AN 8-BALL HANDICAPPING SYSTEM
For AMATEUR LEAGUES

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"There are three kinds of lies: lies, damned lies, and statistics." [Sir Charles Wentworth Dilke](#) (1843–1911)

First released in 2007, the original Hillsboro Independent Pool League 8-Ball handicapping system was developed by Bob Mobile and is based upon Balls per Inning Averages. I can't tell you how long I have been using this simple system for both straight pool and other billiard games like 8-ball and 9-ball but I can say that I was using this system to assess my opponent's skill against my skill: at least as early as approximately 1966 when I was in the U.S. Air Force and probably derived more income from playing pool than I did from my military pay at certain times through 1970. The concept is a simple one: ***Use STATISTICS and not ego or gut feeling.*** Billiards or any other sport for that matter, is not like playing a slot machine where the player has no say in their ability to win. Using statistics in billiards allows you to objectively determine your risk of playing any opponent—as long as you know their "stats" and your "stats", unless of course- you are being hustled. To know your opponent's true stats takes a long time but you can generally obtain a **rough idea** after watching them and subtly making note of innings for a few games. You should always be aware of your own "stats" or limitations.

Average Balls per Inning (BPI) is directly related to a player's average percentage of probability of pocketing any one shot and once this is known—a whole lot of additional information becomes available if you are willing to do a little simple math!

STRAIGHT POOL HANDICAPPING- A LITTLE NOSTALGIA

My first attempt at developing a handicapping system was to develop a MANUAL handicapping system for Straight Pool (14.1), a game I had been playing for many years. This was eventually upgraded to rather sophisticated computer programs in both compiled basic running under DOS and MS Excel for the PC. Various versions of manual and PC versions were deployed in several states' establishments throughout the years. Straight Pool is very easy to handicap! The program became so accurate that we started a "high run kitty" that was paid to the player that achieved the greatest percentage capture ratio to their predicted high run for each entire session. This allowed a player, with, for example, 1000 chances (every turn at the table is a chance) to run a predicted 10 that ran 12 to win over a higher level player that was predicted to run 60 and ran 71 (120% vs. 118%). The long-term, multiple chance high run predictions were generally very accurate allowing everyone an equal chance at the ADDED money pool. Simple statistics is great for straight pool!

The promotion of "mini competitions" within a league, especially when some awards are based upon ***stated objective goals*** that give all levels of players a fair chance at "special recognition" helps to foster growth and a sense of belonging. Do it if you can and watch the players improve their skill over time. In short, keep everyone interested in being a part of the league.

8-BALL and 9-BALL RACE GRIDS

As I began to expand into developing handicapping systems for other popular billiard games like 8-Ball and 9-Ball: I quickly found out that the "Race Grid" is probably the single most important element in creating a relatively fair and practical handicapping system. How many games must each player win to win the match set? What is the worst case number of games to be played in order to save time on a match night?

H.I.P.L. – THE 8-BALL HANDICAPPING SYSTEM "EXPERIMENT"

T.A.P. was the first "professionally organized" 8-Ball League that I ever played in and I was a member for a number of years. During those years, I collected a lot of player statistics from our own score sheets, tallying personal score sheets and collecting score sheet data from around the US and Canada that was intermittently published on the Internet. I liked their general methodology, rating system and especially their shortened race grid.

By the time our local area was "dropped" from the TAP organization, I had collected a massive amount of data and had already "roughly" determined the correlation between their rating system and a much simpler method of using Modified Average Balls per Inning. *TAP claims to use OVER 80 ALGORITHIMS TO DETERMINE THEIR PLAYER HANDICAP RANKING!* Is this really necessary?

Our local area still wanted to play but there was no local league management available. So I "assisted" with the startup of "The Hillsboro Independent Pool League" (H.I.P.L.) and we began playing again under TAP general rules, a few local modifications to TAP rules and the first matrix of player ranking versus modified Average Balls per Inning. Here is baseline **version 0.00** of that H.I.P.L. matrix along with the trigger points:

Player Handicap	Min. AVERAGE M.B.P.I.	MIN % PROB of making 1 ball
7	>= 3.94	>= 79.76%
6	>= 2.64	>= 72.53%
5	>= 1.89	>= 65.40%
4	>= 1.05	>= 51.21%
3	>= 0.86	>= 46.17%

H.I.P.L. ver. 0.00 baseline handicap matrix

DEFINITIONS OF AN INNING, B.P.I. and M.B.P.I.

An inning is nothing more than a turn at the table and the most important statistic associated with an inning is how many balls are pocketed during that turn at the table (Balls per Inning or B.P.I.). An inning ends when a player retires from the table due to either a miss, **foul**, *safety play after pocketing 1 or more balls* or end of match set but not game if they have not missed. *An inning is not charged if only a safety is played and no balls are pocketed*. The percentage of probability of pocketing any one shot is thus simply: 100* BPI/BPI+1 and represents a player's basic skill set in any game of billiards. *M*.B.P.I. indicates *modified* and is explained in detail in the Algorithm Section of this document. The relationship of M.B.P.I. to player handicap level is unique for this system.

HANDICAP "ALGORITHM CREEP"- Excel Version 1.00

After completing our first 8-Ball session, the results were very promising using ver. 0.00 handicaps and the TAP race grid with 61% of 27 players winning 40 – 60% of their matches. However, it was noted that the distribution of match wins was not evenly centered around 50% as I believe it should be. 40 – 60% match wins was established as a "measurement standard" going forward for comparison purposes and the addition of a 75% match win bias factor was introduced for the next session while holding to the original v 0.00 handicap matrix values. This became version 1.00 of the handicapping system.

75% win bias means that if a player wins 75% of their matches, they automatically go up 1 level until such time that they drop below 75% match wins. This moves the higher "winners" lower and closer to 50% while moving the lower players higher and closer to 50% because they are the ones that are being beaten. The overall goal is an even distribution of match wins, peaking near 50%. At this time it is believed that 'Match Win Bias' applied for match wins much below 75% may be too aggressive but this assumption is unproven. Future software will allow user entries of no bias or 'bias aggression' from 65% - 85% match wins with a 75% default offering the league manager limited but reasonable flexibility for fine tuning.

Note that after Session # 010, the use of 75% "Win Bias" and/or "Carry Bias" into a subsequent session came and went as the H.I.P.L. performed numerous experiments with the original handicapping system methodology.

HANDICAP "ALGORITHM CREEP"- Version 1.00a OOPS!

The results of running Sessions #002 and #003 were analyzed using version 1.00 of the handicapping system. The bell curve distribution of winners centered around 50% match wins improved. However, we noted that under the new 75% match win bias rule, it was possible for a player to go up 2 levels in a 1 week period *IF*- they happened to advance 1 level due to their personal BPI "stat" *plus* get "hit" with a +1 bump 75% match win bias at the same time. It was also possible for a new player, with very little history, to go up or down 2 levels in a 1 week period if they happened to play a single exceptionally good or bad match. Very few were impacted by the above problem but to permanently fix it- I developed a *Bias Hold* procedure to prevent any player from going up or down more than 1 handicap level in a week. This "fix" became version 1.00a of the original handicapping system and has been eliminated by the H.I.P.L. in the most recent revisions.

Overall, these two sessions showed excellent results and Session #003 ended with many 4 match ties and the final playoffs going hill – hill all the way and an upset. Things appeared to be working quite well but there's always room for improvement.

HANDICAP MATRIX MODIFICATION- Excel Version 1.01

As we began Session #004, I instituted a minor 4% compression of the 4 handicap range- 2% from the top and 2% from the bottom. Handicap 4 represents the majority of most amateur players and this change protected the "middle ground" in an attempt to maintain as accurate a correlation to the target T.A.P. rankings as possible. This change represented "composite" version 1.01 of the handicapping system and here is the updated handicap matrix showing the trigger points that must be exceeded to reach the next level shown:

H.I.P.L. ver. 1.01 updated handicap matrix

Player Handicap	Min. AVERAGE M.B.P.I.	MIN % PROB of making 1 ball
7	>= 3.94	>= 79.76%
6	>= 2.64	>= 72.53%
5	>= 1.71	>= 63.10%
4	>= 1.13	>= 53.05%
3	>= 0.86	>= 46.17%

HANDICAP MATRIX MODIFICATION- Excel Version 1.02

As we began Session #005, some captains felt it would be prudent to raise the 2-3 trigger point higher to give the lesser players a slightly greater advantage. This was accomplished and resulted in a 2% probability of making 1 ball "bump". The change was subtle and was measured just like all other changes we made with comparative results shown below. The goal is to have the handicaps create a 50-50 chance for any player to prevail. This change represented "composite" version 1.02 of the handicapping system and here is that updated handicap matrix showing the trigger points for each level:

Player Handicap	Min. AVERAGE M.B.P.I.	MIN % PROB of making 1 ball
7	>= 3.94	>= 79.76%
6	>= 2.64	>= 72.53%
5	>= 1.71	>= 63.10%
4	>= 1.13	>= 53.05%
3	>= 0.93	>= 48.19%

EVALUATION-- Was moving to Version 1.02 a good idea???

One of our captains made the suggestion of "upping" the trigger level required for Handicap 3 entry in order to give the lesser rated players a better advantage. After 3 sessions, the version 1.02 results were compared with the results of 4 previous sessions. The comparison indicated that there was no foundation for requesting the trigger point change whatsoever with a 4 session average of 3 level players winning 40.32% of their matches before the change was implemented and a 3 session average of 40.65% after the change was implemented. There were insufficient data to evaluate handicap 2 players. They must simply come up to speed with practice and help from their friends.

The trigger point change remained throughout the original system as it really did not appear to do any harm- nor did it really do any good. This is a fine example of making changes that are not based on a sound analysis. Changes made to a proven system should be well thought out as they will impact all the players in the league. During my 5 year tenure as an 8-Ball league manager I was constantly faced with folks requesting changes and in some cases when I would ask 'Why?' the response would be 'Because I think it should be.'- *lacking any supporting evidence for their thesis.*

The league manager is responsible for decisions that impact the entire league and must use caution yielding to pressure from individuals that want to change things without well founded justification. Don't change things just for the sake of change.

HANDICAP BPI ALGORITHM MODIFICATION- Excel Version 1.10

Effective starting with the spring 2011 session (#008), I modified the manner in which a player's average B.P.I. was calculated. For players with less than 12 matches, the average B.P.I. is as it was before- a running average of any matches played with a minimum of three (3) and up to eleven (11). Once a player reached 12 matches, the new algorithm discarded the single best and worst B.P.I.s and calculated a running average based upon the remaining ten (10) matches. But only after a significant and true player history was already in place. This method tended to greatly stabilize a player's average B.P.I. and prevented them from abruptly changing handicap levels due to one extremely good or bad match while ensuring an accurate method of history based "smoothing".

CARRY BIAS CALCULATION REVISION- Excel Version 1.11

Effective 2/27/2016, the method used to calculate win carry bias has been modified as follows (it is assumed that the default 75% is the win bias value of choice):

If the "Use Carry Bias" option in v 2.00 is enabled, a player with 75%+ win bias at the end of the previous session will carry this bias as a +1 value added to their baseline handicap, into the first week of an active session. *However, from this point on and through a period not to exceed a total of the results for the first 3 matches of an active session, the (75%) win percentage trigger point will be calculated based upon the player's win/loss values (stats) of the entire previous session plus the win/loss values of the active session*. If at any time during these first 3 matches the overall win percentage drops below 75%, the win carry bias value will be *immediately* reset to zero *and all win percentages will now shift to the player's win stats for the active session only using the normal calculation for win bias*. As always, any player winning the first 3 matches in an active session will have +1 bias automatically added as standard win bias and play at the elevated handicap on their 4th match based upon their win percentage stats for the active session only so that *after any player's third match they will be running on the win/loss bias calculations for the active session only.* This "switchover" is easily accomplished with conditional branching, ensures that *active session "stats" have the most significant weighting* in terms of handicaps and that *an active session is quickly isolated from a previous session and considered unique* based upon the potentially unique player population and matchup mix that may dynamically occur. This will assist in giving all teams the fairest possible chance for the prize money pool during the playoffs for each unique session by helping to move more players into the 40 – 60% match win zone.

