Pegasus Limb Phasing, how can it be used and what will it tell me?
ETB Pegasus Limb Phasing
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*For Precision Riding*

ETB Pegasus Limb Phasing is a training and diagnostic tool that measurably characterises the way your horse creates its stride. It does this by recording the following:

1. Stride duration (i.e. rhythm)
2. Stride length
3. Stride speed
4. Temporal limb phasing

What is Temporal Limb Phasing?
Temporal limb phasing monitors the degree of cannon swing of each leg within a stride. This allows each leg pattern to be monitored individually and/or in relation to each other. Relating each leg to each other gives us information on how the horse creates its stride: i.e. how quickly and how far away from each other each leg moves to produce the stride.

As training is generally about altering the horses’ stride to produce different levels of desired effects and movements, then leg patterns form an important landmark point.
For Dressage Horses

It delivers objective data of the effect your training has had on the horse, specifically:

- Rhythm (stride duration)
- Suppleness
- Stride length
- Symmetry
- Degree of collection

It can tell you:

- The optimum rhythm for this horse in each gait
- Steadiness of rhythm through extensions and collections
- The maximum stride length your horse can achieve
- Whether the horse moves the same on both reins
- What effect different training aids have on stride parameters

It provides quantitative information to share with:

- Vets – so they know what is normal for the horse
- Riders – are they achieving what the trainer/vet wanted?
- Owners – so they know the horse is progressing

Pegasus can be used ridden or unridden in any weather.

The following are examples of the answers to some of the above and comparisons that can be made between horses at different levels.

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**Key to Graphs**

<table>
<thead>
<tr>
<th>Shaded areas show:</th>
<th>Stride parameters:</th>
<th>Limbs:</th>
</tr>
</thead>
<tbody>
<tr>
<td>walk - yellow</td>
<td>duration - purple</td>
<td>left fore - blue</td>
</tr>
<tr>
<td>trot – turquoise</td>
<td>length - red</td>
<td>right fore - green</td>
</tr>
<tr>
<td>right canter/gallop - violet</td>
<td>speed - black</td>
<td>right hind - light blue</td>
</tr>
<tr>
<td>left canter/gallop - pink</td>
<td></td>
<td>left hind - amber</td>
</tr>
</tbody>
</table>

Please Note: the left hind leg is used as a reference point and so its line (amber) will always appear at the very bottom of the graph, except during the left canter when the right hind leg line (light blue) will.

Results are also given in the form of four (walk, trot, left and right canter) statistical tables but only graphs have been used for demonstration purposes within.
The optimum rhythm for this horse in each gait

For Horse 1 competing at Novice the answer is:

- Walk 1.25s (1.10s)
- Trot 0.8s (0.76s)
- Canter 0.6s (0.61s)

*Values in brackets are taken from dressage horses competing at Olympic level for comparison purposes.*

Graph showing stride duration

For horse 2 competing at Advanced Medium the answer is:

- Walk 1.20s
- Trot 0.75s
- Canter 0.60s

Graph showing stride duration

If the horse is not ridden at these rhythms then it will not be working at its optimum performance. It does not matter too much if the values differ from the high competition levels, provided that the horse maintains this rhythm throughout.
Steadiness of rhythm through extensions and collections

Fact:
FEI rules state that rhythm should be maintained through all paces in all gaits.

For Horse 1 competing at Novice:

The stride duration shows that Horse 1 loses its balance and rhythm (see red circle) particularly in the second trot. Ideally you want a straight line as that indicates steady stride duration/rhythm. The walk and the first section of the right canter are also a little unsteady but the canter improves. Otherwise the horse maintains a steady rhythm.

Graph showing stride duration

When the stride length and speed are added to the graph it becomes clear that Horse 1 loses its rhythm as it moves to extensions in trot and slightly less noticeably in canter. For a horse at Novice level this can be expected but progress can now be monitored objectively from here.

Graph showing stride duration, stride length and speed
**For horse 2 competing at Advanced Medium:**

Horse 2 generally has a steadier rhythm (purple line is more level) than Horse 1. Considering this horse is more advanced than Horse 1 this is expected.

Graph showing stride duration

When the stride length and speed are added to the graph the qualities of the more advanced horse can be seen. As the horse moves into extensions the rhythm remains steady in trot and right canter. There is some variation in left canter, which could be improved upon through training.

Graph showing stride duration, stride length and speed
The maximum stride length your horse can achieve

Fact:
More advanced dressage horses are able to achieve a greater stride length than a novice. Horses at FEI Olympic level can achieve an average stride length of 3.5m in their extended trot and canter (Clayton, 19941, 2).

For Horse 1 competing at Novice the answer is 3.1m in trot, left and right rein canter.

The novice horse has comparable extensions in both trot and canter. As the horse moves up the competition level this should increase and these improvements can be objectively monitored.

Graph showing stride duration, stride length and speed

For Horse 2 competing at Advanced Medium level the answer is 3.4m in trot, left and right rein canter.

This horse is progressing well. Its more advanced level is showing itself through its achievement of longer stride length in extensions than Horse 1. It probably has some further scope for improvement and this can be monitored.

Graph showing stride duration, stride length and speed

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Whether the horse moves the same on both reins

An ideal way of determining this is to look at the limb movement in both left and right rein canters.

Reminder for canter limb pattern; the outside hind pushes off, then the other hind leg and opposite foreleg should move together (referred to as the diagonal pair) with the leading fore leg finishing. For example in left canter the pattern will be RH, LH and RF together and LF.

Horse 1 competing at Novice:

This horse canters differently left and right. In the graph the right rein canter diagonal pair (light and dark blue lines) are well coupled but the left rein canter diagonal pair (green and amber lines) are more separated. It is likely this would be seen visually and the rider would feel the right rein is more comfortable.

Graph showing stride duration and limb phasing

Horse 2 competing at Advanced Medium:

The more advanced horse canters the same on both reins. In comparison to Horse 1 it can be seen that the diagonal pair in both canters are well coupled, to the same degree. The only subtle difference between this horse’s canters is that the lines on the left canter are higher up the graph than the right. This indicates the horse would look slightly more collected on that rein.

Graph showing all factors
Degree of collection

**Horse 2 competing at Advanced Medium is collected:**

The qualities of the more advanced horse can be seen as this horse’s leading canter forelimbs are later in the stride (over 60% of the total stride duration). This is indicative of a horse that is more collected and engaged from behind, making the front end lighter and thus spending longer through the cycle.

Graph showing all factors