of the cows.

However, the advantages of AI are usually far more and include the following:

• It reduces the spread of venereal diseases, because there is no direct contact between bulls and cows.
• Accidents during mating are avoided.
• The best genetic material of proven sires can be used to improve a dairy herd.
• The occurrence of dystocia (difficult birth) is reduced.
• Dry cow management can be better controlled, due to accurate drying off and calving dates.
• It is cheaper to buy semen than to keep a bull.
• The safety of farm personnel is ensured.
Heat spotting
- A cow gets in heat every 18 to 24 days.
- Observe your cows in the morning and afternoon.

Signs of heat
- Mountings of cows on cows.
- Clear or turbid bull string.
- Swollen or red vulva.
- Bellowing and restless.
- Ruffled tail hair.

• If you detect heat in the morning, AI should be done in the afternoon.
• If you detect heat in the afternoon, AI should be done the next morning.
Breeding goals and values should be established to select the best semen.

• A trained inseminator will insert a pistolet into the vulva and through the vagina and cervix into the uterine body.
• The loaded pistolet contains the straw with the semen.

Place pistolet into vulva and vagina to the end of the cervix.
C. Gestation in cows

Gestation is the period of development from conception to birth. The gestation period for dairy cows varies, but usually lasts 276 to 283 days (nine months)

Getting cows pregnant once a year is essential for the production cycle on farms. Pregnant dairy cattle need to be comfortable, have shelter and a calm, relaxed environment with access to high quality feed and fresh, clean water. During the first days after conception, the cow should be exposed to as little stress as possible in order to reduce the risk of loss. The calf is born after a period of approximately nine months of pregnancy.

Pregnancy can be divided into three phases or trimesters, each comprising approximately three months.

First trimester
The foetus is in the early stages of development. The cow’s milk production is high at the beginning of the first trimester. The foetus does not have a high nutrient demand at this stage. Towards the end of this trimester, the foetus is approximately mouse-sized.

Second trimester
The foetus is growing fast and starts to demand more nutrients from the cow. High-quality feed is needed for the nutrient demands of the foetus, to replenish the cow’s body weight and for optimum milk production. Towards the end, the foetus is approximately cat-sized.

Third trimester
Approximately 70% of the foetus’ growth occurs in the last trimester. At 45 to 60 days prior to the expected calving date, cows should be dried off (stop milking). The cow’s nutrition during the third trimester of pregnancy has a significant impact on the growth of the foetus and on the quality of the colostrum she provides. The newborn calf’s size is dependent on a number of factors, such as breed and nutrition. Birthweight varies from ±22 kg to 45 kg, depending on the breed.
The expected calving date is determined from accurate breeding records. Cows carry their calves for 276 to 283 days. However, it is essential that you are able to identify the signs in a cow that is close to calving, in order to spot the cows that will calve within the following 12 hours.

A separate calving area allows for easier observation and management of cow and calf. Cows close to calving should not be disturbed, as they tend to try and delay calving when there are strangers nearby or when they are exposed to abnormal environmental conditions. However, you still need to keep a close eye on the cow, because the calf is on its way. Delivery without complications is the norm in cattle; however, if a cow has difficulties (dystocia), a competent person should assist it, while maintaining high standards of hygiene and using proper equipment.

The birth process has three stages:

1. Dilation of the cervix
The cow’s body gets ready to calve. Signs of labour are: the cow stops eating and wants to be by itself; restlessness; the ligaments around the tail-head and vulva relax and clear mucoid fluid comes out of the vulva.

2. Delivery of the calf
During the second stage of birth the udder may begin to moisten or drip slightly. With normal presentation, the front feet and head usually appear first and the calf is born on its stomach with its front legs stretched out in front of it. A cow usually lies down during the latter stages of calving when the calf is delivered, although some stand up, allowing the calf to drop to the ground.

3. Shedding of the placenta
After calving, a cow will lick its calf to stimulate vitality of the calf. The afterbirth is usually pushed out soon afterwards. Many cows will eat the afterbirth. Eating the afterbirth is a natural process and must not be discouraged, because the afterbirth serves as a valuable source of nutrients for the cow. A healthy calf usually tries to stand up within minutes after the cow has started licking it and will then try to suckle. It is very important that the calf gets enough colostrum within four to six hours after birth to boost its immunity.
• Dilation of the cervix.