The idea for this revision was generated through the continuing handicap system experimentation efforts by the H.I.P.L. and those efforts were greatly appreciated. This methodology will help to ensure that win bias is primarily weighted based upon the stats of an active session, the calculation "transition point" coincides with the earliest time when normal win bias could be realized and only the very strongest players are impacted.

This revision will be included with any future software updates and remains untested. Common sense would indicate that it is an improvement over the original methodology provided there is no "sandbagging". *As always, any form of bias (WIN, HOLD and CARRY) is considered to be a part of the overall player handicap rating algorithm rather than a separate entity and never removed for any reason including the Maximum Handicaps Rule*.

"Rev -1": HANDICAP CHANGES UNKNOWN

After 5 years and 10 sessions, starting with the fall 2012 session, I am no longer involved with this local 8 ball league. At the start of their new session, the new league management indicated "The handicaps will not change" but they changed almost immediately with metrics representing a significant variation from the previous session. It was noted that some players were being assessed by how league management felt they should be rated rather than their computerized history- some weren't. Some players received handicap bias properly- others didn't and in all cases the bias would not appear until after a player's 4th match rather than their 3rd as it should if they had won 100% of their first three matches. In addition, for a typical week: approximately 15% to 18% of the players could be rated differently than they would be based upon the original system and this continued throughout the session (for Week #12 it was 11% of 38 players rated differently). It is the author's belief that the adherence to any handicapping system must be strictly left up to the computer and subjective human decisions must stay out of the equation as much as possible. There may be exceptions but if the historical record length used to determine a player's handicap is properly balanced then an accurate rating will be reached within a very reasonable amount of time.

At the conclusion of week #10 the charted plot of the player results, *shown below as Figure 1*, had no relationship whatsoever to a desired bell curve peaking near 50% (*Figure 2*) of match wins with a win distribution that appeared to be mostly random, represented a remarkable variation vs. expectations and may indicate that either the new handicapping system or the methodology employed to strictly manage it had little or no control over a player's percentage of match wins. The question then becomes: How early on should such a trend be recognized and the situation remedied before it becomes too late to be resolved prior to the playoffs where cash prizes are offered?

My past experience indicates that an obvious (charted) pattern of "control" as shown in *Figure 2* does not really begin to emerge until after at least 4 weeks of play with bias influence, the sooner the better. This pattern will change every week but after this period the trend of player match wins should begin a very obvious migration towards the 50 percentile center of the chart if the handicapping system is working properly. I am thankful for the presently published H.I.P.L. new handicapping system data of player wins and losses on the Internet. This information is extremely helpful for comparison purposes against the original results to determine if those methods of measurement are valid and the overall impact of this league's changes as they continue to upgrade their handicap system. I believe there is something that may be revealed using these metrics.

Figure 1. Fall 2012 Results after 10 of 18 Weeks- RED FLAG??

HANDICAPPING ACCURACY ASSESSMENT FOR Fall '12 SESSION- Week 10
37% of 38 players have won 40-60% of their matches
Handicaps are based on unknown factors but appear to include + 75% Match Win Bias
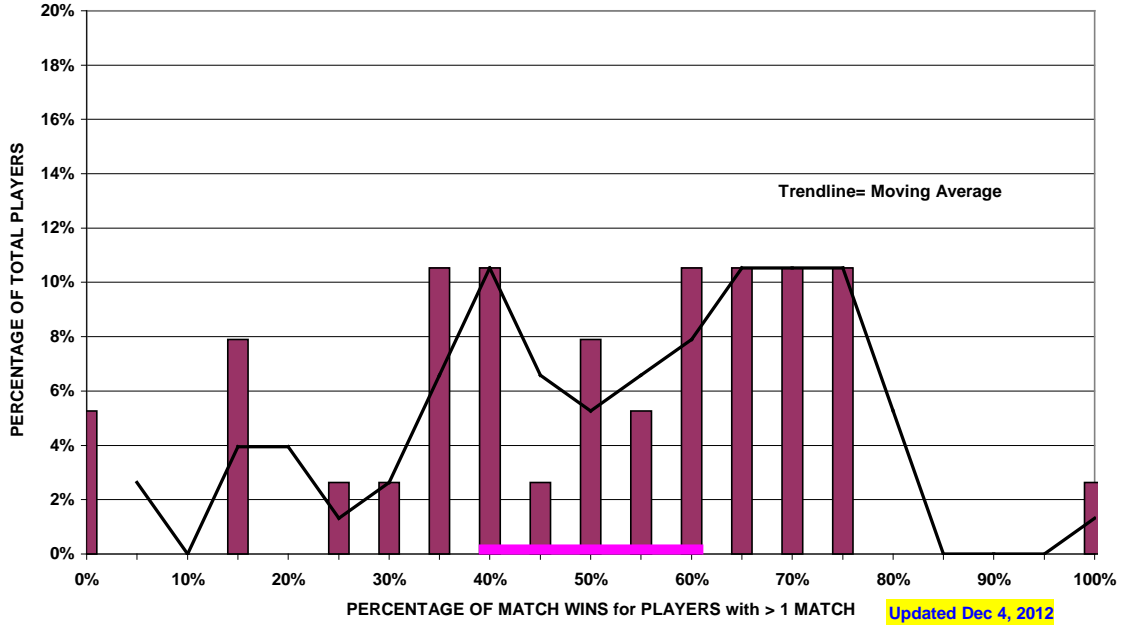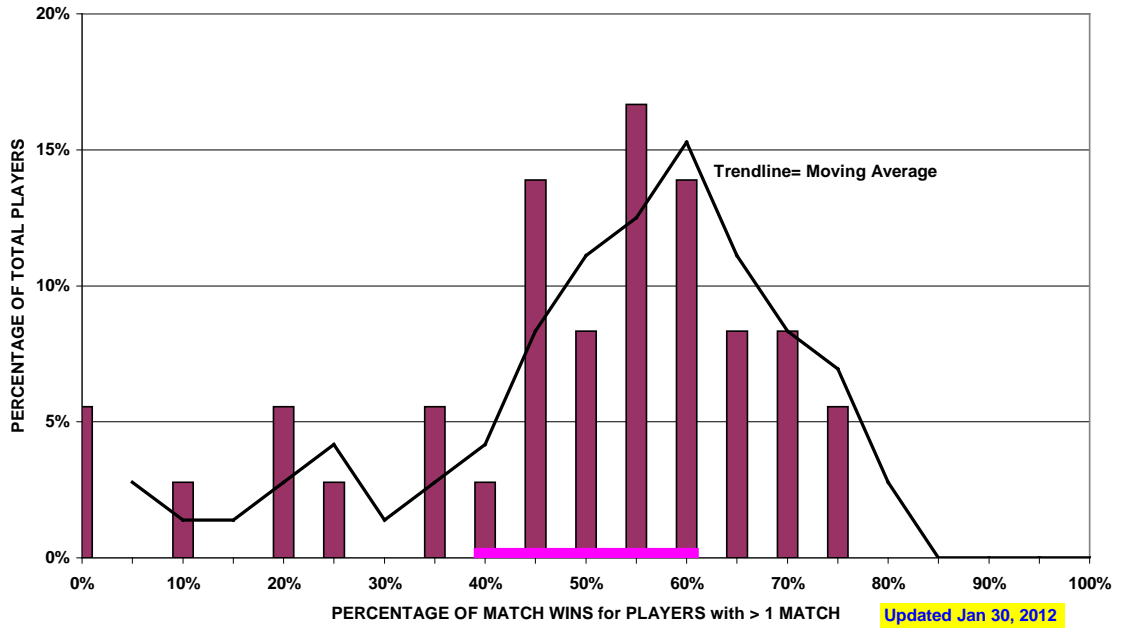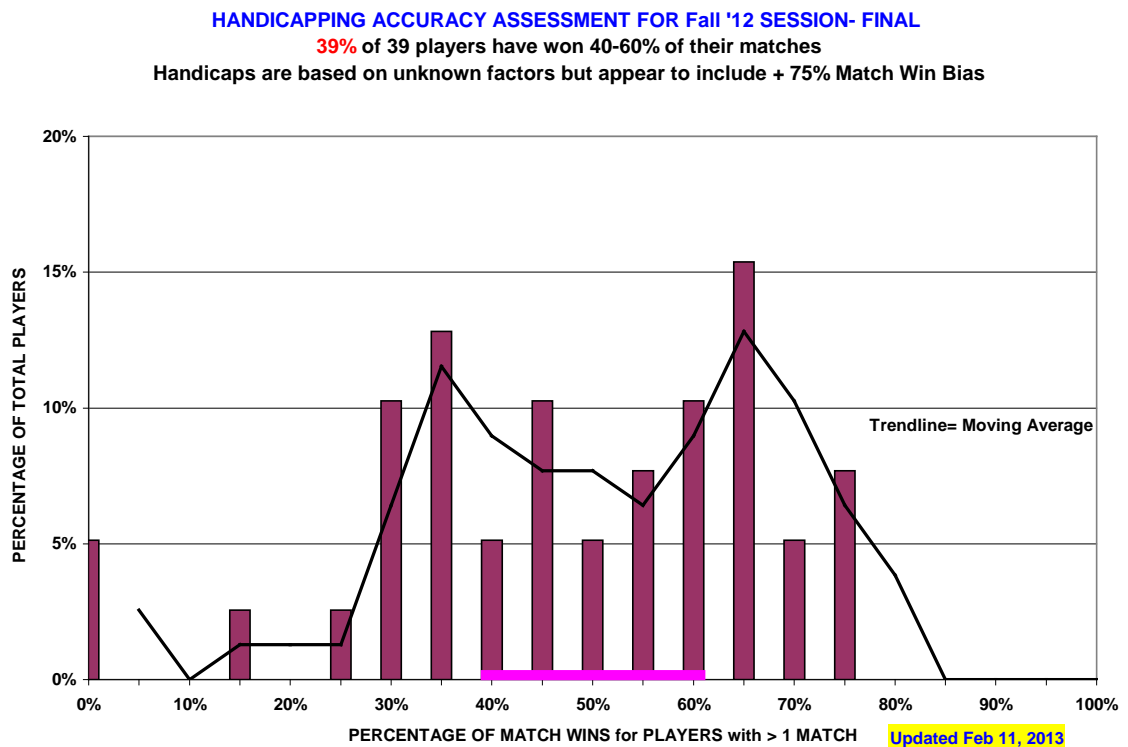

Figure 2. Fall 2011 Example of Expected Player Results centered near 50%

HANDICAPPING ACCURACY ASSESSMENT FOR SESSION 009- FINAL
56% of 36 players have won 40-60% of their matches
Handicaps are based upon v 1.10 (B.P.I. brackets + 75% Match Win Bias)

Although I am no longer actively participating in this particular league, I remain very interested in the development of a fair and equitable 8-Ball handicapping system, especially for leagues with a significant spread of player talent- where "equalization" is the goal. And having put forth a significant effort to develop, track and measure the results of the original handicapping system, I added these latest "tracking results" in the table on *Page 19* below for comparison purposes. Comparing these entries with the original results from 10 previous sessions with a *"strictly enforced handicapping system"* should assist in determining if any new changes have resulted in an overall improvement in attempting to equalize the player's match win results across the full spectrum of player talent within the particular league being measured. I consider all of this to be of great value for future software development (validation) purposes, especially should certain portions of the original algorithm be phased out (e.g. BIAS which has always been a point of contention by some). It is my hope that this particular league's new handicapping methodology will at least equal or at best exceed the original system that I developed. This particular full session results were posted in the table on *Page 19* and in *Figure 3* below for comparison against previous handicapping system results.

Figure 3. Fall 2012 OVERALL Session results for comparison v. Figure 2

HANDICAPPING ACCURACY ASSESSMENT FOR Fall '12 SESSION- FINAL
39% of 39 players have won 40-60% of their matches
Handicaps are based on unknown factors but appear to include + 75% Match Win Bias

Session # 011 Week 17 Player Handicap Discrepancies

In an attempt to try to understand why there was such a large discrepancy in the charted results at the end of the fall 2012 session (**Figure 3**, a session where the handicaps were not supposed to change) when compared against the results of a session exactly 1 year earlier as shown in **Figure 2**, I analyzed player handicaps just after week 17 was completed. These handicaps were used for the final playoff matches on week #18. The results of this analysis revealed that 15.4% of the entire population of players that would have been rated at handicaps 2 – 5 were rated differently under the new H.I.P.L handicapping system in place for this particular session. These results were entered into the table shown on P*age 19*.

