

SELECTING THE RIGHT STYLE OF COLLAR FOR YOUR CARRIAGE BREAST COLLAR OR NECK COLLAR

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DRAFT

Draft - Draft Horse - In Draft - Out of Draft - Line of Draft - Line of *traction* - Chain Draft - Axle Draft - Balanced Draft - Center of Draft – Point of Draft, oh my!!

DRAUGHT!!! How many meanings and spellings can one word have! We won't even be discussing basketball picks, breezy rooms, beer or chimneys in this article!

Before starting a discussion on the selection of breast or neck collar, it's important to understand that we are not just talking about picking out a piece of equipment. We are talking about "draft" and virtually all the horse-related applications of the word. Many of these applications, the venerable Webster may never have dreamed of. So I'll start by roughly defining the many applications of the word "draft (draught)" as they apply to a horse and carriage.

First of all, we'll simply note that here in the US, we generally spell the word "draft." Most of the rest of the English-speaking world spells it "draught."

The word "Draft" has lots of meanings outside the realm of carriage driving. Someone with a thesaurus and a good dictionary can probably define the word "draft" better than what follows, but I think for the purposes of this discussion, we will be safe if we just associate the word "draft" with "pulling". Yes, technically it's "pushing," but a lot of us are secretly more comfortable calling it pulling, so let's go with that.

When we refer to "draft," in the equine sense, usually we are referring to the horse pulling something. A "draft" horse is generally thought of as an animal of great size and strength that pulls wagons and implements. Technically speaking we could call all our driving horses "draft" horses because they pull something, but the phrase "draft horse" is generally reserved for the big guys.

In Draft - This means your horse is actively pulling something. It means the traces (what "tugs" are called in carriage driving) are taut and he is actually applying his strength to move a load. It doesn't just mean that he is simply hitched to the cart and it's rolling along behind him, it means he's actively working to move it along.

Out of Draft - This means the cart is rolling along behind the horse with traces slack. This can be when you're going downhill (in which case we hope the horse is "in

breeching"), or when he's on the flat and just bumping into the collar occasionally as the cart rolls along behind, traces slack. When the traces tighten, he is back "in draft."

Line of Draft – This is the imaginary line described by the traces as they pass from the collar to the singletree when the traces are taut, i.e. when the horse is pulling.

Angle of Draft - This is the imaginary line described by the traces in relation to the horizon when the traces are taut, i.e. when the horse is pulling. "*Angle of traction*" is the same thing.

Point of Draft - This is the spot on the horse's shoulder (actually the place where the trace meets the hame) that the horse is "pulling" from.

Center of Draft - This is a theoretical spot on your horse's body. It is found by drawing an imaginary line through his theoretical center of gravity (A plumb bob suspended from thoracic vertebra 10, about a hand behind the shoulder blade), and a horizontal line bisecting his body mass into two equal halves. The point where these two lines intersect is his theoretical "Center of Draft."

Chain Draft - Chain draft is a way of attaching the singletree TO THE AXLE OF THE VEHICLE with chains. Two chains attach to the axle in the vicinity of the springs, and triangulate forward to attach to the CENTER of the singletree. The singletree is suspended from the crossbar of the vehicle by straps, so that there is an unbroken *line of draft* from the horse's collar, through the singletree, to the axle.

If a cart originally had the singletree on top of the crossbar, and the owner converted it to *chain draft*, this would affect the *angle of draft*, or *angle of traction*.

Axle Draft – This is the same thing as *chain draft*, in that the *line of draft* goes straight from the horse's collar, through the singletree to the axle, but may be achieved by means other than chains (i.e. a hinged "yoke" that would pass around a low foot basket).

Note: *Chain/Axle draft* takes the draft (pulling) right to the axle. It is not a lowered singletree that puts the *line of draft* to the axle. Even the yoke functions somewhat differently than true chain draft, but it does work quite well.

