Ranking Using Buchholz Numbers

At recent petanque tournaments a number of players have asked how the final rankings are determined using the Buchholz number concept, rather than the more traditional points difference (delta) concept.

The Buchholz number is a measure of the strengths of the teams you compete against; you are rewarded for winning against strong opposition rather than weaker opposition.

Over the course of an event in a tournament (say the Qualifying Round as an example) the Buchholz number, abbreviated BHN, allocated to your team is the total number of wins recorded by all the teams (against all opposing teams, not just your team) you played against.

The BHN tends to be a fairly coarse means of ranking teams so an additional measure is required referred to as the fine Buchholz number, or fBHN. This has a similar definition and your fBHN is the total number of wins that all the opponents of all your opponents have achieved throughout the event. Your fBHN is actually the sum of the BHN's of all the teams you played against. Again, the emphasis is on the number of teams you have played that have won – so if you defeated any of them you get a higher ranking by beating a team with wins (rather than with losses).

This is easier to explain in detail by using actual data – so the table below shows the final rankings, using the BHN and fBHN criteria, after the recent Women's 4-Round Qualifying event at the Victorian Championship Doubles at Weird Entertainers and Petanque Club on Sunday 20 September 2015.

Rank	Team A	Team B	Score	BHN	fBHN	Games	Points
1.	**Grancourt, Danielle**	**Coulon, Monique**	3	9	36	3:1	38:31
2.	**Lacase, Julie**	**Min Kuan, Lim**	3	9	30	3:1	44:29
3.	**Deramond, Adeline**	**Kinghorn, Bridie**	3	8	34	3:1	46:25
4.	**Mangan, Kate**	**Lebrasse, Medgee**	3	7	35	3:1	40:26
5.	**Papotto, Elisa**	**Marie, Eileen**	2	10	31	2:2	27:32
6.	**Dufresne, Lynn**	**Kommameuang, Latsamy**	2	8	33	2:2	34:37
7.	**Yeomans, Dianne**	**Deramond, Lisa**	1	9	30	1:3	26:39
8.	**Florent, Chantal**	**Carre, Alice**	1	7	31	1:3	27:39
9.	**Mayor, Pierette**	**Bommarito, Danielle**	1	7	28	1:3	27:41
10.	**Marshall, Shirley**	**Hebblethwaite, Aileen**	1	6	32	1:3	26:36

You will notice that based on the points differences (the traditional way with delta scores) the top 4 teams with 3 wins each would have been ranked

Rank	Team A	Team B	Score	BHN	fBHN	Games	Points	Delta
1.	**Deramond, Adeline**	**Kinghorn, Bridie**	3	8	34	3:1	46:25	+21
2.	**Lacase, Julie**	**Min Kuan, Lim**	3	9	30	3:1	44:29	+15
3.	**Mangan, Kate**	**Lebrasse, Medgee**	3	7	35	3:1	40:26	+14
4.	**Grancourt, Danielle**	**Coulon, Monique**	3	9	36	3:1	38:31	+7

But from a look at the actual games played (and this was a Swiss Draw) you will discover that Adeline and Bridie, for example, actually played against overall weaker teams than Danielle and Monique. The full results are on the following page but in summary Adeline and Bridie won against teams finally ranked 5th, 6th and 8th, while Danielle and Monique won against overall better teams finally ranked 2nd, 3rd and 7th.