The reasons for all the handicapping results differences remained unclear and may or may not have included adjustments to multiple trigger points, etc. It's impossible to tell. However, it was indicated that as a result of meetings, some (unknown %) player ratings were changed based upon where humans believed they should be rated and replaced some computer generated ratings.

Regardless of handicap differences, it is believed that the original metrics remain valid and will reveal the efficiency of any league's handicapping methodology regardless of how it's accomplished. Hopefully the H.I.P.L. will realize improvement over the past results that I achieved over a testing period of ten (10) sessions. Experimentation is good as long as changes are not too harsh so as to impact too many players at any one time.

It is the author's belief that any changes should be goal oriented (what needs to be improved/ fixed?), deployed with careful consideration, utilize past historical statistics and be never accomplished just for the "sake of change" with the results measured, documented and archived for future reference.

"Rev -2": HANDICAP CHANGES for SPRING 2013 (Session # 012)

For the spring 2013 session (# 012), the H.I.P.L. modified the B.P.I. trigger points and spreads for player handicaps 3 (to >= .93) and 4 (to >= 1.25). A comparative analysis reveals that the cumulative effect of all changes thus far: *could potentially impact up to 27% of league players at Handicap 2-6 levels as they start this new session vs. how they would be rated under the original system and as of Week #13, 22.5% of players rated at handicaps 4-6 were rated differently.* These are harsh changes to a system that had proven to work quite well and correlated nicely to a nationally established league. ***Note: The original trigger points depicted in earlier matrix tables are all (>=) values which must be equaled or exceeded to qualify for each associated handicap level.***

In addition to handicap trigger point and spread changes for this session, the league eliminated 75% match win bias from carrying over from a previous session. This change will impact the players with a strong and recent session match win history and the players that they play against in the early weeks of each new session resulting in an increased risk of latency in controlling some players match win/ loss percentages by that portion of the handicapping algorithm that still remains intact.

As with all other changes if the data remain available: the results were tracked, updated in a chart (in this case **Figure 4**. below) as a new session progresses and placed in the table on **Page 19** for future reference. It is this author's belief that if "equalization" is the goal- no matter how the trigger points are juggled around, the "bottom line" is:

1. The overwhelming majority of players should be in a 40-60% match win zone and as close to 50% as possible no matter how this is accomplished. The *Page 19* table of tabular metrics will show this value as "STD". The higher the better and a practical target remains elusive at this time. 67% was the best achieved and could have varied even higher. All results reflected a maximum of an 18 week session.

2. The distribution of player <u>match win results should *strongly* show signs of control and *strongly* peak as close to 50% as possible</u>. This is shown in the corresponding chart as *Figure 4*. This chart may be compared against both *Figure 3* above to determine any intermediate improvement over the previous session and *Figure 2* above to estimate the overall improvement of the revised handicapping system over the typical results of the original system that was developed by the author.

3. Deviating too far from the original carefully researched trigger points will move the league players further away from the originally correlated T.A.P. rating boundaries making it more difficult to correlate player ranking with other nationally established and recognized leagues that they may be interested in joining. So caution is advised if this is considered to be an important factor. The original H.I.P.L. handicapping system roughly correlated to a player ranking of one less than an APA player simply via the correlation to T.A.P. in the year 2007.

"Rev -3": H.I.P.L. HANDICAP CHANGES for FALL 2013 (# 013)

Starting with this session, "carry bias" returned as per the original design by the author and the latest handicap *MBPI* trigger points were posted on the H.I.P.L. website as per the table below. ***These are not actually percentages (%) as is shown on their website. They are Modified Balls per Inning (M.B.P.I) values***. As always, any handicap differences and player impacts between the original system and the H.I.P.L. modified system were logged into the table shown on *Page 21*. If there are discrepancies other than for handicaps 3 and 4 then other factors may be at play such as errors, human intervention, etc. The method of calculating *MBPI* and the unique relationship to actual player handicap remained essentially unchanged from the system originally developed and published by the author except for the elevated trigger point for Handicap 4. This change may impact both 3 and 4 level players by moving them further away from the carefully researched trigger points that originally correlated to 2007 T.A.P. ratings. It remains to be seen whether this change improves upon the original system results developed by the author. All handicap levels contain spreads and all players vary in their performance ([O] indicates an <u>o</u>riginal handicapping system value and [-3] the new REV -3 value). Please refer to *Appendix A Page 1* for the most recently estimated handicap trigger points utilized by the H.I.P.L. as they have constantly changed over time.

Rev -3 Published Handicap Trigger Points used by the H.I.P.L.

| Player Handicap	Min. AVERAGE M.B.P.I.	MIN % PROB of making 1 ball
7	>= 3.94 [O]	>= 79.76% [O]
6	>= 2.64 [O]	>= 72.53% [O]
5	>= 1.71 [O]	>= 63.10% [O]
4	>= 1.25 [-3] (>= 1.13 [O])	>=55.56% [-3] (>= 53.05% [O])
3	>= 0.93 [O]	>= 48.19% [O]

"Rev -4": H.I.P.L. HANDICAP CHANGES for FALL 2014 (# 015)

For this particular session (# 015), 75% "Win bias" was finally completely eliminated and replaced by a system that increased a players's B.P.I. by 0.6 if they won their match set and reduced a player's B.P.I. by 0.6 if they lost their match set regardless of their handicap and average B.P.I. In fact, in some cases a B.P.I. was logged as a negative value for lower handicap players! 0.6 B.P.I. equates to a 37.5% probability of pocketing any one shot. In addition, the original method of freezing a new incoming player for 2 matches and then allowing their computer stats to prevail was replaced with a new and less accurate smoothing methodology of seeding such a player with 12 full weeks of mid-range false B.P.I. values for their assumed handicap bracket regardless of whether the initial handicap was right or wrong, **_negatively impacting player results_**. Please review the H.I.P.L. website announcements, meeting minutes and rule book for more information.

As the most important statistical foundation of a player's ability to pocket any single ball was merged into this new handicap system with the direct modification of averaged B.P.I. for all players that have not won exactly 50% of their matches, tracking of handicap variance against the original system was no longer maintained on *Page 21*. However, the *Table 2* bottom line results continued to be tracked as this league continued to attempt to improve their handicap system.

The final results of these changes yielded: 60.6% of the entire population of players with 40-60% match wins, 9.1% with ≤ 25% match wins and 12.1% with ≥ 75% match wins which was significantly higher compared to previous sessions that utilized "Match Win Bias" and was hardly surprising.

HANDICAPPING ACCURACY ASSESSMENT FOR Fall '14 SESSION (#015)- FINAL
61% of 33 players have won 40-60% of their matches
REVISED H.I.P.L. Handicap System (Rev -4) with 75% Match Win Bias Eliminated
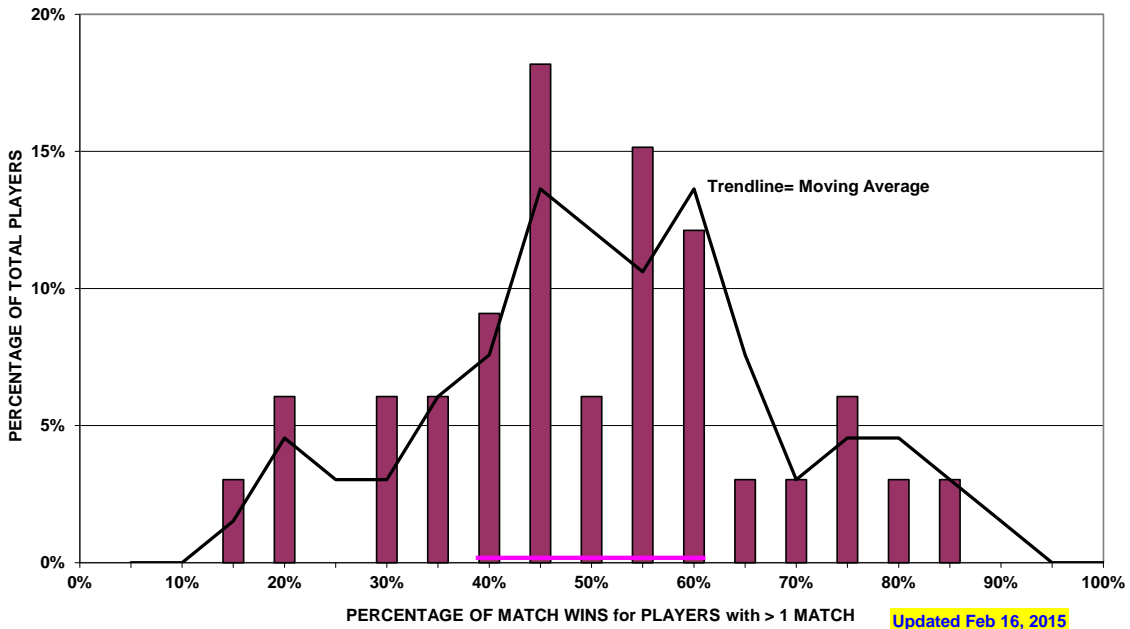
"Rev -5": H.I.P.L. HANDICAP CHANGES for Spring 2015 (# 016)

Starting with session # 016, 75% "Match Win Bias" had returned but in a modified manner **no longer restricting a player from advancing or declining more than one handicap level between back-to-back match sets** *(weeks). Only one player was impacted (jumping from HC4 to HC6 for one match) but unfortunately this also impacted the opponent with an easy win. So two players were impacted. Win bias was forced to be tracked only by team captains on match nights and no longer by league management.* "Win Carry Bias", strongly recommended by the author, and carried into the subsequent session was discontinued. Also, although previous revision (Rev -4) +/- 0.6 BPI adjustment factors for match wins/loss were no longer utilized, *the adjusted BPIs remained in the database for up to 12 weeks creating a temporary "artificial" handicap calculation* that improved over time as the older data were replaced with fresh data. Thus the term "Hybrid Session" was used and *actually lasted beyond 2 sessions for those that did not have fresh data for a full 12 records.* The +/- 0.6 win/loss BPI adjustment applied across all handicap levels could never work effectively simply due to the scaled ratio *percentage of probability of pocketing one ball* versus the *averaged percentage of probability of pocketing one ball* for varying handicap levels. In other words: +/- 0.6 (37.5% probability) is a very large value for a handicap 2 player (max. 48.2%) and significantly less for a handicap 7 (min. 79.8%) player. This adjustment could have easily been "backed out" of the database using past win/loss records once this problem was recognized to avoid continuing problems for the entire league but unfortunately it was not and impacted many players across multiple sessions.

In addition to the above, the evidence showed that this league reduced the trigger points to qualify for handicap levels 6 and 7 but this was not documented in their official rulebook and may vary to "target" specific players. It remains to be seen how this change may impact teams playing under the present "Maximum Handicaps Rule" or if that rule will also require revision as an accommodation. Please refer to *Appendix A Page 1* for the latest handicap trigger point estimates.

Please consult the latest **rulebook** on the H.I.P.L. Website directly as their significantly revised but so far derivative handicapping system continues to evolve to suit their particular requirements.

The final results for this particular hybrid and shortened 15 week session with 32 players contributing data, rounded to 5% resolution were: 53.1% of all players with 40 -60% match wins, 6.3% with ≤ 25% match wins and 12.5% with ≥ 75% match wins (actually worse than REV -4) for comparison against the previous session. The tabular results were entered into *table 2*.

"Rev -5": H.I.P.L. CHARTED RESULTS for Spring 2015 (# 016)

The session #16 charted results for the league being measured were interesting. This league made numerous revisions to the original system and methodology and unfortunately the charted results appeared to reveal a potential problem. One definite problem is the "seeding" of new players with a full 12 weeks of subjective B.P.I. data. One new player was seeded in this manner and out of 13 matches only won 1. This particular player would have been rated at one handicap level less for at least 3 weeks under the original methodology and it's possible he would have more wins if he was ranked lower during that period. Unfortunately, there is a "domino effect" when a player is miss-rated because each player they play against receives a biased advantage or disadvantage. Thus, we can say that for at least a 3 week period, the results for up to 4 players may have been skewed. In addition, the arbitrary modification of handicap trigger points targeting specific players should not be required. The original system design and methodology was well optimized regardless of all the complaints that it generated. When egos are involved, all handicapping systems will generate complaints and perfection is not a realistic goal considering all the variables involved.