Balanced Draft – This will be an unfamiliar phrase to many. Okay, so what is "balanced pulling?" If you think about it long enough, you can create an image in your head about what "balanced pulling" is.

To help you visualize "balanced pulling," let's get extreme, and think of a little bit of a mini horse, hitched to a wooden meadowbrook type cart with two people in the cart. He's got a breast collar on and the singletree is almost higher than his bum. I am not picking on little horses; I am using the smallest horse with the biggest job as my example. The mini horse has no built in variables. He is tiny and like everything else tiny, the tolerances are tighter. That's why he's such a good candidate for an example of why

Balanced Draft - or balanced pulling - is so important.

Okay, you've got a little guy in a breast collar, and the singletree is up above the cross bar. His traces are running uphill. If you look hard, you will see that almost all his body mass is below the traces. The breast collar is being pulled into his throat. He may look cute and conventional with this setup when he isn't asked to really get *in draft*. But what happens when he has to go up a little hill? It's like you trying to pull a load with the strap around your throat - the load will pull you over backwards!! Now our little trooper isn't going to get pulled over backwards (we hope), but he is most definitely NOT in *balanced draft*!

There are ways to set him up so that he has equal amounts of body mass above and below his load - with the traces running through his *center of draft*, so that he will be hitched in balance with his vehicle, have every mechanical advantage and not feel like he is being pulled over backwards, nor pitched over his breast collar onto his nose. It takes work on the part of the driver to achieve *balanced draft* for his horse. Once you've seen balanced draft for yourself, anything else will make you uncomfortable.

Oh, the word *draft* is also applied to the widest part of a neck collar, the place where the *point of draft*, the spot where the traces attach to the hames, is located.

So there's a look at "draft/draught" and the many ways the term relates to carriage driving. I hope this has helped some folks to get grounded in the discussions that follow.

SHOULDERS

If the horse's mouth is the "steering," and the hindquarters are the "motor," then you might say that the shoulders and collar are where the rubber meets the road for the driving horse. This is where flesh and blood, bone and muscle, push against unfeeling, indifferent, perhaps unyielding weight. You can adjust the cart balance and the driving saddle so there is no effect to the horse's back. You can do up straps correctly so nothing interferes with anything else, but there is virtually nothing you can do to prevent the collar from influencing the horse's shoulders. But you DO have the ability to determine HOW the collar influences the horse's shoulders, for better or worse.

Think about it. The horse is virtually attached to the vehicle by the collar. He's pressing his sensitive flesh and bone into many hundreds of pounds of weight.

Do you have a wall full of bits, trying to make the horse happy in the mouth, with two pounds of weight on the reins? Did you ever stop to think about what's happening between the horse's shoulders and the collar when he's pushing into six or seven hundred pounds of payload?

As riders, we concern ourselves with the mouth, with our balance in the saddle, and with the boiler room, the hindquarters. We educate the various parts of the horse's body to respond to our requests, and we *know* we are not effective riders if we are not in balance

with the horse. Rarely, though, is much said about the forehead, unless the horse is heavy on it.

In driving, I feel we should *start* at the forehead when equipping the horse because that's the part of his body that is truly communicating with the vehicle. We still worry about the mouth and boiler room, but we're rarely taught from the beginning to really think about the horse's shoulders having to press into all that weight. We're just happy because we've eliminated having to balance ourselves on the horse's back.

The thing that "they" keep forgetting to point out is that though the horse is no longer burdened by a rider on his back, now he is dragging along a huge weight by pushing against it with his shoulders. Yet we still want him to be light and lovely in his movement, even though we've tethered him by the neck to a rolling anchor.

Well, he CAN still be all light and lovely, probably better than you might imagine, particularly if we pay attention to what we use to connect his shoulders to that rolling anchor; the collar. If we think about how his body levers operate when he's pushing against that weight we begin to realize we must give him a mechanical advantage, one that works with his anatomy.

