

## **Weight and its Effect On the Outcome of Thoroughbred Races**

Saturday June 21, 2003

'Horse of the Year' *Azeri* loads into the gate for Hollywood Park's *Vanity Handicap* carrying an impost of 127 lbs. Her credentials are impeccable - 9 consecutive Graded I or II victories including a monster win in the *Breeders Cup Distaff* last autumn. She is 1/5 odds on the toteboard despite having to concede considerable weight to her six opponents ranging from 9-17 lbs. Down the stretch she had put away all but *Sister Blues* - a stubborn filly carrying 16 lbs less than *Azeri*. The champ seemed to lumber on by and did not make it look easy; the final fraction was average.

Was the 16 pound difference a key factor in *Azeri* having to be pushed a bit more than usual to defeat such an inferior opponent? What impost would have stopped the victory train this day - 130 to 135 lbs, surely a 140 lbs would have been the proverbial 'straw on the camels back'? This race may well represent the most extreme weight spread encountered all year in North America.

Most American trainers simply refuse to enter their Graded Stakes stars if the weight exceeds 126 lbs, and why should they, there is probably another \$500,000 + purse to be contested soon enough elsewhere. The excuses are almost comical: "I will not allow my horse to be subject to injury with such an unsafe high weight" or even more extreme: "I won't let them kill my horse....." These outlandish statements fly in the face of those 2-mile steeplechase races with all the horses safely carrying 135 lbs or more over hurdles. What about European racing where top horses routinely carry 130+ at longer distances. The lore of American equine sport is filled with tremendous performances carrying high weights, most notably the world record mile set by the powerful *Dr. Fager* in 1968 at Arlington while burdened with 134 lbs, then following that up with a 139 lb score breaking the Aqueduct track record at 7f a few months later. The recently deceased *Spectacular Bid* was carrying his highest impost of 130 lbs in 1980 when he broke the record for 1 1/4 miles running an incredible 1:57 and change at Santa Anita.

Do the awesome exploits of top thoroughbreds under high weights really give us much of a clue to the everyday effect of weight on the average runner? Therein lies part of the problem with testing weight as a handicapping factor. The superior horses are assigned the higher poundage based on better recent performance. This is done, in theory, to help equalize the chances of all the entrants. What is the real impact of these weight assignments at all class levels and on non-stakes horses? And how do race-by-race weight changes impact performance?

Weight was considered a very important handicapping factor by most horseplayers until the late 1970's. The landmark books by Beyer and Davidowitz basically dismissed the effect of weight in lieu of accurate speed numbers. They did not really document their opinions, but based them on experience. Dr. William Quirin tested the effect of weight in his 1979 book and provided evidence that high-weights win far more than their fair share of races. That book diminished the notion of weight as a factor for many horseplayers. His study was a very small sample though, not based on clear parameters and his own conclusion was that the weight factor was merely a function of better horses being assigned more pounds.

Interestingly, Len Ragozin from New York and Professor Gordon Jones from California pioneered excellent speed numbers prior to Beyer and Quirin. A key portion of their figure adjustment was weight and they still believe in it today as a factor in making accurate ratings. In England, the *TimeForm* ratings have used weight as the benchmark of their analysis of horses for decades with very accurate estimates of class and ability. Most handicapping experts outside North America consider weight as a factor in their selections because precision speed figures are not available. They pick just as many winners, if not more than their American or Canadian counterparts in the racing press.

The weight issue has supporters and detractors, but it is obvious that most handicappers these days rarely consider it critical anymore. My goal in this article is to research the weight factor objectively and methodically with fair parameters to determine any clear impact on the outcome of races.

## The Effect of Weight --Top Weighted Horses

Most research efforts into top weighted horses has been very simplistic. The test method usually identifies the high weight in the race horse regardless of the poundage spread. Solid conclusions about the effect of weight won't be uncovered if a qualifying top-weight test horse is carrying 114 lbs. and all the others are toting 113 lbs. To determine if those pounds are slowing them down, we need to identify the horses that are clearly the top weight, are carrying reasonably higher amount than all their opponents and establish a minimum level where the weight can have some effect. Here are the specific rules I setup to query top-weighted horses. These rules will give us one - and only one qualifying horse per race - assuming the 1-2 parameters below is met - otherwise the race is ignored for test purposes.