Rd 1	Team A	Team B	
	Papotto, Elisa / Marie, Eileen	Grancourt, Danielle / Coulon, Monique	13:2
	Yeomans, Dianne / Deramond, Lisa	Dufresne, Lynn / Kommameuang, Latsamy	6:9
	Marshall, Shirley / Hebblethwaite, Aileen	Lacase, Julie / Min Kuan, Lim	4:13
	Deramond, Adeline / Kinghorn, Bridie	Florent, Chantal / Carre, Alice	13:5
	Mayor, Pierette / Bommarito, Danielle	Mangan, Kate / Lebrasse, Medgee	5:10
Rd 2	Team A	Team B	
	Papotto, Elisa / Marie, Eileen	Deramond, Adeline / Kinghorn, Bridie	4:13
	Mangan, Kate / Lebrasse, Medgee	Lacase, Julie / Min Kuan, Lim	6:11
	Dufresne, Lynn / Kommameuang, Latsamy	Mayor, Pierette / Bommarito, Danielle	13:7
	Grancourt, Danielle / Coulon, Monique	Yeomans, Dianne / Deramond, Lisa	13:2
	Florent, Chantal / Carre, Alice	Marshall, Shirley / Hebblethwaite, Aileen	13:3
Rd 3	Team A	Team B	
	Dufresne, Lynn / Kommameuang, Latsamy	Deramond, Adeline / Kinghorn, Bridie	3:13
	Lacase, Julie / Min Kuan, Lim	Grancourt, Danielle / Coulon, Monique	9:10
	Papotto, Elisa / Marie, Eileen	Florent, Chantal / Carre, Alice	10:4
	Mangan, Kate / Lebrasse, Medgee	Yeomans, Dianne / Deramond, Lisa	11:10
	Mayor, Pierette / Bommarito, Danielle	Marshall, Shirley / Hebblethwaite, Aileen	2:13
Rd 4	Team A	Team B	
	Deramond, Adeline / Kinghorn, Bridie	Grancourt, Danielle / Coulon, Monique	7:13
	Lacase, Julie / Min Kuan, Lim	Dufresne, Lynn / Kommameuang, Latsamy	11:9
	Mangan, Kate / Lebrasse, Medgee	Papotto, Elisa / Marie, Eileen	13:0
	Florent, Chantal / Carre, Alice	Mayor, Pierette / Bommarito, Danielle	5:13
	Marshall, Shirley / Hebblethwaite, Aileen	Yeomans, Dianne / Deramond, Lisa	6:8

From these full Qualifying Round results you can also work out the BHN for these 4 top ranked teams. For example, consider Danielle and Monique. Their opposition (shaded in yellow above) were Elisa and Eileen, Dianne and Lisa, Julie and Min and Adeline and Bridie. Now let's see how these 4 teams went in terms of wins overall.

- Elisa and Eileen won a total of 2 games
- Dianne and Lisa won a total of 1 game
- Julie and Min won a total of 3 games
- Adeline and Bridie won a total of 3 games

This means that Danielle and Monique's opponents won a total of 9 games, so their BHN = 9.

Doing the same for Julie and Min (their opponents are shaded in green) we find

- Shirley and Aileen won a total of 1 game
- Kate and Medgee won a total of 3 games
- Danielle and Monique won a total of 3 games
- Lynn and Latsamy won a total of 2 games

So, again, we see that Julie and Min's opponents won a total of 9 games and their BHN = 9 as well.

As noted above, the BHN score is not a good enough discriminator; the BHN cannot separate these teams of Julie and Min, and Danielle and Monique. A finer scheme is required and that is the fBHN. This is a bit more tedious but we are now going to look at the winning teams for the above opponents' opponents. But from the top table this is not too tedious and we can deduce that Danielle and Monique's opponents were

- Elisa and Eileen with a BHN of 10
- Dianne and Lisa with a BHN of 9
- Julie and Min with a BHN of 9
- Adeline and Bridie with a BHN of 8

Summing these BHN's gives the fBHN = 36 for Danielle and Monique.

Now do the same for Julie and Min; their opponents were:

- Shirley and Aileen with a BHN of 6
- Kate and Medgee with a BHN of 7
- Danielle and Monique with a BHN of 9
- Lynn and Latsamy with a BHN of 8

Summing these BHN's gives the fBHN = 30 for Julie and Min.

Of these two top ranked teams each with a BHN = 9, the higher ranked one is now the team with the greater fBHN; Danielle and Monique.

It is worth noting that the BHN/fBHN ranking within a group of teams with the same number of wins is often significantly different to the ranking of that group using the delta scores, and explains the concern of players if a group of teams with the same number of wins extends across a break between teams going to different finals events like the Principale and the Complementaire, for example. And this is understandable. But at least now you can see the process in a transparent manner.