The shoulders are very mobile! They have no bony attachment to the skeleton, but instead are held to the ribs with powerful connective tissues. Horses are built in all different front end configurations. Many horses were originally bred for driving, with the right sort of conformation to carry a collar correctly. But today we drive a great many horses that were never designed to tow a weight! These horses are even more acutely in need of our efforts to harness them *in balance with their load*.



This description is a bit crude, but is good enough for our discussion. The shoulder blade is something like a lever, with a fulcrum close to the middle. Like any other lever, the shoulder blade moves back and forth at each end, while the center, the fulcrum, is more stationary than either end. The lower end of the fulcrum is highly mobile. This is where a breast collar rests.

Because a breast collar rests on the lower end of the shoulder lever [Fig. 1], each time the horse in a breast collar advances a foreleg, he has to move the lower end of his shoulder lever against the weight of the carriage.

FIG. 1: The black dot shows the point of the shoulder.

The breast collar rests over the most mobile part of the shoulder blade.



In a neck collar, the *point of draft*, the spot where the trace attaches to the hame, is positioned much higher than with a breast collar, just about over the top of the most immobile part of the shoulder blade [Fig. 2]. Resting on a shelf of thick muscle, well in front of the shoulder blade, the collar and hames elevate the *draft*, the weight of the vehicle, off the lower end of the lever and place it nearer the fulcrum, so the lever is more capable of a full range of motion. Along with other considerations, such as the chest compression that can be caused by breast collars, we can begin to see why neck collars aren't just for "heavy loads" or draft horses.

But the case for a neck collar is not open and shut.

FIG. 2: *The neck collar and hames elevate the point of draft to the most immobile part of the shoulder blade.*

Breast Collars

Breast collars have a lot of advantages, not the least of which is ease of fitting one to a variety of horses. In order for a breast collar to be suitable for carriage driving, plenty of width is desirable to spread the weight of *draft* over as much surface as possible. Skinny breast collars are for show ring driving and have no place with heavier carriages.

Among their disadvantages is the fact that they place the weight of draft over the lower end of the shoulder blade lever, virtually causing the horse to have to lift the weight out of the way before he can advance his foreleg. Another is chest compression. This may not seem like a big deal with a draft horse, but because we drive so many light horses that were never designed to push a load, this is a very important consideration in carriage driving.

Some horses can take the chest compression. Some cannot. It doesn't necessarily depend on conformation. Some horses are just plain offended by the restriction of the breast collar; some are more stoic and do their best.

For the purpose of human gratification, if you are seeking brilliant performance from your horse, consider whether he is capable of offering his best movement in a breast collar, with the chest being squeezed and the range of motion of the shoulder blades restricted.

NECK COLLARS

The advantages of neck collars can be summed up pretty easily. They spread the load over a large surface. They elevate the draft off the mobile lower end of the shoulder blade lever. They do not compress the chest. They don't inhibit the free forward motion of the foreleg. It could be said that they may be inherently more horse friendly than the breast collar.

But only when they are the correct selection for the vehicle or load, and only when they are skillfully fitted.

The biggest mystery in collar fit for all newcomers is fit. There are a number of scary myths (and remote truths) about their use. Horses tend to fluctuate in collar size to a certain extent over the season (though I believe this is much less pronounced in light horses than heavy). So they do have their drawbacks. I believe that the mechanical interaction with the horse's levers makes the neck collar the most horse friendly choice, *but only when it's correctly matched to the carriage or the work.*

IT'S NOT THE PAYLOAD, IT'S THE ANGLE OF DRAFT

Arguments for the selection of breast or neck collar generally revolve around whether the horse is going to pull a light or heavy load. "Breast collars are for light work, neck collars are for heavy work." This is the barest minimum of information one needs to know before making the selection. Light or heavy, rolling or skidding, ultimately it's the angle of the traces between the collar and the load - the *angle of draft* - that decides which collar is appropriate for the job.

A horse has angles and levers. Our job in selecting which type of collar will work best revolves around working with his angles and levers.