1. Minimum top-weight 117 lbs.
2. Spread of 4 lbs or more over all opponents in the race.

Horses in non-stakes races are assigned their weight based on the old "Jockey Club Scale of Weights" that has been around since the 19th century. The scale is designed to give younger horses and females an easier assignment if facing older horses or males. Most common is a race that allows 3-year-olds to face older horses - the 4-year-old-and-up runners will be carrying from 4 - 12 lbs. more than the 3yr based on time of year and distance and race conditions. Females entered against males typically receive a 5 lb. break. Racing secretaries use the scale of weights as a general guide and also draw up their parameters such as recent race success when listing weight assignments. Most claiming races allow a few pounds off if the horse is willing to be entered for the bottom price.

The point of reviewing weight methodology in the preceding paragraph is to recognize that top-weight is not always based on performance solely. It can be a function of age/sex and entry rules. That could be an important aspect to our conclusions about this test.

As with all the test results in this article, I restricted it to races with purse values of \$10,000 or more. This helps to eliminate cheap races with suspect horses and the unusual betting patterns that occur with smaller wagering handle.

### Test Results - High Weighted Horse - 117 lbs. minimum and +4 lbs. spread over all opponents - Purse \$10,000 or more - 2yr data sample

Type of Race	Horses	Win%	I.V.	ROI
Dirt Sprints	8413	18.9%	1.65	0.75
Dirt Routes	4678	19.3%	1.59	0.72
Turf Routes	1681	19.0%	1.62	0.80

### Analysis

The results are conflicting. On one hand, these clear top-weighted horses hold their own and win much greater than their fair share of races. When the impact value rises above 1.50, there is no coincidence as to the positive results regarding win percentage. Considering we have no other information about these horses except that they toted at least 4 lbs more than their competition, a 19% success rate is pretty good.

However, the ROI are very bad for the dirt races. This leads us to a certain conclusion about this top-weighted runners; they are sorely over-bet in terms of their chances of winning. This could indicate that the weight is holding them back from the public's expectation of their real chances. In my experience, the public is usually able to exceed 0.80 ROI with an impact value this high.

At this point it is impossible to draw a solid inference as we do not know the other handicapping factors that were present with the study group, though it looks as if these top-weights should have won more often according to the ROI. We need to add another variable that will provide a benchmark of expected performance to compare an outcome - the (K) rating is the perfect vehicle.

## **The Effect of Weight --Top Weighted Horses and K1**

The (K) rating is HTR's backbone contender selector. The top-ranked (K) runners win at a rate of 30% with an ROI of about 0.88 under virtually all circumstances and race conditions. Massive data sampling from dozens of users over many years have verified these results as ironclad.

In the test below we'll discover if K-1 horses are hindered by having to carry significantly more pounds than their opponents. I tested the K-1 high-weights under the exact same parameters as the previous test.

### **Test Results - K-1 - High Weighted Horse - 117 lbs. minimum and +4 lbs. spread over all opponents - Purse \$10,000 or more - 2yr data sample**

Type of Race	Horses	Win%	I.V.	ROI
Dirt Sprints	2530	36.2%	3.03	0.82
Dirt Routes	1562	34.8%	2.69	0.83
Turf Routes	573	32.4%	2.53	0.73

### Analysis

The impact values are off the charts, these horses (top-weight + K1) win at a rate nearly 3x normal expectation in the race population and significantly better than the normal K-1 performance. However, once again the ROI fall below the bar and are very disappointing. On one hand we have increased performance from the top-weights, perhaps leading us to believe that the weight has no bearing. This has been typical of research into weight over the years that caused some to dismiss it as a handicapper factor. But my sense from the ROI is that these horses *did* under-perform. There are many spot plays and filters that can push K-1 results past 40% winners and over 0.90 ROI. My experience tells me that these top-weighted horses here were similarly elite K-1's and should have won more races in this sample. The jury is certainly still out on this issue now. Let's move on and see what we can discover from the opposite end of the weight spectrum - the horse carrying the lightest load in the race.

## **The Effect of Weight --'Light as a Feather'**

A horse stumbles at the start - the jockey goes plop onto the ground - and now the bewildered horse, sans his pilot, is out there running loose with field, much to the amusement of the fans. Someone will always say: "wow he really wanted to go today"; "watch that horse next time"; "he would have won it if that stupid bum hadn't jumped off". Considering the rider-less horse was carrying about 100 lbs. less than his opponents, we might want to attribute some of that extra energy to traveling "light".

With the jockey firmly aboard though, some horses still get a significant weight reduction over the top-weight, perhaps as much as 7-12 lbs. Does this give them any discernable advantage? We are stuck with a dilemma here that is similar to the high-weights. Those horses that are 'getting in with a feather' are assigned that lighter impost for the same reason that weaker golfers are given a handicap, to help equalize their chances with stronger opponents.