HANDICAPPING ACCURACY ASSESSMENT FOR Spring '15 SESSION (#016)- FINAL
HYBRID SESSION with 53% of 32 players winning 40-60% of their matches
REVISED H.I.P.L. Handicap System (Rev -5) with NO 75% Match Win Carryover Bias

PERCENTAGE OF MATCH WINS for PLAYERS with > 1 MATCH — Updated June 29, 2015
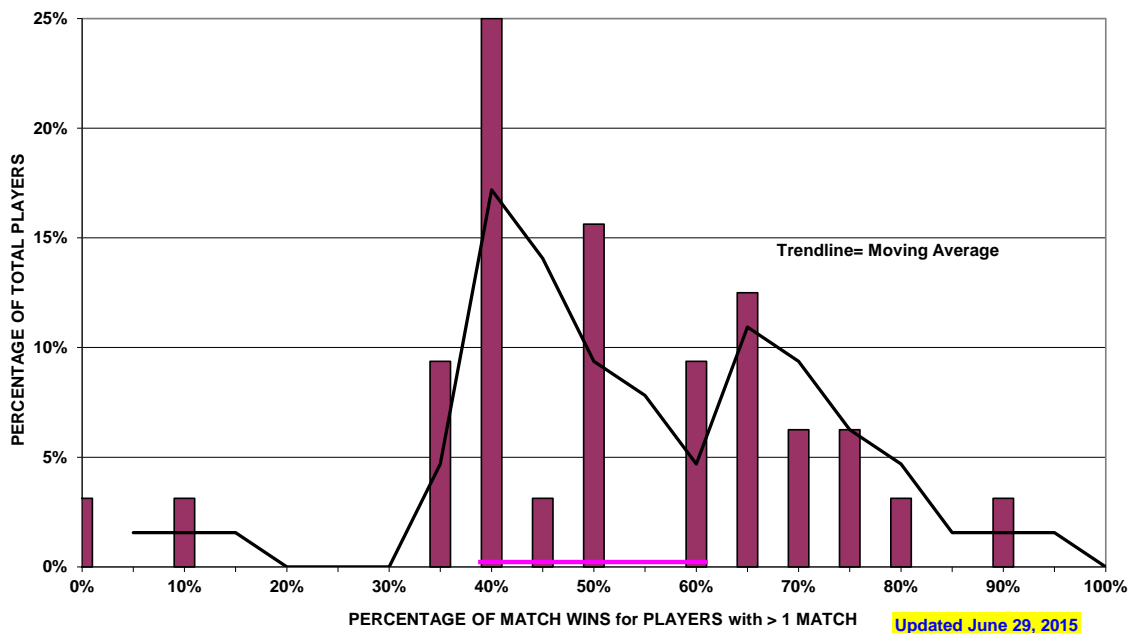
"Rev -6": H.I.P.L. HANDICAP CHANGES for Fall 2015 (# 017)

For session # 017 most REV -5 changes remained in effect. *A new method of false seeding (13) new players for 12 full weeks was utilized, the handicap 3 and 4 triggers were changed to unpublished values (please see Appendix A Page 1), an unequal matchup schedule and unequal byes were noted but across 4 locations and league management was managing both WIN and HOLD Bias again!* As this league insisted on loading a new player's database with *false data* for a full 12 match period, it represented an excellent opportunity to evaluate the impact to the entire league by comparing this methodology against the original as so many players and an entire new team could potentially be impacted. Properly handicapping new players has always been challenging, must be approached with caution and can likely never be accurate until *sufficient true and objective data* is part of the record so that they are not so "statistically new". As the original method worked quite well for decades of past straight pool league and 5 years of 8-Ball league management, I developed customized tracking tables, derived from a modified version of the original spreadsheet *with the latest published handicap trigger points shown in Appendix A Page 3*, to compare the two methodologies in order to quantify any improvement realized by this latest revision.

These tracking tables are on a two page document in *Appendix A Page 4* with instructions and notes on the following page in *Appendix A Page 5*. *Please note that at this time, ALL handicap spreads were different between the two systems and remained unpublished*. An attempt was made to visually "flag" those cases when a player was impacted by an unpublished handicap spread, if discovered, as the modified v. 1.10 handicap table spreads were all based upon the values that were *published* at the time in the latest HIPL Rulebook that may be found **at this link**.

The tracking tables utilized visual highlighting and specialized color coding to show differences for easy reference, estimate the total number of players potentially impacted by these differences and included the handicaps to be used for an upcoming match. The latency of player handicap adjustment is obvious during the early matches of a session and is caused by averaging the large number of "seeded" and false values in REV. -6. Any type of false seeding will also cause artificial "smoothing" early on and all 3s are not created equal. Both systems realize greater accuracy over time as more *real values* are entered. There is nothing that can "fix" a new player that is initially miss-rated short of requiring a "measurement match or two" to analytically estimate player skill set prior to starting in the league. This is exactly what I did for new players when I managed straight pool leagues in the past, having them play and either transmitting a score sheet or playing them directly, and several times when I was a captain actively playing in the HIPL 8-Ball League but this may be impractical unless accuracy is considered a priority.

The player names are kept confidential but can be automatically loaded upon demand via a button driven Macro in the custom MS Excel spreadsheet utilized. Unfortunately, there is no way of knowing the percentage of new player wins that would occur if using the original version 1.10 system but they should be expected to be in the range of values shown in *Table 1* on *Page 19* purely based upon past history.

"REV -7": H.I.P.L. CHANGES for Spring 2016 (# 018)

For session # 018 the Hillsboro Independent Pool League had returned to publishing very detailed player statistics again. The author considers this a refreshing and valuable improvement. This includes significant upgrades to their handicap calculator and the ability to review and utilize past statistics.

In the past I received a significant amount of complaints about publishing too much information (for this particular league) but it remains my belief that more is better. After all, if you subscribe to the Wall Street Journal do you read every word or simply scan for only those items of interest? A sports league is made up of a wide array of people with varied interests. Some just want to have fun and others want to have fun and also use the published information and statistics to improve their own game and perhaps plan their matchups for the evening. So this leaves two options: Scan the published league (too much) information for only those items of personal interest or complain.

It takes time and dedication to manage a sports league and create an easy to use and efficient user/manager interface that plays well for all the varied interests involved. This is more easily accomplished for smaller independent leagues as the amount of information to manage is typically limited. For this session, the H.I.P.L. had grown to 8 teams which could represent a population of up to 56 individuals.

For handicapping system REV -7, most previous cumulative revisions through REV -6 remained in place. *WIN bias was modified* to use merged stats from both the active and *previous session rather than just the active session (!)*. This will result in less players with win bias and a broadened win percentage distribution spread for an active session. Please refer to the chart on *Page 16*.

A *modified version of win CARRY bias* from the previous session was reinstated *using the merged win% results from a previous session so that it could be eliminated (and was) as soon as after a player's very 1st match of a new session should the overall running 2 session wins drop below 75%*. This is considered to be an improvement over original ver. 1.10 (after all- this is CARRY bias) and the original methodology will be upgraded to apply a somewhat similar solution as part of version 1.11 and shown on *Page 5*. In addition, *the formula to calculate player baseline handicap was modified for the first time with Eight on Break and Break and Run bonus points reduced or eliminated*.

With the return of all forms of 'Bias' (*modified WIN*, HOLD and *modified CARRY*), REV -7 represented an untested variation of the handicapping system. The results for REV -3 using the original forms of bias were very good but lasted for only two sessions and for those sessions, only the handicap 4 trigger point had been raised from 1.13 to 1.25 MBPI influencing both the handicap 3 and 4 spreads. The *Figure 4* example, only a single sample reference, shows the results from a previous session (REV -2) *with CARRY bias eliminated* but prior to the increase of the handicap 4 trigger point. Obvious migration to a 50% PEAK value was not realized until after the results of Week #7 with the session ending PEAK value skewed low. Although only a single sample reference should be considered insufficient to draw accurate conclusions, it may offer some subtle clues.

As usual, the results for Session 18 were placed into *Table 2* for future reference. However, the massive modifications since REV -5 have made it difficult to impossible to determine any cause and effect results correlations to specific changes.

"REV -7": H.I.P.L. Session # 018 RESULTS

The original handicapping system "Win Bias" methodology, based upon Occam's razor, is an integral part of the rating algorithm and a proven effective dynamic equalizing factor across the full spectrum of player talent. "Carry Bias" is different and computed differently. H.I.P.L. Revision -7 would ensure the demise of **_both_** WIN and CARRY bias handicap adjustments over time by including previous session results as part of the win percentage sample for WIN bias for an **_active and unique session_** as depicted in the following chart:

Comparison of Bias Calculation Methodologies aka "The Bias Battles"

HANDICAP WIN BIAS METHODOLOGY DIFFERENCES: H.I.P.L. vs. Modified ORIGINAL SYSTEM
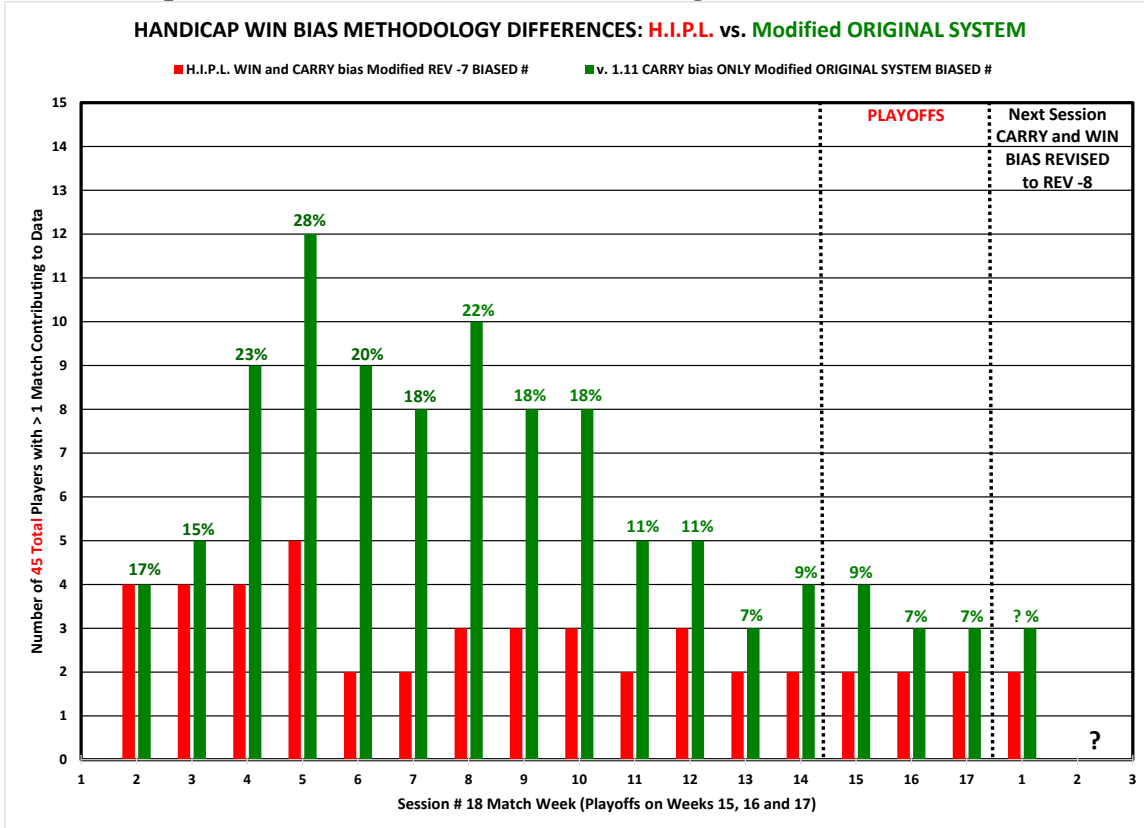
Resulting in the realization by some teams with a long term view, that their final "advantaged positioning" for an **_active session playoff_** was placed in jeopardy by a handicapping system that had been watered down through the use of creative math.

