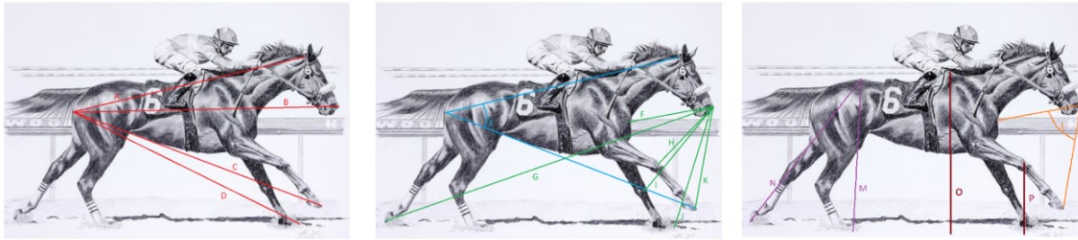


# RACEHORSE STRIDE ANALYSIS

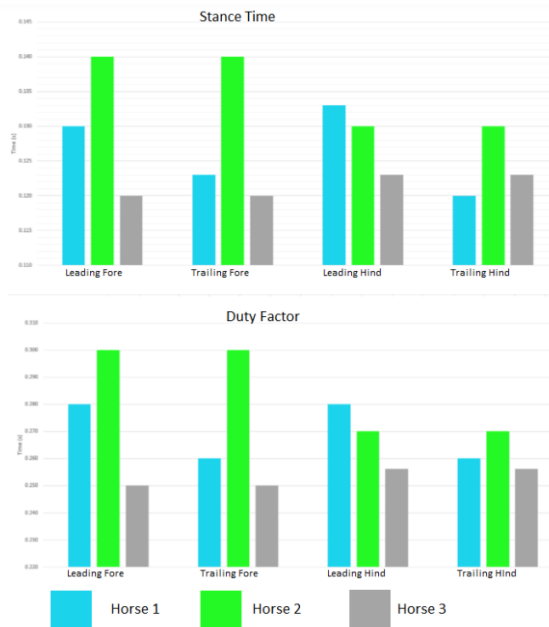
A stride analysis report was conducted on three horses, two travelling at 25mph and the third travelling at 33mph. The data was used to assess the stride parameters of all three horse including stance duration and duration of aerial phase.



Identity	Description—Measured at maximum stretch	Units
A	Distance of poll to point of buttock	Meters
B	Distance of nose to point of buttock	Meters
C	Distance of leading fore hoof to point of buttock	Meters
D	Distance of trailing fore hoof to point of buttock	Meters
E	Angle between poll – point of buttock – leading fore hoof	Degrees
F	Distance between leading fore shoulder and nose	Meters
G	Distance between trailing side hind hoof and nose	Meters
H	Distance between leading fore knee and nose	Meters
I	Distance between trailing fore knee and nose	Meters
J	Distance between trailing fore hoof and nose	Meters
K	Distance between leading fore hoof and nose	Meters
L	Angle between leading fore shoulder – nose – leading fore hoof	Degrees
M	Distance between leading side hind hoof and top of croup	Meters
N	Distance between trailing side hind hoof and top of croup	Meters
O	Distance from top of withers vertically to the ground	Meters
P	Distance from leading knee vertically to the ground	Metres

	Definition
Stance Duration	The gait phase that lasts from heel strike to toe off—this can be further split into contact phase and support phase
Protraction duration	Time between stance duration
Duty Factor	The fraction of the stride for which the limb maintains contact with the ground surface
Duration of aerial phase	Time during which no limbs are in contact with the ground (independent of speed)
Overlap time	Time during which more than one leg is on the ground—drops with speed and approaches zero at maximum speed

Horse		1	2	3
Stride Length (m)		5.34	5.41	6.99
Stride Time (s)		0.467	0.473	0.48
Speed (m/s)		11.43	11.43	14.56
Speed (mph)		25.58	25.58	32.58
Stance Duration	Leading fore	0.130	0.140	0.120
	Trailing fore	0.123	0.140	0.120
Leading hind	0.133	0.130	0.123	
	Trailing hind	0.120	0.130	0.123
Protraction Duration	Leading hind	0.350	0.327	0.360
	Trailing hind	0.340	0.347	0.357
Duty Factor	Leading fore	0.280	0.300	0.250
	Trailing fore	0.260	0.300	0.250
	Leading hind	0.280	0.270	0.256
	Trailing hind	0.260	0.270	0.256
Duration of aerial phase		0.117	0.127	0.147
Overlap Time (s)		0.130	0.170	0.170



- Horse 1 has a difference of 54% if the stance duration of the leading side compared to the trailing side
- Both Horse 2 and 3 symmetrically load limbs on both sides
- At a faster speed the stance duration of the hind limbs increases above that of the forelimbs indicating the propulsion comes more from behind to enable the horse to travel faster. This is reflected also in the duty factor of the limbs
- Horse 3 has slightly bigger stride parameters at full stretch compared to both Horse 1 and 2 despite him having a much larger stride length of 6.99m compared to Horse 1(5.34m) and Horse 2 (5.41) \*Horse 3 is travelling faster. The stride time is similar for all three horses
- The aerial time is greater when the speed is greater