



# technical brief

## “Structural Soundness”

**Extension Specialist, Bob Freer**

The purpose of buying a bull is to produce calves – as many as possible for as long as possible. A sound bull is capable of siring about 50 calves per year, for about 6 years – a potential of around 300 calves in his lifetime, yet many bulls don’t get near this number of offspring.

Surveys show that some 10% of bulls break down in the first few weeks of mating; that the average working life of a bull is around 3 years, and that after 5 years of age the breakdown rate is about 35% per year. Surveys also show that pasture reared bulls have almost double the working life of bulls that have been heavily grain-fed.

The main reasons why bulls are culled include...

**Arthritis** – about 50% of bulls are culled because of loss of mobility due to arthritis. Arthritis is caused by poor leg & joint structure. Grain feeding of bulls as yearlings accelerates the onset of arthritis and joint problems.

**Injury** – caused through fighting, accounts for about 10% of bull wastage.

**Broken penis** – (15%) this problem is usually found in bulls in their first season, or in older bulls as arthritis begins to affect serving ability. Poor serving dexterity caused by structural problems (particularly straight hind legs) is the major cause of a broken penis.

**Corkscrew penis** – this problem is mainly found in poll bulls, with affliction rates of around 15%. The penis corkscrews as the bull mounts, making service difficult if not impossible. This condition often only appears when a bull is 3-4 years of age, and gets worse as the bull gets older.

**Sheath problems** – such as inverted prepuce and / or sheath infections account for about 5% of bulls culled. Pendulous sheaths contribute to sheath problems.

**Overgrown feet** – (5%) Feet defects such as scissor claw and uneven toes are inherited feet problems – overgrown feet is generally a sign of poor leg structure.

Clearly, structural soundness of bulls is a critical issue. As conformational traits are of medium inheritance, introducing a bull with a structural problem is likely to pass that problem on to his progeny.

The following notes provide a useful guideline for evaluating soundness in beef bulls.

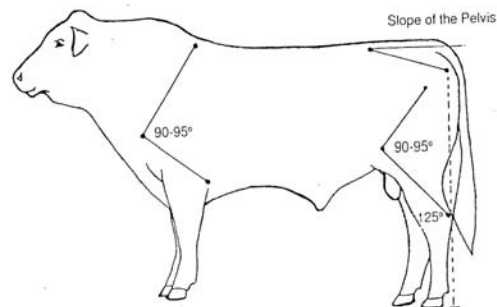
## The Basics of Structural Soundness

The basic structure of a bull is all about **angles** – angles between joints, angles of the foot to the ground, and **symmetry** – symmetry between the hooves, musculature of the hind quarters and balance between the front and rear end.

Any departure from normal angularity alters weight distribution and point of balance across the joints leading to inflammation, impaired serving ability, and increased wear and tear of the joint.

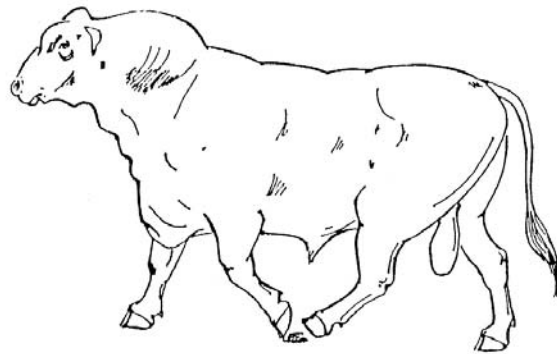
In the fore-end, the angle between the shoulder blade/shoulder/elbow should be 90-95°. An angle greater than this means that the bull is straight-shouldered, often with high and open shoulder blades which if inherited by his progeny contributes to birth difficulty.

Similarly, the angle between the hip/stifle/hock should also be 90-95°. An angle greater than this means that the bull will be straight-legged, short step, and be more susceptible to service injury. The basic angularity of the joints is shown in the following illustration.