I ran a query through my database of the lowest-weight horses. If an entrant was getting a 7 lb. break or more from the top-weight it qualified for my test. No definitive results were found. These low-weights seem to win and lose at expected levels. Rather than post the unexciting test results I think it would be more interesting to discuss three key issues regarding light-weight horses on page-9.

*I have some space here and want to thank "llFred" (Fred B. from New York) for sending me considerable background material on the weight issue. His insights and reading material were fascinating and appreciated.*

**The Effect of Weight - "He Gets In Light"**

- Popular handicapping books, particularly those by James Quinn have dealt with the issue of 3yr vs. older at various class levels. Quinn makes a particularly strong case against betting older horses (age 4 and up) when they face 3yr, especially in maiden claiming and early non-winners allowance. The line of reasoning is that the older runners are proven losers under those conditions, while the 3yr are lightly raced and likely to improve. Weight was also a factor in this opinion because the 3yr's are assigned considerably less poundage when facing older. Quinn based most of his understanding of this issue on races from southern California tracks where the quality of the non-claiming 3yr is higher than anywhere else except BEL and SAR and the results favor the classy 3-year-old. Quinn did not document his viewpoint, but I have tested it, and so have others, and there is no evidence on a nationwide basis that 3yr vs. older is an advantage or disadvantage at any class level. A weight benefit is therefore difficult to ascertain. Certainly we all have seen 3-year-olds that pop the gate and suddenly improve to take apart a field of veteran elders. But just as often the maturity of the older runners gives them the edge over the inexperienced sophomores. The weight difference does not seem to tilt the results toward the 3yrs.
- "Hot" apprentice riders ("bug boys") have become far less common on the major circuits than in the past. Trainers seem leery of giving a raw teenager a good horse when so much purse money is at stake, particularly with quality young stock and grass runners. Getting a few pounds off means less to a top trainer than the edge gained from employing a wise and seasoned jock. These days, most apprentice riders gain their experience on minor circuits, quarter horse tracks and from working horses in the morning, and from riding the occasional 50/1 shot in a maiden claimer. The talented ones are noticed quickly, but there is still hesitation to use them regularly despite the big weight allowance. Bottom line here is that any edge in weight for the bug boys and girls is incalculable either because of their inexperience or the poor quality of the mounts they receive.
- The most acute recognition of weight difference occurs at the highest levels of class - as with the Azeri race discussed at the beginning of the article. Horses can receive as much as a 20 lb weight advantage when facing the cream of the handicap division. (Too bad there *isn't* much of a handicap division anymore because all the best 3yr's seemed to be washed up by their 4th birthday). There is zero evidence that the weight matters here as the high-weighted favorites win far more than their fair share of these stakes events and the lowest weighted horses rarely make an impression. The large gap between the class and ability levels apparently cannot be made up with acceptable weight variations. If they had put 150 lbs on Empire Maker in the Belmont Stakes would he lose to a cheap maiden claiming sprinter from Finger Lakes carrying 110 lbs.? No way. What about a 200 lb. impost, would that even it up? Maybe. The overwhelming majority of races in North America do not have weight differences greater than 5-lbs between the contenders. So the poundage differential would seem to make scant difference if the ability gap is already real. If two horses are virtually equal in all respects then wouldn't a few pounds lighter give one an edge? I suppose it could, but other developments may absorb the minor gain, such as pace, post-position, racing luck, etc. We need a laboratory with two perfectly equal thoroughbreds running hundreds of clean match-races, but with one carrying 5 lbs more than the other. This might tell us once and for all the value of that weight in the outcome.

The 'Sheets' and Weight

This concludes the discussion of weight in terms race outcome. To sum it all up in one word --> "inconclusive". Weight does not seem to directly impact the outcome of most thoroughbred races, although a minor effect seems likely in some cases. There may be a more important aspect to the issue. It is a subtle and less direct approach used by the *Ragozin* and *Thorograph* 'sheets' to adjust their numbers. Turn to page-10 for more.

**The Effect of Weight - Form Cycle and Speed Figs**

Our study so far focused on race outcome only. Now we turn to the individual horse to find out if weight shifts are affecting their performance, speed figures and current form. I'll research it by locating horses that dropped or added a significant amount of weight from their previous start in the last 45 days. We'll then compare the Cramer speed 'sheet' figures between the two races to see if there is improvement or decline. Obviously weight is not the only reason that horses improve or decline their speed numbers from one race to the next, dozens of other factors could be responsible. But in a large sample, we'll hope that some tendency will be revealed to believe the weight change is really having an effect. Here is how I setup the test.....

