HOW THE CITY OF LAKES LOPPET WAVE ASSIGNMENTS ARE DETERMINED

NEW FOR 2011:

1). This year the 2010 and 2011 Pre-Loppet races will be considered for wave placement in the freestyle event.

2). Due to it's growing popularity, the classic event will have two waves. A similar wave placement methodology will be used for the classic event wave placements. Only other classic races will be used for race time normalization to the 2010 City of Lakes Loppet classic race.

ORIGINAL POSTING

Have you ever showed up for the City of Lakes Loppet freestyle race, picked up your bib and wondered how the powers that be put you in a particular wave? Have you ever thought to yourself, "Man, I'm a wave 2 Birkie skier, how can I be in wave 3 for the Loppet?" Well, here's how it's done.

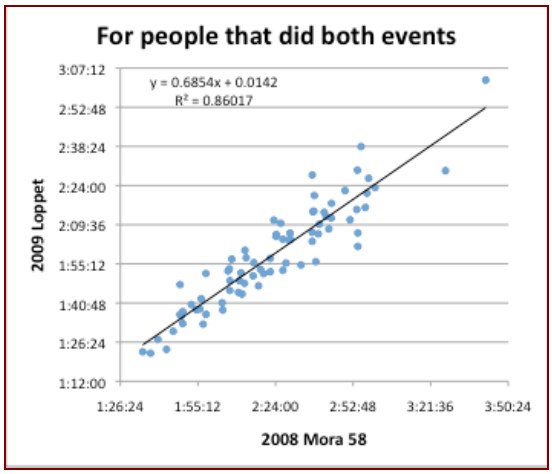
We've compiled a database of results from the big local races. We use the results from the last 2 years of the Loppet, the 35km and 58 km Mora races, the 25 km and 50 km Pepsi races, and the Birkie/Kortie races. If you've done any of those events over the last 2 years we should have your time in our database. We compare all those times and use your best result for placing you in a starting wave for the Loppet.

I'm sure some of you are already saying to yourself; "Wait a minute, how can you use the results from a long, tough race like the Birkie and compare that to a result from somebody that did a shorter "easy" race like the 35 km Mora"? Well, you can't. Not directly anyway. You have to manipulate the results a bit to account for things like distance, snow conditions, course profile, etc.

So now you may be saying something like; "That makes sense, it sure isn't fair to compare a 50 km Birkie at 0 deg F on fresh soft snow to a 35 km Mora on fast hard pack at 25 F. I'm with you so far. But how exactly do you compare those different events"?

We use a statistical tool called linear regression. I'm sure I just lost half my audience with that last sentence but hang in there, its not all that bad and actually pretty interesting. What we need to do is estimate how long it would take somebody to ski the loppet course based on skiing on some other course. We do this by searching our database to find people that skied both courses, compare those results and determine the regression equation that relates those 2 times.

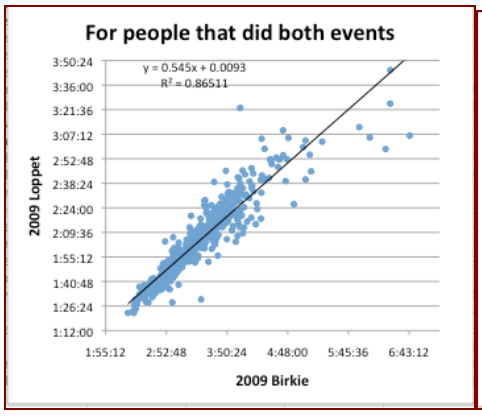
Here are some examples that should make this clearer. But first, one important detail. We are always going to use the 2009 *(this will be updated to the most recent event each year)* City of Lakes Loppet freestyle results as our baseline or common point of reference for all these comparisons. In other words, when we are looking up all these results to determine the regression equations we need to find people that did that other event AND also did the 2009 Loppet. So for example, we search thru the results of the 2008 Mora 58 km race and look for names that also show up in the 2009 Loppet results. We did that and the chart below shows what we found.



In this example there are 77 names that show up both sets of results. Each dot on this graph is one person. The bottom horizontal line shows their time in the 58 km Mora race and the vertical axis on the left shows that same person's time in the 2009 Loppet freestyle. The line drawn thru the data points is the best fit regression line and the equation in the upper left hand corner is the regression equation where 'x' is the time in the Mora event and 'y' is the estimated time to do the 2009 Loppet event. So, even if you did only the 2008 Mora 58 km race and never did the Loppet before, we can use this equation to come up with a pretty good estimate of how long it would have taken you to do the 2009 Loppet course.

With me yet? Step back and look at the big picture again. All we are trying to do is make a guess at how long it would take somebody to ski the Loppet course in 2009 by using data from people that actually did ski the Loppet course in 2009 and also skied the Mora 58 km course in 2008. We see that the results for those people that did both events are not just randomly scattered around but follows a pretty well defined line. Since it follows a pretty well defined line we can say with some confidence how long it will take somebody to ski the Loppet course based only on how long it took to ski the Mora course.