• Delivery of the calf.

• Shedding of the placenta.
Recommended best practices
- Monitor cows that are close to calving at regular intervals, namely every four hours.
- Move animals that are close to calving into the calving area.
- Provide a comfortable, dry, sanitary environment for the cow and calf.
- Make sure that cows have plenty of room during calving.
- Replace bedding after each calving.
- If a cow has difficulty with calving, immediately report it to the supervisor, who will provide appropriate assistance with obstetrical procedures and treatments, or will call the veterinarian in complicated cases.
- Dip calf navels in disinfectant as soon as possible after birth, and repeat daily until the umbilical cord is dry.
- Provide food, water and shelter from adverse weather for cows that are unable to stand as a consequence of difficult birth or milk fever. Place these cows on bedding or soft ground.
E. Herd composition

It is important for anyone working on a dairy farm to have a basic understanding of the ideal structure or composition of a dairy herd, so that constant production can be maintained.

Herd composition is the result of a number of related management decisions, such as calving pattern, rate of reproductive success, replacement management, and long-term goals regarding herd size and culling policy.

In an all-year-round calving herd the following should be considered:

- The majority of cows should be lactating (±80%).
- A number of them should be dry (±20%).
- Some cows need to be culled.
- Heifers will have to be raised to replace culled cows.

In seasonal-calving herds, the herd composition will obviously be determined by the calving season. For example, after the calving season all cows will be lactating.

In the average South African dairy herd, ±25% of animals are culled each year for various reasons, such as mastitis and other diseases, infertility and loss of production. If the herd is managed well, culling will be voluntarily and planned, and the general standard of the herd will be maintained or improved.
F. Condition assessment (scoring)

Body condition scoring is the term given to the process we use to evaluate a cow's condition. It is very important that dairy producers evaluate their cows in this way, as one gets a quick and reliable estimate of each cow's body reserves. These reserves have a direct effect on the cow's milk production, reproduction and feed intake.

When and how should it be done?
Body condition scoring should be done on a monthly basis and should be done on every cow in the herd. By doing it monthly, you can easily detect if there is a problem in your herd. Scoring is done in the tail-head and loin areas. Scores are awarded to each cow on a scale of zero to one, with half scores in between:

0 – Very poor • 1 – Poor • 2 – Moderate • 3 – Good • 4 – Fat • 5 – Grossly fat.

The condition of a dairy cow is determined by her production cycle and the efficiency of nutrition

Guidelines are:
• 3 – At the time of calving
• 2 – At the time of service
• 3 – At drying off.

Important
• Avoid scores above 3,5 and below 2.
• Above 3,5 cows become excessively fat and this causes all kinds of health problems such as metabolic diseases (ketosis), retained placentas and uterine infection at calving, poor milk yield and poor fertility performance.
• The milk yield of a cow with a rating of 0 to 1,5 will be very poor.
• It is normal for a cow to lose condition immediately after calving, for approximately 90 days. After this its condition will improve until it is dried off in a condition rating of 3.
• A cow with a condition rating of 1,5 or lower tends not to show oestrus. The conception rate in those that do show oestrus, is usually low.
• Practise scoring regularly and compare your scores to that of the veterinarian to make sure that you are on the right track.

Use the graphic standards to assess your cows.
• Evaluate the condition of all your cows within groups every month to estimate each cow’s body reserves.

• Look and feel for the amount of fat at loin areas.

• Look and feel for the amount of fat on both sides of the tail-head.

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<th>Condition</th>
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<td>4</td>
<td>Fat</td>
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<tr>
<td>5</td>
<td>Grossly fat</td>
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4.4
Water supply systems and fencing on a dairy farm

A. Water

Water is a scarce and precious commodity and we need to take great care to manage water supply systems well. It is a very important aspect of farming with dairy cattle, because water is regarded as the most important food for animals. About 70% of an animal's body is composed of water and it forms part of many body functions. An animal can survive for a few weeks without food, but if water is withheld for only a few days, the animal will surely die.