- Locate horses that are dropping or increasing 5 lbs in sprints, and those dropping or increasing at least 4 lbs in routes. Races compared only if 45 days or less apart.
- Compare the Cramer 'sheet' speed figure from the earlier race to see if they improved, declined or remained the same after returning to run with the weight change. I used +/- 1pt to assume "same".
- Not enough hard data was available for Turf Routes, so these tests are for dirt runners only.

**Test Results - Dirt Sprint - Carrying 5 lbs MORE weight since last start**

Speed figure remained about the **SAME** from previous = 28%

Speed figure **IMPROVED** from the previous start = 34%

Speed figure **DECLINED** from the previous start = 38%

**Test Results - Dirt Sprint - Carrying 5 lbs LESS weight since last start**

Speed figure remained about the **SAME** from previous = 26%

Speed figure **IMPROVED** from the previous start = 34%

Speed figure **DECLINED** from the previous start = 37%

**Test Results - Dirt Route - Carrying 4 lbs MORE weight since last start**

Speed figure remained about the **SAME** from previous = 30%

Speed figure **IMPROVED** from the previous start = 32%

Speed figure **DECLINED** from the previous start = 38%

**Test Results - Dirt Route - Carrying 4 lbs LESS weight since last start**

Speed figure remained about the **SAME** from previous = 23%

Speed figure **IMPROVED** from the previous start = 37%

Speed figure **DECLINED** from the previous start = 40%

**Analysis**

All of the categories reveal that **DECLINE** is the most common result of any large weight shift. Yet approximately 1/3 of those carrying more weight than in their previous start **IMPROVED** their ratings despite the weight increase. Once again we are left to ponder whether the results have anything to do with the actual poundage, or bear upon the reasons for conditional weight assignments instead. Don't dismiss the fact that a large numbers of these weight-changers ran back to their previous figure as well. Should we devise a mechanical adjustment for weight in our speed figures? - I don't see how that can be done with any confidence. I have evaluated all the weight charts - 3 lbs per length, etc. - unsubstantiated.

Finally, I reason the effect of weight change is an individual factor for each horse. For most, a few pounds up or down is meaningless. For others it might mean losing by a neck in a close finish if carrying 4 lbs. more than the other guy. Many horses probably have a ceiling where they cannot run as effectively; up around 130 lbs. for top class horses, but perhaps as low as 116 lbs. for cheap claimers and babies. Weight is another intangible, as difficult to quantify as trips, breeding and workouts into the outcome. The intuitive approach works best; if you study horses and their form cycles long enough, you'll sense pretty strongly when a weight-shift combined with other factors is going to make a difference.

*System Tests*

**Fast as a Bullet - Gets in with a Feather**

Let's *lighten up* the discussion of weight and see if we can find some winners with it. This system locates horses that will be quick to the front and are carrying very low poundage. Maybe they can hang until the finish with the light load. Here are the parameters.

1. Horse must be ranked-1 in Fr1 velocity.
2. Quirin points +6 or greater. "F" or "E" running style.
3. Weight 112 or less, and at least 5 lbs less than the top-weight in the race.
4. I tested all dirt races, no purse or class restrictions as a limited sample size was expected.

<b>Race Type</b>	<b>Plays</b>	<b>Win%</b>	<b>ROI</b>	<b>W+P%</b>	<b>High\$</b>
<b>Dirt Sprints</b>	<b>2093</b>	<b>19%</b>	<b>0.85</b>	<b>35%</b>	<b>\$73</b>
<b>Dirt Routes</b>	<b>984</b>	<b>18%</b>	<b>0.87</b>	<b>32%</b>	<b>\$61</b>

Analysis

The featherweights scored at just the normal rate for Fr1 winners, but the return is much lower than the typical ROI for an early-speed spot play using Fr1. These horses are surprisingly over-bet. Perhaps that makes sense as the public has increased its awareness and desire to wager on horses with observable front speed. Many of these were undoubtedly ridden by apprentice 'boys and girls' and looked like attractive plays on paper due to the light load they were carrying. With most tests of Fr1 the high\$ (highest mutuel hit in the sample) will uncover more than a few \$100+ winners. But these lightweights brought home only a single 35/1 shot at best. Another indicator that the public finds these horses fascinating and will bet on them.