### Walk

Whilst it is difficult to measure the above angles at a bull sale, a structurally correct bull will have a free moving gait, with the hind feet stepping into the footprints of the front feet. Over or under-stepping of the hind feet are indications of angulation problems and are reflected in long/sloping feet or short/blocky feet respectively.



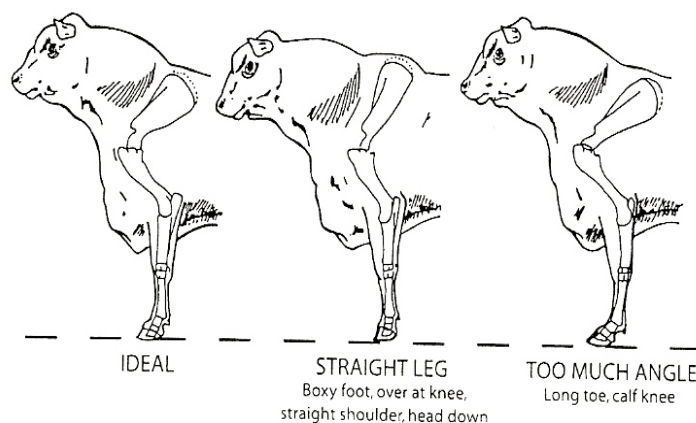
Likewise if he is suffering arthritis in one leg he may tend to short-step or drag his leg on that side. An arthritic bull will also show muscle wasting over the rump and leg muscles of the affected side.

### **The Front End**

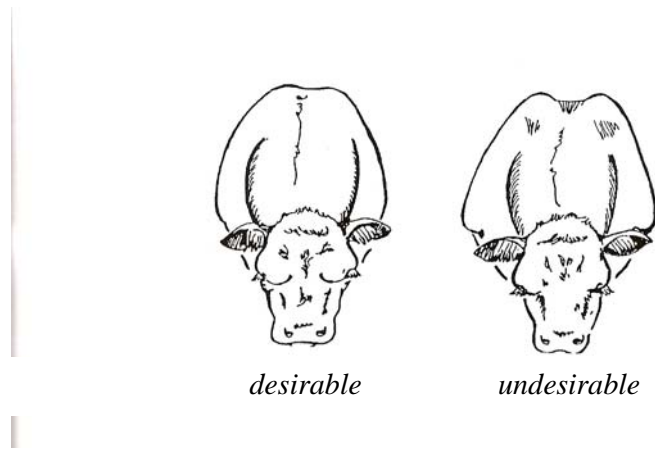
#### **Shoulders**

The shoulders are naturally sloping – the shoulder blade should slope 45-50° from vertical. A bull whose shoulder is tipped forward (straight shouldered) has less angle at the shoulder/elbow joint which reduces the shock absorbing ability of the front legs. Straight shouldered bulls tend to walk with a short, choppy gait and will carry his low, with the tip of the shoulder blade prominent above the backline.

Front leg and shoulder structure of the bull

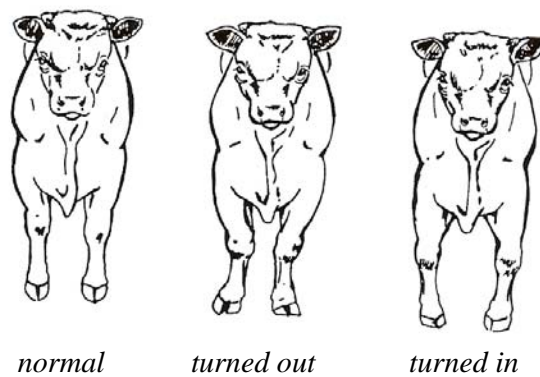


The shoulders should be smooth against the rib-cage. Bulls which are wide between the shoulder blades may sire heavy shouldered calves with increased risk of calving difficulty.



### **Front Legs**

The front legs of the bull should be straight when viewed from in front although a slight turn out is normal in undomesticated animals.