Perhaps the easiest way to visualize this is by hitching a horse with a breast collar to a meadowbrook type cart with the singletree way up on top of the front crossbar [Fig. 3]. Your shafts and traces are parallel to the ground. All your horse need be concerned with is bumping into the breast collar to push the load along. The push is in the direction we

want the carriage to go, so the setup is efficient according to the laws of physics.

FIG. 3: *This horse is hitched with a breast collar to a meadowbrook cart with the singletree mounted atop the crossbar. The traces show horizontal draft. There are reasons why this setup doesn't work well with the horse's angles and levers and we'll discuss them later. But for a simple cart going down a nice, smooth, hard road, this is a pretty uncomplicated setup.*

Well, now we want to take this horse and harness and skid some logs with it. Bad choice. Why? Because the more the traces angle down at the neckstrap, the more of the draft is brought to bear on it, across the top of the horse's neck! You can feel this effect by placing your hand on edge, under the neckstrap. Have someone pull straight back, and you will feel nothing. Have them pull down low and your fingers will collapse under the weight! In extreme cases,

virtually all the draft will be transferred to the top of the neck, while the breast collar hangs uselessly!

Now let's exchange the breast collar for a neck collar and hames. Same horse, same high-singletree meadowbrook. Your traces are parallel to the shafts and your horizontal angle of draft just tickles the physics professors because the horse is applying energy in the direction that we want the carriage to move. But up at the business end, the shoulders, you will discover that you have an acute angle between the hames and the traces [Fig. 4]. Just the opposite effect from the breast/collar-low draft combination is



taking place. All the draft is being shifted to the area of the shoulder from the *point of draft* (where trace meets hame) and below. The horse is carrying the load in a very concentrated area centered over the mobile lower end of the shoulder blade lever. He's going to get sore there, no matter what you do. While we've concentrated all the draft below the trace/hame attachment, the top of the collar is flapping loosely in the breeze.

FIG. 4: *The acute angle between the hames and traces pull the lower third of the collar down on the active lower end of his shoulder blade.*

Well then, let's go skid some logs. You've got this neck collar and hames on the horse, and a low payload. You've adjusted everything so you have a nice open angle between the traces and hames. The collar is fully seated on the shoulders, spreading out the weight and not concentrating it in any one area. The shoulder blade lever is free to rotate without being impeded at either end.

Between these combinations of collar and payload, there are infinite variations. Shoulder conformation plays a part in collar selection. For instance a very straight shouldered horse may do just fine in the neck collar/high draft combination, but a horse with an extreme slope to the shoulder will suffer.

Along with considerations of getting the right collar for the draft angle, now it's time to decide just exactly what your plans are for your driving horse. We've examined how the angle of draft affects our selection, and we've also seen that breast collars and neck collars have their own built-in advantages and limitations. It's time to decide which of these limitations we can live with, according to our driving activities, and which we simply can't tolerate.

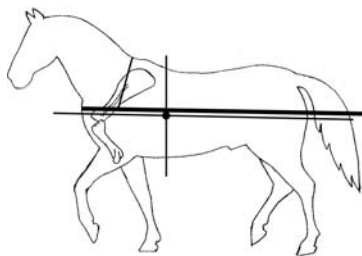
WHAT'RE YOU GOING TO DO WITH THAT HORSE AND BUGGY?

When I first started driving I basically had two choices about where to spend my money. Was I going to show my Morgans and get a show turnout? Or was I going to pleasure drive and get a big wooden wheeled cart? Those decisions were pretty cut and dried. Today the options are endless.

This is where we come to the critical point, where we try to convince the newcomer that it really DOES matter which equipment they select, and that it really IS worth the trouble to learn about these matters before you go much farther.

I can't even begin to address all the driving activities available to carriage drivers, so I can't cover all the possible combinations of harness and vehicle. All I can do is hit some of the highlights and give a brief - well - opinion of each.