The charted distribution spreads for player wins/losses, a metric for determining handicapping system efficiency and fairness, were noted to significantly degrade after revision -3 and this is believed to be attributed to the numerous experiments performed on all forms of bias. The original methodology is simple, effective and proven not to be too harsh. However, handicapping may appear to be harsh on stronger players and must be for a system with a stated goal of "equalization". Enjoy the challenge offered.

Starting in session # 019 the Hillsboro Independent Pool League performed yet another modification to the manner in which both win and carry bias are calculated. The methodology is unknown and unpublished but it was noted that players that won 100% of their first 3 matches did ***not*** receive +1 win bias for playing on their 4th match but if they completed 4 matches and maintained 75% or more wins, they did receive Win Bias for playing on their 5th match. However, those with 3 match wins did not receive advanced bias, realizing that even if they lost their 4th match, they would still have 75% wins under their belt when playing their 5th match. If true, then the impact of Rev -8 will simply result in latency of the application of bias handicapping system "control" and perhaps some smoothing resulting in a system that is less aggressive than the original system. I'm not sure of the reasoning behind this revision or what was wrong with the proven original methodology but hopefully whatever the H.I.P.L does will result in an improvement to the match win distribution spread, an area that needed to be addressed at the time.

In addition, new players were now rated based upon their true stats after their 4th week (versus 3rd week under the original system) of play rather than being false seeded for an entire 12 match period. This should result in an improvement over the newer handicap system methodology that was introduced in Session # 15 and later modified.

The original method of calculating bias must surely be controversial! Please refer to ***Page 24*** for the justification behind a more aggressive handicapping system for relatively short sessions. The original system was specifically designed to equalize, not be too harsh and give all a fair chance at the money pool while offering challenge to the stronger players. This was the stated goal at that time and will remain so via any recommended system defaults distributed. Designing an effective handicapping system is quite challenging considering all the variables involved, especially the human acceptance factors.

Figure 4. (Example Sample of NEW System Rev -2)
Spring 2013 OVERALL Session results for comparison v. Figs. 2 & 3 above
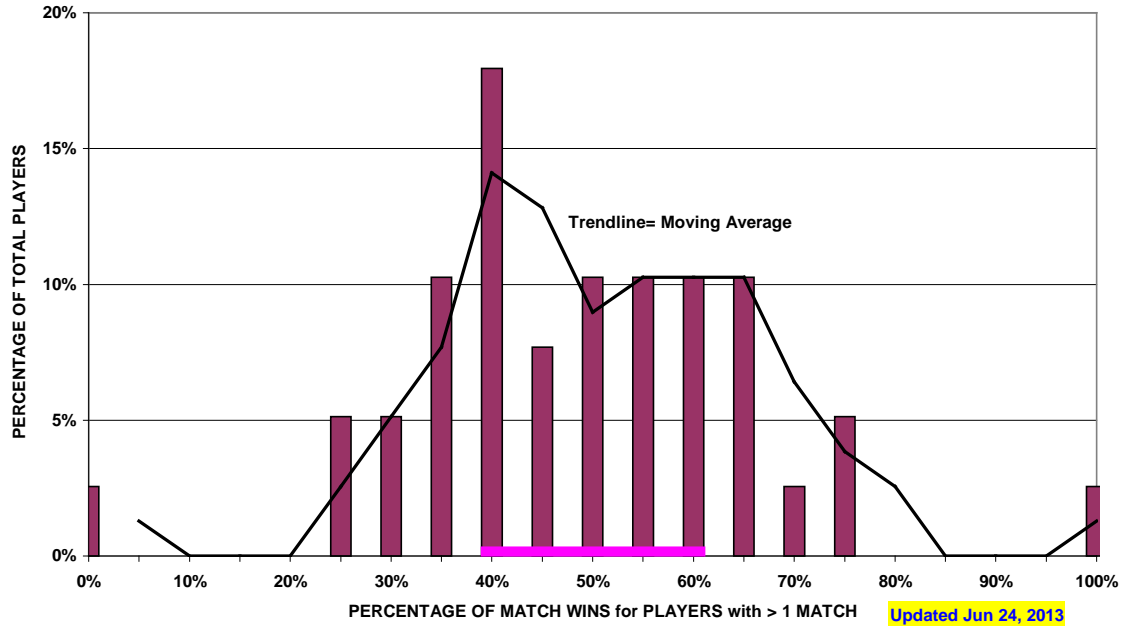
The majority of players should <u>rapidly migrate</u> into the 40 – 60% match win zone (STD). An example is shown below. Match win bias will not start sooner than a player's 4th match if previous session 'Carry Bias' is not used.

Example: Spring 2013 H.I.P.L. (REV -2) STD and PEAK values over time

AFTER WEEK #	TREND Biased%	STD % Players @ 40 – 60% Wins	PEAK(s) for Player Match Wins
Week 4	3.0%	21.2% of 33 Players (minority)	0%, 50% and 100%
Week 5	16.2% +	13.5% of 37 Players (minority)	35%
Week 6	20.5% +	25.6% of 39 Players (minority)	25% and 50% migration signs
Week 7	18.0% -	38.5% of 39 Players (minority)	50% obvious migration begins
Week 8	12.8% -	43.6% of 39 Players (minority)	50%
Week 9	17.9% +	46.2% of 39 Players (minority)	40%
Week 10	15.4% -	41.0% of 39 Players (minority)	65% refer to *Figure 1*
Week 11	15.4%	41.0% of 39 Players (minority)	40%
Week 12	12.8% -	**59.0%** of 39 Players (majority)	40% **(Tie for best STD)**
Week 13	12.8%	53.8% of 39 Players (majority)	45%
Week 14	12.8%	**59.0%** of 39 Players (majority)	**47.5% (Best Week overall)**
Week 15	7.7% -	49.0% of 39 Players (minority)	40%
Week 16	7.7%	49.0% of 39 Players (minority)	30%
Week 17	7.7%	51.3% of 39 Players (majority)	35%
Week 18	5.1% -	56.2% of 39 Players (majority)	40% refer to *Figure 3*

8-BALL HANDICAPPING METRICS- TABULAR RESULTS

The following tables track the results of the 8-ball handicapping system on a session by session vs. version basis for comparison purposes with the PEAK values rounded to 5% resolution. Do NOT jump to conclusions as even multiple sessions using the same versions may show considerable variation. People and circumstances vary. ***Note the 19% STD spread for v 1.02***. So be cautious, absorb all the data shown and be objective when forming your opinion! ***Don't rush to change "just for the sake of change".*** Please see **Page 20** for an overall comparison of system results to date.

TABLE TERMS USED:
SESS: Session number starting at 001. Increments for each subsequent session.
VER: Version number of handicap system. Descriptions shown earlier in this document.
NO. : Number of active players ***with 2 or more matches*** contributing to the data.
STD: Benchmark standard of % of players winning 40 – 60 % of all their matches.
PEAK: The actual % of match wins peak for all players contributing data.
DISTRIBUTION: How well the expected bell curve is distributed around 40 -60% wins.

Table 1- ORIGINAL handicap system results (best/worst highlighted)

SESS	VER	NO.	STD	PEAK	DISTRIBUTION NOTES
001	0.00	27	61%	**50%**	Skewed slightly to the HIGHER side of center
002	1.00	25	54%	55%	Very acceptable- Very Good
003	1.00a	23	52%	**40%**	Acceptable- Fair to Good
004	1.01	24	63%	**50%**	Excellent
005	1.02	21	**67%**	55%	Excellent
006	1.02	37	46%	47.5%	Excellent (2 new teams) 45 – 50% split peak
007	1.02	34	65%	45%	**Excellent (v1.02 3 session average STD 58.33%)**
008	1.10	37	**43%**	**50%**	**Good distribution but Worst STD to date!**
009	1.10	36	56%	55%	Good. Is better control of the losers req'd??
010	1.10	35	46%	55%	**Good (v 1.10 3 session average STD 48.33%)**

NOTE FOR SESSIONS 001 – 010 ONLY: MOST changes were very subtle. ALL changes were carried through for an entire session unless a problem was recognized. ALL changes were documented, tracked, measured and recorded with all data published on the league website.

Table 2- REVISED H.I.P.L. handicap system results (best/worst highlighted)

SESS	VER	NO.	STD	PEAK	DISTRIBUTION NOTES
011	Rev -1	39	**39%**	**65%**	Little obvious player match win control
012	Rev -2	39	56%	40%	Good – Greatly Improved but Peaks Low
013	Rev -3	36	**67%**	55%	Excellent
014	Rev -3	33	61%	45%	Excellent
015	Rev -4	33	61%	45%	Broad distribution. See Page 11.
016	Rev -5	32	53%	40%	Poor and Skewed Distribution. See Page 13
017	Rev -6	38	53%	**50%**	Good but quite broad distribution
018	Rev -7	45	47%	55 &**65%**	Broad distribution continues
019	Rev -8	35	49%	**65%**	Poor and Skewed distribution
020	Rev -8	34	44%	55%	Quite broad distribution, 2nd worst new STD

Table 2 (continued) - REVISED H.I.P.L. handicap system results

SESS	VER	NO.	STD	PEAK	DISTRIBUTION NOTES
021	Rev -8	36	61%	55%	Good but a bit broad
022	Rev -?	39	51%	55%	Broad Distribution
023	Rev -?	36	56%	20,40,60,65	Unusually Broad Peak
024	Rev -?	37	54%	50 & 60%	Broad Distribution
025	Rev-9	37	57%	55%	Please see final plot in Appendix A
026	**Rev-?**	**X**	**X%**	**XX%**	**COVID-19, Spring 2020 Cancelled**

Non-highlighted values shown in RED are a present session with final data to be entered at the end of the playoffs. Please refer to the table on *Page 18* for an example of migration over time. Updates are included at key time intervals for comparison against that table for reference purposes.

8-BALL HANDICAPPING SYSTEM COMPARISONS

The following table compares the Table 1 and Table 2 overall results above of both the STD and PEAK values for both the original handicapping system and the revised handicapping systems presently used by the H.I.P.L. A red color coded number under the TOTAL SESSIONS column indicates an active session is in progress that has not been completed. ***For an active and incomplete session, data are not updated until the end of that session.*** For the six benchmarks utilized: the best value in each column is highlighted in yellow. The goal for the DEVIATION vs. 50% PEAK value is to have it fall as close to 0% as possible. The session distribution plots are always evaluated separately and reveal additional valuable details. It is likely that the best comparison will occur when the revised H.I.P.L. system has completed 10 or more full sessions (5+ years) as they are still in the process of incorporating improvements. Results should be expected to vary from session to session even without any revision changes.

Handicapping Systems Results Comparison Table (6 Benchmarks)

SOURCE TABLE	SYSTEM EVALUATED	TOTAL SESSIONS	STD COMPARISON			DEVIATION vs. 50% PEAK		
			BEST[1]	WORST[1]	AVE[1]	BEST[2]	WORST[2]	AVE[2]
1	ORIGINAL	10	67%	43%	55%	0%	-10%	3.75%
2	REVISED	15	67%	39%	54%	0%	15%	6.50%

Note[1] : Best, Worst and Average higher values are better.
Note[2] : Best, Worst and Average values closest to 0% Deviation are better.

To date, the original program outline, methodology, quality and default values are verified by the evidence of the results obtained through the significant time consuming and compounding experimentation by the H.I.P.L. and their efforts are valuable and greatly appreciated as an excellent learning experience and "system test" with any enhancements realized by these efforts appropriately credited in this documentation.

TABLE OF H.I.P.L. VARIANCE FROM ORIGINAL SYSTEM

The following table originally tracked the variance of the revised H.I.P.L. handicapping system as it evolved versus the original version 1.10 system developed by the author. This was used to determine which handicap trigger points and spreads changed over time and in some cases, when human decisions may be overriding computer decisions [see note 1]. The results shown are the percentage of the overall total players impacted for each individual *original system handicap level* as a percentage. For example, a 20.6% value shown for a handicap level 4 would equate to 20.6% of all league players and those that would have been rated as a 4 *under the original version 1.10 system* being rated differently under the revised H.I.P.L handicapping system.