A 'knock-kneed' bull will have turned out front feet (up to 10° is considered normal). Knock-kneed bulls may show overgrown outside claws which will contribute to lameness..

A bull that is wide at the knees (bow-legged) presents a more serious problem. These animals are often narrow in their stance and may roll their feet as they walk. They tend to be more prone to arthritis.

### **The Rear End**

#### **Hind legs**

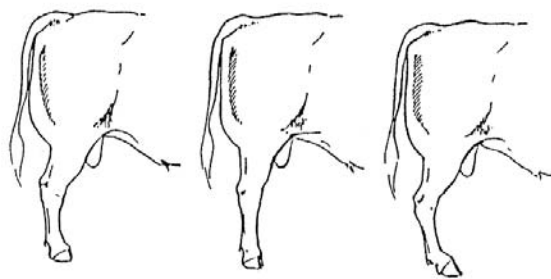
More bulls break down from problems associated with the hind leg than from any other reason.

Correct structure of the hind leg is all about angles at the joints of the hip, stifle, hock and pastern joints. The angles, which are apparent in the stance of the bull when viewed side-on are critical, particularly during serving when large amounts of stress are placed on these joints. Deviations from the correct angles will cause excessive wear and tear on the joints, leading to early breakdown.

When a bull mounts a cow, he straightens up the joints in his hind leg. When he thrusts, he further straightens the leg, placing enormous stress on all joints, but particularly the hock. If these joints don't have enough angulation, they quickly become swollen and painful, leading eventually to breakdown. Straight legged bulls are often clumsy servers suffer a higher incidence of broken or damaged penises during serving.

Too much angle through the hock joint (straight/post-legged) is a serious structural fault.

These cattle don't have the flexing and shock absorbing effect of the structurally sound animal, and they are prone to severe wearing of the hip joint, leading to arthritis. Bulls showing arthritic problems are reluctant to serve cows as the condition can be quite painful. Too little angle through the hock joint (sickle hocked) whilst undesirable is not as damaging as post-leggedness.

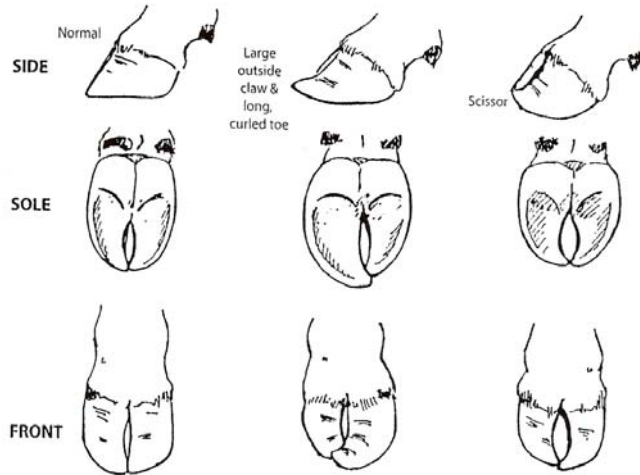


*correct      post-legged      sickle-hocked.*

Viewed from behind, the leg through the hock joint should be close to vertical. . A bull is "cow hocked" when the hocks are rotated inwards and the hooves rotated outwards. This may cause problems but usually only in extreme cases where uneven pressure on the claws causes the outside claw to grow long. A more serious problem occurs where the legs are wide at the hocks (bow-legged), but the feet are turned in. Extra strain is placed on the ligaments of the hock joints causing lameness and even permanent damage.

### **Feet**

A normal foot should have claws of equal size, at 45' slope to the ground. Deviation from this angle is usually an indication of poor leg structure/angle. Foot defects are exaggerated by heavy feeding and soft ground. Avoid overgrown, scissor or curved claws as these conditions will worsen as the bull ages, caused by overgrowth where the toe loses contact with the wearing surface of the ground.



Scissor claws and uneven claw size/shape are considered to be inherited defects.