The breast collar/high singletree combination: **[Fig. 5]** This would include a typical meadowbrook type vehicle, and a lot of light American or Canadian style "runabout" four wheelers. Smaller turnouts with ponies and minis may include the light steel carts with wire wheels. These vehicles are built for efficient travel on good, firm, level surfaces.



Why? Because the most efficient way to move an object is by applying force in the direction we wish it to move - that means horizontal, straight-ahead draft. The horse is little inconvenienced by bumping into the collar occasionally to move the relatively light load long. Things change when the road noses upward and the terrain gets bumpy.

FIG. 5: *The combination of a breast collar with horizontal traces to a high singletree is efficient for light travel on good surfaces.*

Knowing what you now know about how breast collars affect the horse's shoulders, how would you judge this combination when the going gets steep, rough, rocky? Are you going to be driving in soft, deep footing a lot? Do you wish your horse to give a brilliant, free-legged performance in a deeply footed arena?

The breast collar/low singletree combination: **[Fig. 6]** This would include the ubiquitous and to me, gut-wrenching combination of very low draft (singletree mounted very low) four wheeled marathon vehicles, with the horse coupled in very close to the vehicle, making a dreadfully steep angle of draft.

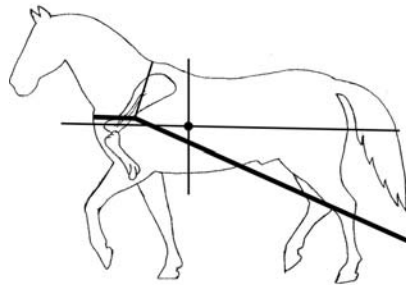


FIG. 6: *The combination of a breast collar with angled traces to a low singletree transfer weight to the top of the horse's neck. This is an undesirable combination.*

It is common to not only harness horses to these carriages with breast collars, but to hitch them so closely to the carriage that they can "poop over the dashboard onto the driver's boots." Two things happen in this situation. The first is that the angle of draft caused by the traces slanting downward from neckstrap to singletree causes the weight of the vehicle to be transferred to the top of the horse's neck. The second is that the very close coupling of horse to vehicle exacerbates the steep angle of draft and causes the horse to actually have to lift the front end of the vehicle with every step. Add to that the typical construction of the vehicle which throws most of the weight over the front end (requiring an active live body on the back step to keep the rear wheels on the ground), and you have a combination which forces the horse to waste great deal of his "pushing" strength to carry the front end of the vehicle. He is lifting the front end of the vehicle with each stride!

You say the marathon vehicle is built for cross country driving - but is it? And is it a breast collar that you want to harness him with for this vehicle? Are you going to use this combination for hours of recreational - or perhaps competitive distance - driving?

The Neck Collar/Low Draft Vehicle: [Fig.7]

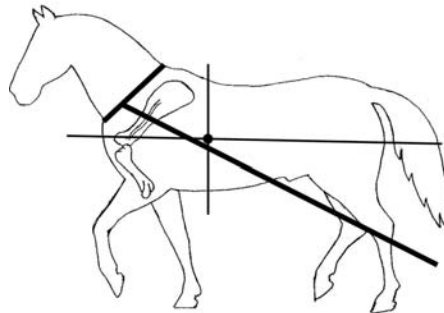


FIG. 7: *The combination of a neckcollar/hames with traces at a nearly plumb angle to the singletree spreads the draft correctly over the entire shoulder surface, while centering it over the least mobile part of the shoulder blade.*

I was looking at a photo of a horse nicely harnessed to a low-singletree marathon vehicle with a neck collar this morning. But something still was not right. Then I remembered a photo of one of my own previous turnouts, my horse hitched with neck collar to a similar



low-singletree marathon vehicle, and I remembered why it still didn't look right. Once again, both horses were coupled in too closely to the vehicle. The angle of draft was too steep. [Fig. 8] How do I know that? It's called "Balanced Draft," and we're coming around to that subject.