Note: Starting with revision Rev -4 during Session # 015 this information was no longer updated as it was believed this would be a starting point for very significant variance from the original TAP correlations, especially with the changes that occurred since revision Rev -5 during Session # 016, as this league continued to revise their handicapping methodology over time. However, the final Table 1 and Table 2 "bottom line" results along with revision numbers were still maintained starting on Page 19 and utilized for reference purposes including possible obvious revision associated cause and effect relationships, all of great interest when attempting to develop accurate and high quality software solutions that allow the user reasonable flexibility to modify input parameters in a carefully restricted application.

Table of player handicaps impacted versus original v. 1.10 system

New HIPL Session	v 1.10 vs. Overall Players	v1.10 HC2	v1.10 HC3	v1.10 HC4	v1.10 HC5	v1.10 HC6	v1.10 HC7
011 Rev -1	15.4% of 39	2.6%	2.6%	5.1%	5.1%	0%	0%
012 Rev -2	15.0% of 39	0%	0%	12.5%	0%	2.5%	0%
013 Rev -3	11.1% of 36	2.8%	0%	8.3%	0%	0%	0%
014 Rev -3	20.6% of 34	0%	0%	20.6%	0%	0%	0%
015 Rev -4	Tracking halted	N/A	N/A	N/A	N/A	N/A	N/A

Note[1]: Under the original version 1.10 system, human intervention is never allowed except for rating a new player joining the league or most unusual circumstances. After a new player's 2nd match, all subsequent ratings are strictly and objectively determined by computer algorithms based upon the player's unique personal statistics.

The original system is specifically designed to be transparent by allowing computer algorithms to accurately and efficiently determine the handicaps, eliminating that burden from league management rather than to have league management continuously adjusting values, variably "targeting" specific players with unpublished handicap trigger points, potentially impacting all league players that may not be fully aware of these compounded consequences and wasting valuable time. Please refer to Tables 1 and 2 and the Handicapping Systems Results Comparison Table on Page 20.

RESEARCH ON OTHER LEAGUES and SYSTEMS

This section measures the effectiveness of other handicapping systems from match wins criteria published on the internet. To be listed, a minimum of 30 players ('NO.') with at least a 10 match history each is required, except for one case: APA 3. Three charts are provided that compare the percentage of player match win statistics for three subsets of APA player data from a single very large league.

Table of results for leagues other than the H.I.P.L. (best record highlighted)

SYSTEM	NO.	STD	PEAK	LEAGUE and DISTRIBUTION NOTES
APA 1	342	**90%**	**50%**	**Brooklyn/Queens > 99 matches life: Outstanding!**
APA 2	452	72%	45%	Brooklyn/Queens 10-99 matches life: Excellent!
APA 3	**186**	**43%**	**40%**	**Brooklyn/Queens 2 -18 matches: Poor - Fair**
BCA	128	56%	55%	Houston 8-Ball: Good
T.A.P. 1	77	49%	60%	Northwest TAP League: Good
T.A.P. 2	177	45%	60%	Phoenix TAP: Fair - Good

APA 1. Brooklyn-Queens APA Historical Data: Players with > 99 matches

HANDICAPPING ACCURACY ASSESSMENT for The Brooklyn/Queens 8-Ball League
90% of 342 players with > 99 matches have won 40-60% of their matches
A.P.A. Sanctioned Handicapped League

PERCENTAGE OF MATCH WINS for PLAYERS with > 1 MATCH   Updated Mar 2, 2013
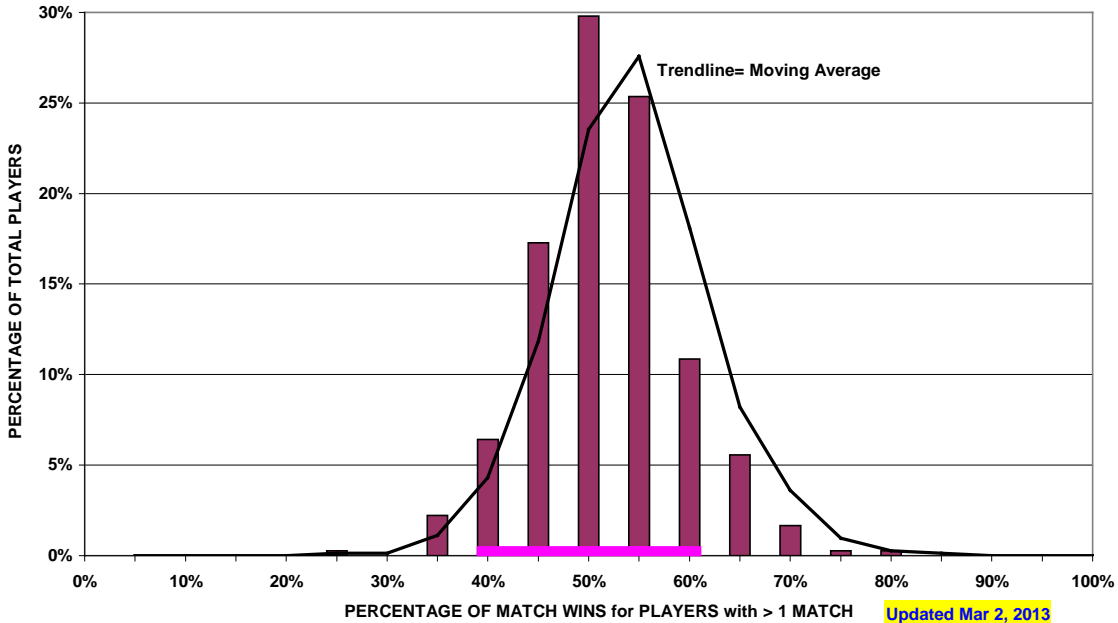
APA 2. Brooklyn-Queens APA Historical Data: Players with 10- 99 matches

HANDICAPPING ACCURACY ASSESSMENT FOR The Brooklyn/Queens 8-Ball League
72% of 452 players with 10 - 99 Matches have won 40-60% of their matches
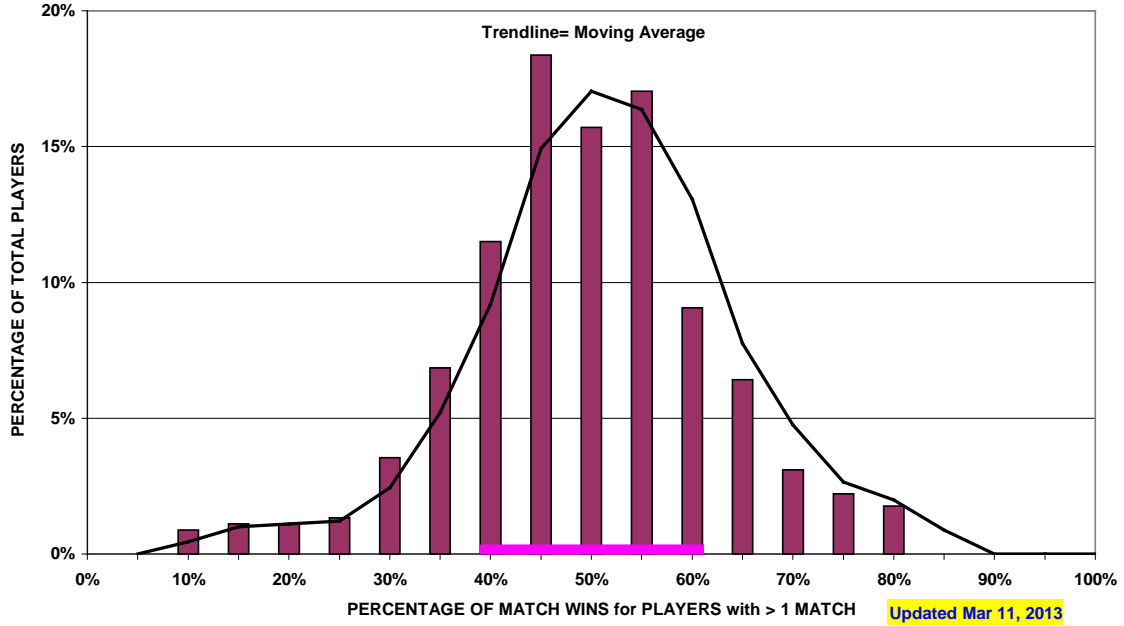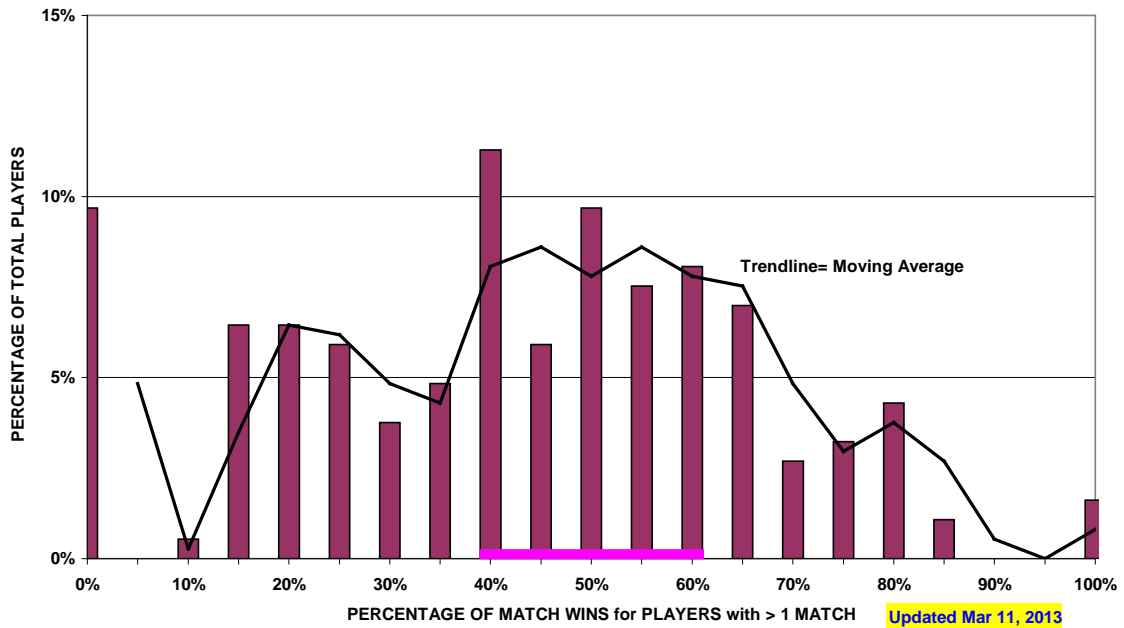**APA Sanctioned Handicapped League**

APA 3. Brooklyn-Queens APA Historical Data: Players with 2- 18 matches

HANDICAPPING ACCURACY ASSESSMENT FOR The Brooklyn/Queens 8-Ball League
43% of 186 players with 2 - 18 Matches have won 40-60% of their matches
APA Sanctioned Handicapped League

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Analysis of the Comparison of APA Results

A comparison of the three (3) subsets of data from the very large Brooklyn Queens APA league offers a fine example of the variability of results dependent upon the size of the data sample used to obtain those results. In this comparison the same "control" is used: The APA Handicapping system itself. Therefore, the only variable is the total number of matches that are played to determine the result. The APA 1 subset represents players with a match history of over 100 matches each and in some cases over 800 matches. This represents a great deal of data and proof of the long term effectiveness of the APA's very fine handicapping system with 90% of all players in this subset winning 40 – 60% of their matches and a strong peak at 50%. An excellent achievement.

As less and less actual matches are played, the overall effectiveness of the handicapping system begins to falter both in terms of the number of players winning 40 – 60% of their matches but also the distribution of match wins for all players within the particular subset. APA 2, representing 452 players each with between 10 and 99 matches still appears to be very effective but note the significant 18% drop in the "STD" value in the table and the widened spread in distribution in the associated chart. Finally, APA 3 represents 186 newer players with between 2 – 18 matches contributing to the data. For this subset, handicapping control is barely recognizable and there is a remarkable drop in the "STD" value in the table. Why did I analyze a subset of new players with between 2 – 18 matches each you may ask? More about this later. For all three (3) subsets the peak of the population of players winning 40 – 60% resides within the 40 – 60% zone.