Sufficient, clean drinking water must always be available for your herd. Water is necessary for vital body functions, such as regulation of body temperature, digestion, metabolism and excretion, and it also affects total milk production. Scientific studies have shown that if a cow drank 40% less water, it could result in a 25% drop in milk yield.

Cows are sensitive to poor quality water and should have free access to high-quality drinking water. A high-yielding cow drinks up to 130 litres per day. The size and number of the drinking troughs are important factors in providing enough water for dairy cows.

Limiting water availability to cattle will lower production rapidly and severely. Water quality, such as its taste and hygiene, affects water consumption. If the quality of drinking water is compromised – e.g. being polluted by toxic levels of various minerals, algae, manure or urine – cows will limit their water intake to the point of dehydration.

The temperature of drinking water also has an effect on drinking behaviour and animal performance. Cows prefer to drink water of cool to moderate temperatures, rather than very cold or very hot water.
Recommended best practices

- Have a back-up watering system in place for use in case of emergency.
- Build and locate watering systems so that they are protected from pollution and freezing.
- Keep water troughs and bowls clean and check them at least once daily to make sure that they supply sufficient water.
- Situate additional watering points at walk-through areas, for use immediately after milking.
- If your cows are going to drink directly from a dam or river, make sure that they have easy access and that the quality of the water is of an acceptable standard.
- Test water quality at least annually.

The size and number of drinking troughs are important to provide enough water.

Avoid poor quality water.

Water
- Adequate access to water source.
- Clean, fresh water.
- Easy access for cows.
B. Fencing

The value of farm fencing should not be underestimated. Although it is expensive, both in terms of time and money, it is one of the most important investments a farmer will make. Properly built and well-maintained fences will contribute to good management practices on any dairy farm.

Fencing is part of the infrastructure on farms and is erected for a number of reasons, including the following:

- Separating the properties of different owners.
- Keeping livestock within certain areas or out of other areas.
- Security.

It is important to do thorough planning before you start putting up fences. The fences will last longer and will be more effective if planned and constructed properly.

The better the fence is constructed and maintained, the better for you, your neighbours and your animals.

Your fence design will determine the supplies you will need. Fencing material usually consists of the following:

- Fence posts: these form a very fundamental part of a fence. Proper selection and installation will determine the life of the fence. It must be strong enough to withstand great pressure and must be able to resist rot and decay.
- Wire: several types can be used in a livestock fence, including woven wire, barbed wire and smooth wire. Most wire has a coating to protect it from rust and corrosion.
- Fasteners: fence wire will be attached to wood posts with staples. Special clips are available for attaching wire to metal posts.
- Electric fencing: this should be designed, maintained and used in such a way that contact with it does not cause unnecessary pain or distress to the cows.

A fence can be built with basic hand tools. Always use good quality tools and keep it clean and in good repair.
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Draw up a plan before you put up fences.

Wire

Barbed wire

Woven wire

Electric fencing
Fencing tools

- A tamping bar is essential for setting a corner post tight. It serves a double purpose in helping to break up hard or rocky soil.
- Heavy leather gloves: the cut ends of fence wire are very sharp; even with good gloves you are likely to get a few scratches.
- Hammer: get a good claw hammer.
- Wire cutters: good quality wire cutters are essential. Bigger is not necessarily better. It is the quality of the cutting edges that counts.
- Spade: any decent round point shovel will do.
- Post-hole digger: the old-fashioned clam-shell diggers.
- Crimping tool: the best method of stringing a fence involves splicing the wires with a swage sleeve, which requires a crimping tool. The crimping tool and sleeves will also be used for repairing fences.
- Fence tensioner: there are several types of tensioners. The ends clamp on the wire and the clamp pressure increases as the tension increases. These are indispensable for attaining a good tight fence.
- Fence pliers: not absolutely essential, but even a good pair is relatively inexpensive and they are handy to use.
Fix your fences
1. Make a loop in one end of the wire and pull the other end through it.

2. Anchor the loose end between the hammer claws.

3. Twist the hammer so that the wire wraps around it.

4. Keep twisting until the wire is as tight as you want it. Bend the wire back towards itself, then untwist the hammer. The tight crimp will hold the wire tight.

5. Finish the splice by wrapping the end of the wire tightly around itself.