FIG. 8: *The horse is wearing a suitable collar, but is hitched too close to the vehicle and is having to lift up on the front axle with each step!*

The trouble with these two turnouts is that while we've got a nice plumb angle between the hames and traces, the horses are both coupled in too closely to the vehicle, and are having to lift the front end of the vehicle off the ground with each step. The situation for the horse cannot be corrected by any sort of creative harnessing owing to the construction of the vehicle. It can only be moderated by a careful selection of neck gear. Once again, tremendous energy is wasted "carrying" that should be used for "pulling." The situation might be improved for both horses by lengthening the traces, but firstly, with the way these vehicles are constructed - for sharp, tight, fast turns - this is not possible. Secondly, the line of draft should bisect the center of gravity of the vehicle, which generally occurs at a point midway between the two axles. Instead, these vehicles have the line of draft

basically running into the ground through the front axle. The front wheels are anchored to the ground.

This is not a condemnation of the vehicle (I am trying to keep my personal opinions out of the discussion). It is a discussion about whether you are planning on going marathoning, or competitive distance driving, or recreational trail driving. If this is your vehicle of choice for your activities, you must decide whether to use a breast collar or a neck collar. Your responsibility is to make the decision based on what's best for the horse, not on what everyone else uses.

It's interesting to note that the evolution of the marathon vehicle seems to include raising the singletrees back up to more horse-friendly positions.

The Neck Collar/High Draft vehicle: **[Fig. 9]**

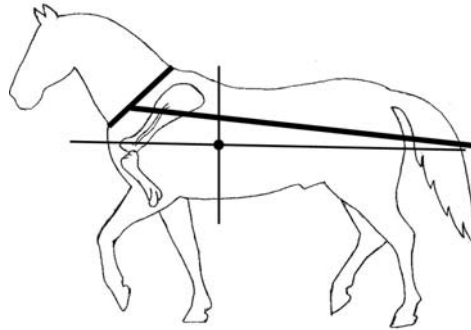


FIG. 9: *The combination of a neck collar with horizontal traces to a high singletree forces all the weight onto the lower third of the collar. This is an undesirable combination which may result in injury to the lower end of the shoulder.*

I've already gone over some of the pros and cons of this combination. Once again, there are good and bad points about the neck collar, too. A neck collar with the high-draft vehicle, particularly on a horse with well sloped shoulders, will concentrate pressure right at the spot where traces join hames. The upper part of the collar will be useless. I tried and tried and tried to make this combination work before I learned about *balanced draft*. I tried all the remedies - Epsom salt shoulder baths, alum shoulder baths, long conditioning to toughen the skin, different size collars. Invariably, a long-ish drive would bruise the shoulders. Now I know why. It's as simple as the wrong angle of draft.

Notice I haven't said a word about using a breast collar for light work and a neck collar for heavy work. Light or heavy, that's just not main issue in collar selection for carriage driving. It DOES become an issue when the size of the horse shrinks in comparison to the weight of the load. Neck collars ARE good for heavy work, but if the angle of draft is wrong, the neck collar can be just as bad, possibly worse, than a breast collar.

But what if you've convinced yourself that the neck collar creates the best work environment for your horse and activities, and you can't afford to trade off your meadowbrook? Here is one of those places where tradeoffs become necessary.

Between breast collar/high draft and neck collar/low draft, there are endless combinations. NOW what do we do?

We know we're never going to attain "perfection." Harnessing for horse comfort and efficiency is a series of tradeoffs. We have to decide which ones we can afford. So now I leave you in a panic of knowing just enough to be afraid of "ruining" your horse if your angle of draft is a half degree off plumb.

Calm yourself, because the next section will teach you about "balanced draft," a wonderfully clear and easy way to visually confirm that you have harnessed your horse in harmony with his carriage.

AT LAST – BALANCED DRAFT

This is where you develop a calibrated eyeball to determine if you have made the right selection - breast collar or neck collar - for your particular carriage. It's the ability you will take along to driving events to see how other turnouts appear to either hit or miss the mark.