AGGRESSIVE HANDICAPPING IS REQUIRED FOR SOME LEAGUES

I chose to isolate the subset of APA data that represents newer players with 2 – 18 matches because at least for the H.I.P.L., each league session is comprised of 18 matches over 18 weeks with two back-to-back sessions and a summer break. Other leagues may have a similar schedule and 2-18 matches represents a worst case scenario realized by the newest players with the lowest match history. Therefore, to avoid the pitfalls of a handicapping system that may not be able to control their newest player's match wins in a relatively short period of time: a more aggressive handicapping system than the APA's method may be required- depending upon the duration of a league "session".

The 75% win bias portion of the original algorithm is "carefully considered aggressiveness" and the fact that it is carried into a subsequent session by an active player is absolutely intentional. Leveraging upon the historical data of players that have a recent history of winning all the time allows them to be hit "hard and fast" and this benefits those that they typically beat. There are typically only 18 matches per session, 15 followed by the 3 weeks of playoffs and the player handicaps remain dynamic throughout the playoffs. Please refer to the table on ***Page 18*** for a real world example of the migration of the most important player statistics that must be controlled versus time. The sooner these statistics can be controlled by the handicapping system- the better.

Based upon the large amount of APA data presented and comparing the overall results from 10 full sessions of data compiled using the originally developed handicapping system, the original system has proven to be quite effective for relatively short sessions. It is also believed that the value of the simple tabular and charted metrics developed for comparison and tracking purposes has been proven.

The H.I.P.L. 8-Ball Handicapping Algorithms and Methodology

The author wishes to receive no compensation whatsoever regarding the development of these 8-Ball Handicapping Algorithms. *As with any "White Paper", if direct quotes to the content or procedures, utilization of the algorithms or carefully researched handicap trigger points are referenced or utilized in any manner, then credit is simply due to the author. The system description and distributed © MS Excel spreadsheets are protected under Copyright © Bob Mobile with all rights reserved and re-publication permission must be obtained from the author.* This is an experiment and remains a "labor of love". **Please refer to the website http://plagiarism.org/**

THE RACE GRID:

One of the most important factors contributing to the success of this system is a practical and shortened "race grid". This system leverages upon common race grid information published by other leagues. We finally settled upon the race grid by TAP that limited the maximum number of games per match set played by only the highest handicapped players- to 9. We played 4 matches on regular league nights (ties are no big deal) and best of 5 during the playoffs. Starting at 6:00 PM, we were often completed by 9:30 PM and everyone understood that the playoffs may run late. The *shortened* race grid worked well for us, became the foundation for the original handicapping system and is shown below:

Player A vs. Player B 8-Ball Race Grid based upon original Handicap Brackets

A vs. B >	HC 2	HC 3	HC 4	HC 5	HC 6	HC 7
HC 2	2 / 2	2 / 3	2 / 4	2 / 5	2 / 6	2 / 6
HC 3	3 / 2	2 / 2	2 / 3	2 / 4	2 / 5	2 / 6
HC 4	4 / 2	3 / 2	3 / 3	3 / 4	3 / 5	2 / 5
HC 5	5 / 2	4 / 2	4 / 3	4 / 4	4 / 5	3 / 5
HC 6	6 / 2	5 / 2	5 / 3	5 / 4	5 / 5	4 / 5
HC 7	6 / 2	6 / 2	5 / 2	5 / 3	5 / 4	5 / 5

SIMPLIFIED SCORE SHEETS:

Many larger organizations require extra entries into the score sheets and their algorithms are often overly complicated as they represent a system of checks and balances to "red flag" possible error entries. For a smaller league, these data may not be required and for larger organizations may overly burden those keeping score. If one focuses on "training" those keeping score as to the absolute minimum required entries to attain a reasonable level of accuracy, then an evening of league play becomes much less stressful for all concerned.

The H.I.P.L. score sheet data entries were limited to Completes, Innings, Made on Break, Break and Run, 8 on Break and Games Won/Lost. There are no dead ball or safety entries. From time to time the score sheets were audited to ensure minimal deviation from a control standard. We utilized the audit data to determine if further "training" was required and diplomatically reacted accordingly. Everyone was well aware that the entries directly related to a player's handicap and potentially an award. We found every excuse to reward the players based upon statistical comparisons against their peers.

VARIABLE DECLARATION

As I build out the routines that will ultimately become the foundation for a larger program, I will define the variables to be used in this section to assist the reader with a better understanding.
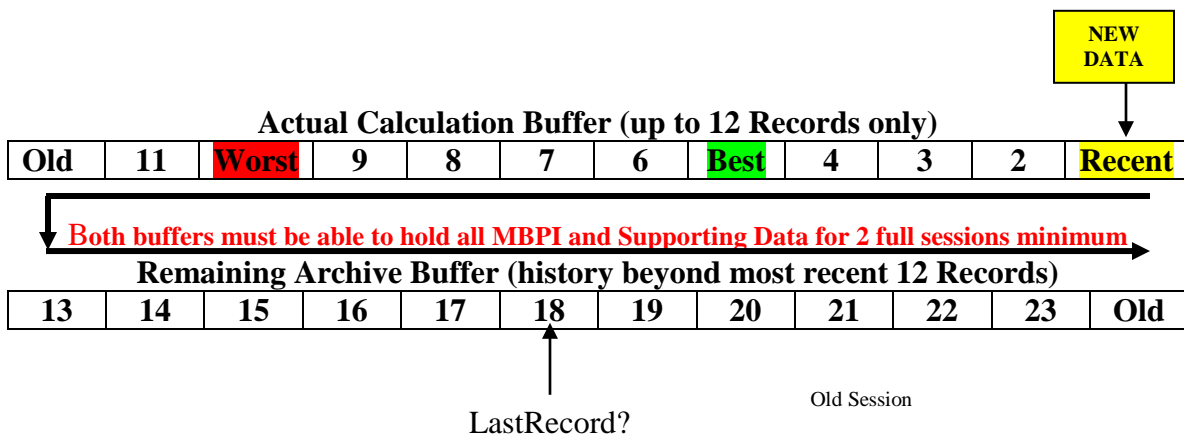
*ForcedHcap (*Integer 2-7*):* When a player with no previous history first joins the league, the captain of the team will rate them (hopefully properly) and they will play at that level for a maximum of two (2) matches. After that time, the computer algorithm will determine their final handicap which includes the results of their first two matches.

RecordCount (**Integer**): The number of B.P.I. records in a player's Actual Calculation Buffer historical record. The acceptable range is between 0 and 12. More is not necessarily better and the maximum record count of 12 has been proven to allow a relatively fast adjustment of a player's baseline handicap should a player be practicing heavily or not playing regularly. If too many records are counted, it will take longer to adjust an *averaged* player's baseline rating.

AveMBPI (**Single Precision**): A Player's averaged Modified Balls per Inning value used to determine their baseline handicap. This average is determined differently once a player has a record (*RecordCount*) of 12 modified Balls per Inning data points as the lowest and highest modified BPI records are discarded in the equation. Otherwise a simple average of up to 11 individual modified BPI records is used. In simple programming terms:

If *RecordCount*= 12 Then
AveMBPI = SUM of all Player Records - (BEST Record+ WORST Record)/10
Else
AveMBPI= SUM of all Player Records/ *RecordCount*
End If

It should be noted that the "actual calculation buffer" holding up to 12 individual player modified BPI data points and used as part of the calculation for *AveMBPI* is arranged in a first in/ first out (FIFO) basis where the oldest record after #12 gets shifted into a "remaining archive buffer" that is used only to hold a player's remaining session(s) history but *not* used to calculate *AveMBPI* as illustrated in the example below:

Actual Calculation Buffer (up to 12 Records only)

Old	11	Worst	9	8	7	6	Best	4	3	2	Recent

Both buffers must be able to hold all MBPI and Supporting Data for 2 full sessions minimum

Remaining Archive Buffer (history beyond most recent 12 Records)

13	14	15	16	17	18	19	20	21	22	23	Old

LastRecord?

Old Session

26

BaseLine (Integer): The baseline handicap of a player. This is based only upon their *AveMBPI* value (acceptable range 2 -7). The trigger points (*LowTrig3* through *LowTrig7*, a SINGLE PRECISION VARIABLE) that determine a player's baseline handicap are contained in a separate database array that is read into the main program to allow easy maintenance and future modification of the trigger points should it be deemed necessary rather than hard coding them into the main routine. ***Please see the results of various HIPL experimentation and the original system***. In simple programming terms:

IF *AveMBPI* >= *LowTrig7* Then 'Default value is 3.94. Change with caution if desired.
BaseLine=7
ElseIf *AveMBPI* >= *LowTrig6* Then 'Default value is 2.64. Change w/caution if desired.
BaseLine=6
ElseIf *AveMBPI* >= *LowTrig5* Then 'Default value is 1.71. Change w/caution if desired.
BaseLine=5
ElseIf *AveMBPI* >= *LowTrig4* Then 'Default value is 1.13. Change w/caution if desired.
BaseLine=4
ElseIf *AveMBPI* >= *LowTrig3* Then 'Default value is 0.93. Change w/caution if desired.
BaseLine=3
Else
BaseLine=2 'No other options available. They must be a 2!
End If

MBPI (1) to MBPI (12) **(Single Precision):** Each individual player's modified Balls per Inning for each match set. For a handicap 7 player, this value could actually represent the results of up to 6 separate games per match.

      After receipt of the score sheet (and the appropriate double checking) and after an interim calculation, the result is entered into one (1) of twelve (12) data bins organized in a first in, first out manner (FIFO) for a later rolling average calculation.

      As a league may allow multiple matches per player, multiple bins may be filled on a particular evening. Each bin contains the overall result for a match against a single opponent. ***Seeding a new player's entire database with false values is unnecessary and not supported but could be accomplished manually via database editing if really desired. See REV -4 through REV -6 with a REV -6 analysis earlier in this document.***

THE MODIFIED BALLS PER INNING FORMULA

      To calculate Modified Balls per Inning (MBPI) for a single match against a single opponent from the score sheet data submitted, the following formula is used:

MBPI (n)= TOTAL COMPLETES + MOB + 8 on Break[1] + (8x Break and Runs[1])/ Total Innings
Or Simply
MBPI (n) = Assessed Total Completes/ Total Innings

      Note that the above formula represents a modified Balls per Inning value that is different from the true as it accounts for additional bonus factors as follows:

1. Any player accomplishing a break and run has demonstrated significant skill. For this accomplishment, they receive an extra 8 bonus points[1] (as completes). For those players that rarely accomplish this, the elevated MBPI will eventually be washed out by the "background noise" from their other matches as part of their rolling average. However players that regularly accomplish break and runs will advance quickly as this represents a statistically significant feat and the system must account for this consistent level of performance. 8 on Break is a rare event and for most players, more luck than skill. An 8 on Break nets a player one extra "bonus" as a complete (*[1] see Appendix A page 3 H.I.P.L. modifications for both types of bonus points*). Players that consistently make the 8 on break will accumulate more bonus points as completes but for the most part, the bonus will contribute an insignificant amount to their rolling average MBPI.

2. Consistently pocketing balls during an opportunity to break represents skill. In fact, the average balls MOB statistic greatly contributes to the probability of also pocketing the 8-Ball during the break. Those doing so will consistently realize an elevated MBPI. For others, the net effect will be washed out by the "background noise" from their other matches as part of their rolling average.

In summary, this system utilizes M.B.P.I. as the most significant weighting factor to determine a player's baseline skill set. It is a very simple formula that essentially equates to what each player may be expected to accomplish during their turn (inning) at the table, on average. Please refer to the definition of an "inning" described earlier in this document.

"BIAS" and the FINAL HANDICAP

So far, we have calculated the "baseline" handicap value (*BaseLine*) for a player based strictly upon Rolling Average Modified Balls per Inning but another factor or factors still need to be taken into account to determine their final handicap (*FinalHcap*, an Integer between 2 and 7). They are:

- Match and/or game wins and/ or losses and/or any other factors.
- How far a player's final handicap (*FinalHcap*) might advance or decline since their last match (aka Hysteresis).