A couple more examples are shown below;



Ok, so that's all there is to it. Well, not quite. There is a little bit more. We have to take all that information and program our database tool to make use of it. The picture below shows a section of our database for a person that has already registered for the 2009 Loppet and all the race results found for that person. So this person did 7 events over the last 2 years. Her actual race times are shown in the left hand column, the estimated time to do the 2009 Loppet based on these results is in the 2nd column. This person actually did do the 2009 Loppet and her time was 2:05:33. All of the estimated times for her based on those other events are all within 5 minutes even though the actual

times cover a range from 1:48 to 3:21 so the method seems to work pretty well. So, we look at all those adjusted times and use the fastest one for placing her in a wave for 2010. So in her example we would use her 2008 Birkie time.

	Actual Time	Adjusted Time
2009 Loppet Time	2:05:33	
2008 Loppet Time	1:48:10	2:04:25
2009 Pepsi 50 Time		
2009 Pepsi 25 Time	2:02:48	2:05:12
2010 Pepsi 25 Time	<File	
2010 Pepsi 50 Time	<File	
2009 Mora 35 Time	1:52:57	2:10:59
2009 Mora 58 Time		
2008 Mora 35 Time	2:38:04	2:10:22
2008 Mora 58 Time		
2009 Birke Time	3:21:00	2:02:56
2009 Kortie Time		
2008 Birkie Time	3:18:59	2:01:26
2008 Kortie Time		

Other Qual Time:

Adjusted Other Time:

Minimum Time: 2:01:26

Wave:

Luminary Start:

Year Pin: 5

Another example for somebody that has never done the Loppet before is shown below. This person has only done the Birkie over the last 2 years and based on those times it's estimated that he would have done the 2009 Loppet in about 1:31 to 1:35 so we will use that time to place him in a wave for the 2010 Loppet. His estimated time is faster than the person in the first example so he would be put into a higher wave even though he has never done the Loppet before. We won't hold it against him that he hasn't participated in the Loppet before but all his ski buddies should get on him for missing all the fun Loppet skiers have had the last few years!

	Actual Time	Adjusted Time
2009 Loppet Time		
2008 Loppet Time		
2009 Pepsi 50 Time		
2009 Pepsi 25 Time		
2010 Pepsi 25 Time	<File	
2010 Pepsi 50 Time	<File	
2009 Mora 35 Time		
2009 Mora 58 Time		
2008 Mora 35 Time		
2008 Mora 58 Time		
2009 Birke Time	2:22:37	1:31:07
2009 Kortie Time		
2008 Birkie Time	2:22:29	1:35:04
2008 Kortie Time		

Other Qual Time: 2009 Birkie 2:22

Adjusted Other Time:

Minimum Time: 1:31:07

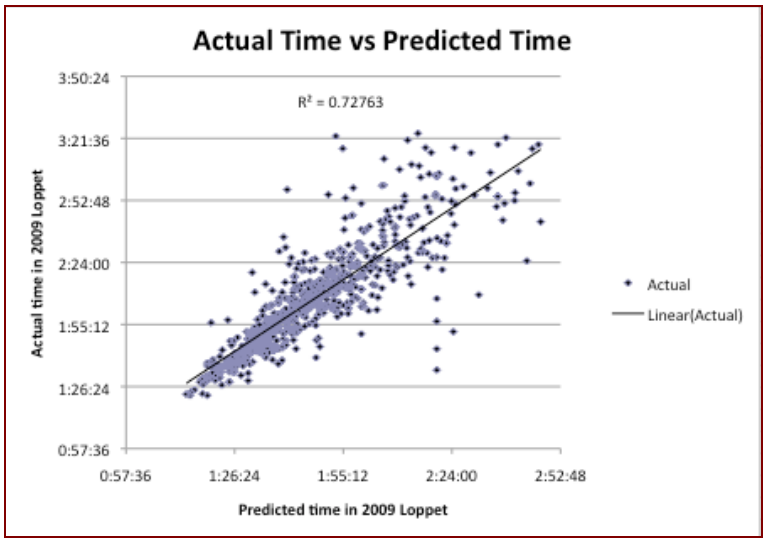
Wave:

Luminary Start:

Year Pin:

If you have already registered for the Loppet you may remember that there was a place on the registration form to put in a qualifying time. This person did that by noting their 2009 Birkie time of 2:22. In this case the information won't be used (except to verify that we got the right time from the database!). But some people have not raced lately or have done races in other parts of the country and they may put that information in there. We will try to use that information to place a person in an appropriate wave but I just want to remind everybody that the Loppet registered about 6000 people for all our events over those 2 days and given the huge numbers we just can promise that we will get a chance to use a result from a 10 km race from 8 years ago in Vermont but we will try our best.