We've examined different scenarios with horses hitched to various styles of vehicles with breast collars or neck collars. We know that there are infinite combinations of horse and vehicle, draft angles, and purposes for which we use our carriages. What we need now is a way to visually appraise our choices, and give us a way to tweak what we've got to the horse's advantage; a way to be sure we've set him up as comfortably and efficiently as possible. In other words, we need a way to assure ourselves that we've hitched the horse in *balanced draft*.

Draw an imaginary vertical line through your horse's theoretical center of gravity. This occurs roughly at thoracic vertebra 10, about a hand behind the rear sweep of the upper shoulder blade. (As a side note, this is the strongest, most rigid part of the spine and consequently, an excellent place to position the driving saddle.) Now, draw an imaginary horizontal line through his body, bisecting his mass into two approximately equal upper and lower halves. The place where these two lines intersect is the horse's theoretical "center of draft." [Fig. 10]



FIG. 10: The "Center of Draft" is found by drawing a vertical line through the horse's center of gravity, and a horizontal line which bisects his body mass into two approximately equal halves.

In almost all cases, the horse will be harnessed to the vehicle in *balanced draft* when the trace (or tug) passes through the intersection of these two lines [Fig. 11]. I could go into a lot more detail about identifying balanced draft, but this really sums it up. With the traces passing through the center of draft, you will virtually always have relatively equal body mass above and below the load. The horse will neither be pulled backward (too much mass below the load) nor tipped over on his nose (too much mass above the load). You will invariably have a good angle between hames and traces. With breast collar harness, balanced draft is sometimes difficult to achieve. Generally the horse will have too much body mass above the load - the traces will pass below the center of draft. But I have seen instances where it is very close. In other situations, the results are dreadful.

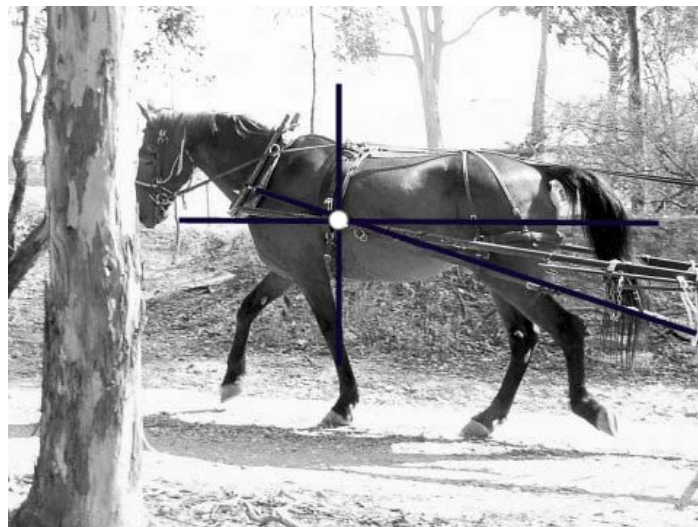


FIG. 11: *The traces pass through Hurdle's Center of Draft, denoted by the white spot. The angle between collar and trace is good, there is not too much body mass above nor below the load. He is set up to pull efficiently, comfortably and in balance with his vehicle*

On a horse hitched to a very low singletree with a breast collar (especially very close to the vehicle), you will see daylight between the horse's belly and the traces. The traces will be inches below the center of draft. Now that you are really scrutinizing, you can see that almost the entire body mass of the horse is above those traces. His whole mass is poised over the load, ready to put him on his nose. This sounds silly with a great big draft horse, but with a mini, it can actually pull them off their feet.

So that's about it. Neck collar or breast collar - you now know that it isn't just a matter of weight, it is a matter of *balanced draft*. It is also a matter of how you expect to use your horse and carriage. Once you are able to identify balanced draft, you will also be better

able to tweak the gear that you decide to buy to its best efficiency. I hope these notes have been of use, and that they help settle the questions (and explode the myths) about which collar - neck or breast - is best for you and your horse.