The arguments in favour of the traditional delta approach for ranking are that it is simple, well understood and has been used for many decades by petanque players; broadly subjective and historical reasons.

The argument in favour of the use of the BHN and fBHN approach is that it rewards wins against overall stronger opponents compared to weaker opponents; certainly a more objective reason. It is best used when employing a Swiss Draw and particularly if the teams are seeded (which tends <u>not</u> to be the case for petanque when used in a Qualifying Round; although this is now slowly changing*).

One significant, and good (in my view) outcome with the BHN/fBHN approach is that if you do have a Bye then you certainly get a win but it cannot improve your BHN/fBHN score, while with the delta scheme you get a 13-7 win <u>and</u> a +6 delta for doing nothing!

My main concern, however, is that the Swiss Draw implemented by the Sport scoring program is not as systematic as it could be; there is an element of randomness built into the draw which is unfortunate. But the use of the BHN/fBHN scheme is currently preferred by FIPJP and PFA and possibly it does have more valid reasons to be used than the delta approach. You make up your own mind.

A few notes follow on the next page with some possibly useful references.

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* comment added in November 2018

Notes:

The Buchholz number is defined as the sum of the opponents' scores. But the original idea behind the Buchholz ranking was for getting a way to separately rank players on the same total score in chess, where players were awarded a score of 1 for a win, ½ for a draw and 0 for a win. Obviously the score of ½ for a draw is irrelevant when discussing petanque.

So essentially we are looking for an acceptable tie-break scheme for teams on the same number of wins. There are many such schemes, some of which are listed in the references cited below.

The Sport scoring program defines the Buchholz number the same way (number of wins) despite using the term 'scores'.

But in principle in petanque one could use the scores of opponents rather than 1 for a win and 0 for a loss, and by score I mean the score difference, the delta. I have done this for this tournament data and it makes absolutely no difference to the BHN/fBHN ranking, but I cannot say for certain that this would always be the case.

There are many ways that have been suggested to come up with a tie-break method in sports/games. The BHN/fBHN scheme has been used in petanque for a while but is not used in many other competitive arenas – seemingly only chess, bridge and badminton.

Petanque, like chess and bridge needs a way to come up with a tie-break method after a relatively few games in a day (or maybe 2) as there is not a season of play where a large number of games are played by all teams.

So the tie-break scheme using BHN/fBHN is sort of inexorably linked to the Swiss System where teams are playing a relatively small number of games, compared to the number of teams.

The more traditional delta scheme used by petanque is simple and invariably a satisfactory tie-breaker. Another simple scheme that could be used is one whereby 2 teams on equal wins are separated on a count back if they have played each other. But that won't always occur.

One of the reasons we are discussing this is that the Swiss System comes in many guises. If, as with the Sport scoring program, the subsequent draws within the group of teams on the same number of wins (a win-group) is random then this is more likely to lead to the need for a tie-break scheme after the final round. If the draw within each win-group is more systematic the tie-break is less likely to be needed – but ties may still occur.

There are also many variations on the Buchholz-type tie-break scheme. Another that is sometimes used is the Median-Buchholz tie-break scheme where the upper and lower extreme results are excluded from the calculation.

One final point about the BHN/fBHN ranking: the actual scores are then totally irrelevant and only wins matter. Seems a shame to throw away all that score data after a long struggle on the piste to win 13-12. A win 13-12 provides no more impact to your final result than a 13-1 win. Similarly a loss of 12-13 is treated as exactly the same as a loss of 1-13. Time for a re-think?

This is an argument that will continue and there are a few useful commentaries cited below.

https://en.wikipedia.org/wiki/Buchholz_system

http://www.swissperfect.com/tiebreak.htm

http://positivepetanque.org/swiss-system/

http://www.scottishpetanque.org/Wordpress/wp-content/uploads/2013/01/Swiss-Ladder-Timed-Games.pdf