Long sloping claws or short blocky claws indicate too much or not enough pastern angle, causing the hoof to wear abnormally and will affect the mobility and performance of the animal. In the front feet, short blocky feet indicate a shoulder that is too straight. The figure below indicates the correct angle of the pastern joint.



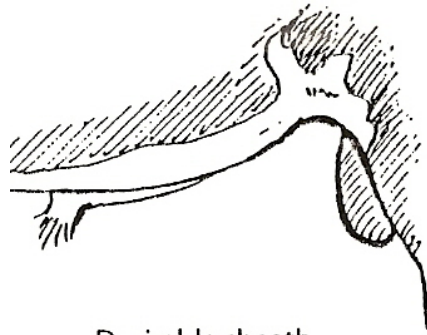
*correct      too much angle      not enough pastern angle.*

Even minor feet defects in young bulls should be taken seriously as the defect will become more pronounced as the bull gets older and heavier. They will also become exaggerated when the bull is exposed to heavy/wet soil conditions, heavy grain feeding or lack of exercise.

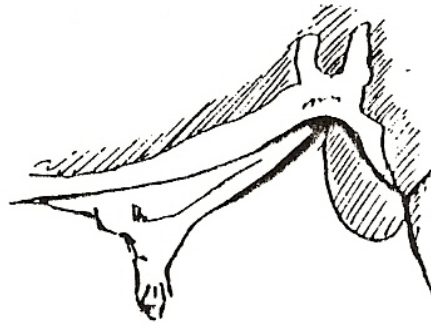
### **The Sheath**

The sheath should be trim and close to the body. A loose sheath is more prone to injury or infection (from grass seeds, and other foreign objects) and should be avoided. Tropical breeds are more susceptible to these problems and buyers of these cattle must be critical in their selection.

A slack prepuce (hanging down of the pink, inner mucosal cover of the penis) should also be avoided. Whilst some drop of the prepuce during urination is normal, a bull whose prepuce is visible all the time should be regarded as having structural fault.



Desirable sheath



Loose, undesirable sheath

### **Testicles**

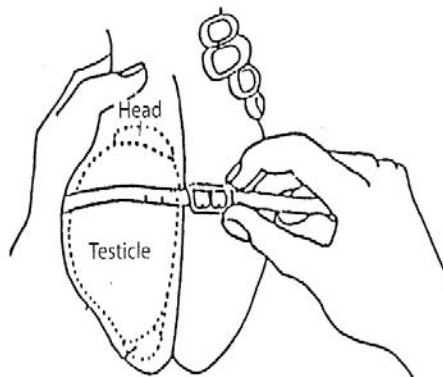
The two testicles should be of similar size and consistency, the normal testicle should feel firm and springy. Soft, spongy testicles indicate a break-down of the sperm producing tissue and such testicles produce low quality semen, usually with a high percentage of abnormal sperm.

The amount of semen produced by the testicles is highly related to their size, or volume (the more sperm producing tissue there is – the more sperm that are produced) and the best method of evaluating a bull's semen producing ability is to measure the circumference of the scrotum.

Bulls 18 months and older should have a scrotal circumference of no less than 32cm, and well developed 18-24 month old bulls will have a scrotal circumference greater than 35cm.

To measure the scrotal circumference, stand behind the bull in a crush. With one hand force the testes to the bottom of the scrotum, with the other hand loop a tape measure around the scrotum (encircling both testicles) and pull the tape firmly around the position of greatest circumference (see illustration).

A good visual reference of adequate scrotal circumference is two beer cans suspended, side by side, in a stocking - this "model scrotum" measures about 35 cms around.



### **Avoiding Bull Breakdowns - Buyers Check List.**

- **avoid straight legs, check track**
- **avoid pendulous sheaths**
- **look for symmetry in the feet and hindquarter**
- **testicles minimum 34cm, firm**
- **favour pasture reared bulls, bulls reared in large groups**
- **avoid mixed-age bull mating groups**