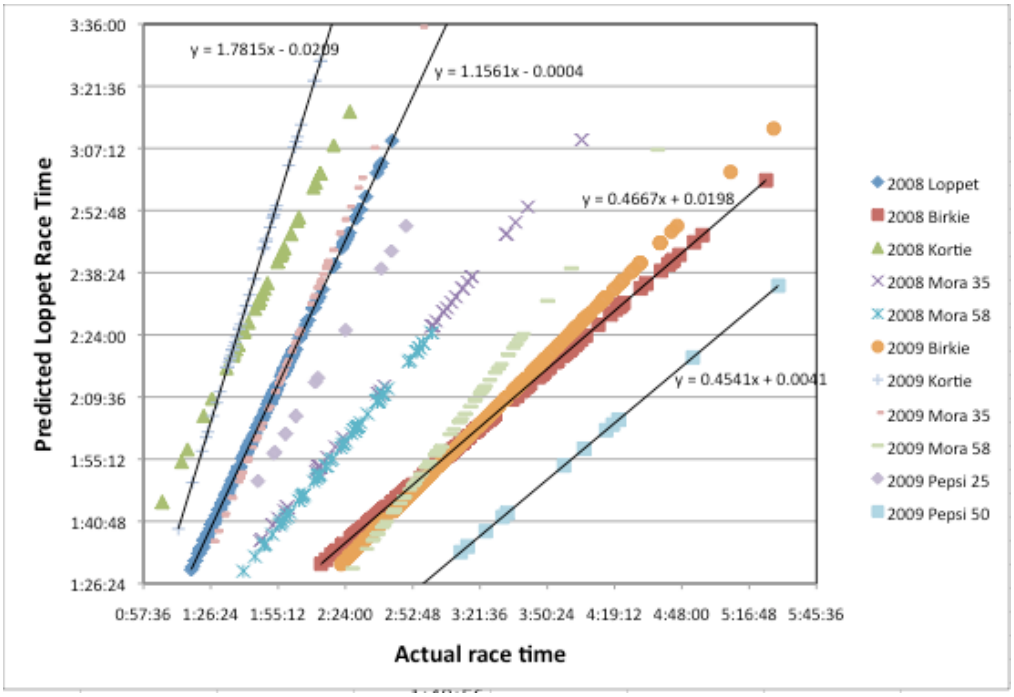
You should now be saying to yourself; "Wow, that's awesome. But how well does all this actually work"? Well, we've been doing it for many years not and it seems to work pretty well. The chart below shows the results for all this stuff from the 2008 event. We predict the finishing time of the top half of the field quite well but a little less well for the 2nd half. That's to be expected because the people in the top half then do be more consistent in their fitness level from one year to the next.



A few more fun details: Did you know that your bib number in the loppet shows your expected finish result? Once registration closes a couple days before the event we take all these predicted times and sort everybody from fastest to slowest and divide everybody up into waves with an equal number of people in each wave. Your bib number corresponds to where you placed in that ranking. So if you are bib number 3021 you are expected to be the 21st fasted male in wave 3 or if you are bib number 2505 that would be the 5th fasted female in wave 2. Just a quick reminder how to read bib numbers; the first digit shows the wave so 3021 means wave 3. All the male bibs start at number X001 for each wave and the female start at X501 so 2505 is a female in wave 2 ranked 5th fastest in that wave.

So, I hope you stuck with me through all that and have a better understanding of how you get assigned to a particular wave. One question I often get is; "how come we don't know our wave assignment as soon as we register"? It's that way because we don't do the final wave assignments until everybody registers and we know how many people are in the event and what the break down of fastest to slowest skiers is. Our goal is to have an equal number of skiers in each wave and avoid the Birkie wave creep problem where there are almost 1000 people in each of the first few waves and only a couple hundred in each of the last few.

One last cool chart for the really hard cores out there that are still reading this. This chart shows the results of all the regression equations that will be used for the 2010 Loppet wave assignments. This chart shows some cool things. Like what you ask? Well, first of all we see that the shorter races all have a steeper slope than the longer races, which make perfect sense when you think about it. The 2008 to 2009 Birkie/Kortie comparisons are interesting. The same course was used both years but for both events we see the 2009 line is a bit steeper than the 2008 line which means the conditions were a bit faster in 2009 than 2008. The 2008 Mora 35 and 58 fall along the same line and if you remember back to that year it was really, really cold and the 58 km event was shortened to just fallow the 35 km course so it should fall along the same line on this chart. The 2009 Pepsi 50 km is the farthest to the right, much farther to the right than the Birkie's which means it must have been really, really slow that day.


y = 1.7815x - 0.0209
y = 1.1561x - 0.0004
y = 0.4667x + 0.0198
y = 0.4541x + 0.0041
Predicted Loppet Race Time
3:36:00
3:21:36
3:07:12
2:52:48
2:38:24
2:24:00
2:09:36
1:55:12
1:40:48
1:26:24
0:57:36
1:26:24
1:55:12
2:24:00
2:52:48
3:21:36
3:50:24
4:19:12
4:48:00
5:16:48
5:45:36
Actual race time
2008 Loppet
2008 Birkie
2008 Kortie
2008 Mora 35
2008 Mora 58
2009 Birkie
2009 Kortie
2009 Mora 35
2009 Mora 58
2009 Pepsi 25
2009 Pepsi 50