As I developed the algorithms, I listened to player's concerns. Early on, it was mentioned that some sort of method was needed to "tax" the players that were winning all the time. I thought about this for a long time and referenced our statistics (yes I maintained every player statistic since our inception in 2007 and I maintained statistics that went back as far as 2003). After careful consideration, I devised an addition to the algorithm that would appropriately "tax" the winners while benefiting the losers and be equitably applied across all handicap levels (except baseline 7). It became known as "BIAS", was accepted by majority vote and unfortunately it was considered by some to be a "separate" portion of the handicapping system that became a target of numerous attacks and pressure for elimination. I must state that "BIAS" is a very important part of the original *overall algorithm*, must not be isolated and serves it purpose very well.

Under the original system, a "bias correction factor" of +1 is applied to a player's baseline handicap (*BaseLine*) if the player's __match win__ record equals or exceeds 75%. During a new session, the first time this will be realized will be on a player's 4th match

(however, when compiling score sheet data, if the player has 100% match wins after their 3rd match, the bias will be applied for the first time – not to be actually realized by the player until their 4th match). A player carrying this win bias at the end of a session, will continue to carry win bias into a subsequent session until the soonest possible time that it can be determined that they cannot possibly achieve 75% match wins by their 4th match. *Please refer to Page 5 for the revised methodology used to calculate "Carry Bias".* (*Note: For Session #012, The H.I.P.L. temporarily removed "carry bias" from a player from a previous session. This returned to normal starting with Session #13 and was eliminated during session #s 15-17, then returning in a modified manner for session #18. Please refer to their website handbook and rules for further clarification and to the REV -7 variation for WIN and CARRY bias shown earlier*).

As I force a condition that ensures that *a player's handicap cannot change more than 1 level in a 1 week period* (unless a new player was miss-rated by their captain), the calculation modifies the bias correction factor accordingly where the bias correction factor could actually become 0 or a negative value regardless of the player's percentage of wins. Thus, an advancing player based only upon their improved baseline MBPI would receive a 0 bias value, *called Bias Hold*, if they happened to also reach or exceed 75% match wins at the same time. This hold would last only for the next match then switch to a 1 if they continue to meet or exceed 75% match wins. The bias correction factor may also be applied by league management for special circumstances such as sandbagging, etc. *Note: After Session #018 the H.I.P.L. permanently eliminated "Bias Hold" but it came and went during previous sessions.*

So a player's final handicap is determined as follows:
A check is included to determine if the player is a new player with no more than a two (2) match history. If they are new, their final handicap is temporarily determined by the value decided by their captain. This forced value is saved as *ForcedHcap*.

If *RecordCount* > 2 Then
FinalHcap= Baseline + Bias
Else
FinalHcap= ForcedHcap
End if

Where *Bias* is an Integer with a value of -1, 0 or +1 only

During past league management, the author managed the entry of only Carry Bias and Bias Hold manually with the following MS Excel formula, placed in the WIN BIAS Cell for each player *with the 11/1/15 tested and simplified formula shown second*:
=IF(*AveMBPI*>=*LowTrig7*,0,IF(OR(WINS+LOSSES<3,WIN%<75%),0,1))
OR Simplified and recommended as:
=IF(OR(*AveMBPI*>=*LowTrig7*,WINS+LOSSES<3,WIN%<75%),0,1)

In the future, Carry and Bias Hold will be coded into the expanded overall algorithm. This algorithm will include the use of bias as an option but the author strongly

recommends its use. Many professionally managed leagues include factors for player match wins, game wins and sometimes both. Positive bias plays more to egos and at this time it is believed that the application of positive bias only will produce the desired overall outcome of moving most players closer to the 40 – 60% match win goal without hurting anyone's feelings. However, there is value in applying negative bias for losing matches. Example: -1 bias for player handicaps > 2, after **n** matches should their match wins be 25% or less. Thus, 'bias aggression' match/game or both based modes and levels with variable but practically limited ranges of control to allow fine tuning by the league operator to determine optimum settings will be included as follows:

- Choice to use bias or not. If not, set bias flag to zero and exit routine
- Do you wish to use 'carry bias' from a previous session (Y,N)? Default: Y
- Aggression BASIS: (MATCH %, GAME %, BOTH)? Default: MATCH %
- Aggression TYPE: (WIN, LOSS, BOTH)? Default: WIN
- WIN Aggression: Positive bias. Default => 75% (adjustable 65 - 85%)
- LOSS Aggression: Negative bias. Default =< 25% (adjustable 0 - 35%)

These choices allow a league operator the flexibility to experiment. If historical records are maintained, it is believed that optimum settings can be achieved for each unique environment. Default settings are a recommended starting point and several sessions of data analysis may be required to compare the results of each scenario tested.

In summary, bias has the value of being an overall management tool to determine a player's final handicap when added to a player's baseline handicap. When used to advance a player's rating by a maximum of one should they equal or exceed 75% match wins, win bias alone has the following positive impact:

- It gives the biased player's opponents a better chance of winning.
- It increases the risk of loss for the player receiving the bias.
- It moves more players closer to the 50% match wins goal.
- Due to the significant spreads within each handicap bracket, it improves the chances of lower level players beating higher level players within that same bracket. Thus, it is a self-regulating mechanism within any bracket so that trigger levels need not be adjusted to compensate for bracket spread.
- It "raises the bar" for the players winning the most and offers them greater challenge.
- It is automatically removed once the biased player's match win record falls closer to the 50% match wins goal.
- As so few are able to maintain win bias for more than a few weeks, it can be said that those that are able to maintain win bias have earned the privilege of advancing.

BASELINE HANDICAP 7 PLAYERS ARE EXEMPT FROM +1 WIN BIAS
BASELINE HANDICAP 2 PLAYERS WILL BE EXEMPT FROM -1 LOSS BIAS

MEASURING THE RESULTS

One knows when a handicapping system is working well. Some of the signs are many hill-hill matches, upsets during the playoffs, etc. However, it is important to create a series of goals and measurement metrics to track a handicapping system as it evolves. If you make a change, was the change worthwhile?

The H.I.P.L. handicapping system was originally measured and rated based upon two primary benchmarks:

1. The percentage of players winning between 40 – 60% (50% +/- 10%) of their matches. The more- the better. The practical goal remains elusive and for now, the goal is an undefined "overwhelming majority" of players. One of our players indicated that we should strive for 90%- *unlikely in a short 18 week session!*

2. The overall distribution curve of player % of match wins. The curve should be symmetrical and peak as close to 50% as possible. There are always outliers. For purposes of tracking, each revision to the system was assigned a unique revision number and is described above with the tabular results entered. In addition, as each session was played, a chart was created and archived when the session ends. All of this information is invaluable when it comes to research and assists in setting realistic goals for possible future revisions. More importantly, all archives were available on the original website just in case an interested party saw something that they felt could be made better. Yes, 40 heads are better than 1.

This brings up another point: Listening and reacting to input. Every session and during our player's meetings I was approached by several individuals with suggestions on how to make the handicapping system better. This is what I have found:

- It is important to *always listen*. All league players are shareholders.
- Some individuals had no clue as to the detail involved with the system and how we recorded and archived information for future reference.
- Some individuals may not be aware of the maturity of the handicapping system and may offer "frivolous" advice to change things just for the sake of change.
- Generally speaking, if it ain't broke don't fix it unless you have high confidence that any changes made will be an obvious benefit to the entire league.
- Some players were completely aware of all aspects of the handicapping system and offered excellent advice.
- Some players had temper tantrums when their ideas were not incorporated.
- Publish absolutely everything that you can about the handicapping system so that more of the players have the opportunity to become fully aware. The downside is manipulation by sandbaggers, the upside is this will improve the quality of the feedback that you receive. This will also raise the overall confidence level of the league. *For an independent league: hiding information means something is wrong!* For a commercially managed league, their handicapping system is intellectual property that generates revenue and considered a trade secret. Thus, many of their details cannot be published. *ALL* leagues must be run as a business!
- Suggestions for change must be well founded, goal oriented (what is the problem that must be corrected?) with results that are measurable and traceable. Failure to meet any of these criteria leaves room for doubt about the validity of the request and needless to say, the value of any change.
- Leverage upon known past historical data as much as practical. Especially for those players with a recent history of a high percentage of match wins.
- Changes should be subtle. Harsh changes, especially to a proven system that is near maturity, could have a lasting negative impact on the entire league.

- Keep archived records and closely track the results of any revision. Be prepared to roll back to a previous revision as soon as a potential problem is recognized.
- ***Expect results variations even within a given single revision.*** People and conditions vary. This is not perfect science but "good science" must be applied to reach the goals. ***Failure to apply good and objective science can result in a major free-for-all of constant changes which will result in digging a deeper hole that becomes difficult to climb out from. An entirely unmanageable situation.*** "Good Science" means repeatable outcome.
- Stay objective and always strive for a system that is best in class.
- The players will tell you when they're happy (and when they're not) and it's all about happy, comfortable players that have confidence that what you have created is working for them!
- Solicit feedback ***and listen***!

REVENUE and PLAYER REWARDS

During the latter league sessions, up to and including Session # 010, the original H.I.P.L. assessed a pay as you go match fee of $6.00 total per player per individual match played. $5.00 of this went into the league coffers and $1.00 went into the hosting establishment's funds for billiard table maintenance. The league had six teams playing four (4) matches a week on Mondays at 3 host establishments for 15 weeks of seeding then a best of five playoff schedule that lasted 3 weeks. This generated $1,980.00 - $2,100.00 of revenue for the league per session and from time to time certain players would donate cash to the league or sponsor specific awards.

This revenue easily allowed the league to payout $1,000, $500 and $250 to the top 3 teams for each session and fund a Pot Luck Banquet every two sessions where the league provided up to $200.00 in cash awards for several tournaments that were held during each banquet. Sometimes, a $250 pool related door prize was raffled if it was deemed affordable. League financials were carefully monitored, updated and published weekly along with a session budget and projection using customized tools.

In addition, these awards based upon the TAP model, were given out for each session:
- Patches** for each 8 on Break or Break and Run achieved by a player.
- Three MVP Trophies for Handicaps 2&3, 4&5 and 6&7. The MVP for each category was based upon the highest % of Match Wins as first priority then the highest % of game wins as second priority.
- One Most Effective Break Trophy (MEB described below) and
- One Most Improved Player Trophy (MIP described below).

Note**: Patches were discontinued after session # 010. Many enjoyed receiving them, especially the newer players. Some didn't really care and turned them back in for re-distribution to other players (thanks!). Some really didn't care and just left them at the facility after receiving them to possibly be trashed (how inconsiderate!). It was always nice to hear a player's feedback as to how they really appreciated a (patch) award for their unique accomplishments. Some actually cherished them. I have a shirt filled with patches hanging in my closet. It was all just part of the fun. Do it if you can!

The Most Effective Break Award (MEB)

For the game of 8-Ball, having an effective break should be considered a priority skill to master. Without pocketing anything on the break: a Break and Run or 8 on Break are impossible. The MEB award goes to the player that has the **highest percentage probability of pocketing one ball** during an opportunity to break rather than the player with the highest number of made on break. Although the calculation for the MEB isn't perfect, it's a pretty good *estimation*, everyone plays under the same assumptions, *does not overly burden scorekeepers* and is easily determined using a few basic assumptions:

1. The assumption that for every game won, there will be an upcoming opportunity to break (this of course is incorrect for only the last game of a match set).
2. The assumption that for every new match, a player will win the lag and have an opportunity to break at a rate that is equal to their Total Matches Played **x** their Percentage of GAMES won. This is a skill based accounting assumption.
3. The requirement that a player must have a minimum number of matches of > 4 (recommended 6 minimum) in order to qualify for this award.

The formula used is thus:

BREAK EFFICIENCY%= % Probability of making one ball on break=

100 **x (**MOB Total **/** GAMES Won + **(**Total MATCHES Played **x** % GAMES Won**))**

Effective for H.I.P.L. Rev -8, the H.I.P.L. has upgraded their scoresheet to account for actual break attempts for this award. Although this might add a small amount of stress to the scorekeepers' tasks, this method will ensure the highest level of accuracy. Release 2.00 includes a MODIFIED SCORESHEET for those wishing to log real attempts and supports either the imperfect estimate formula shown above OR the preferred method of optionally logging real attempts for this award. The choice is up to league management but risks adding additional stress to the scorekeeping!

Estimating the % Probability of an 8-Ball Break and Run

If the Shot Probability% (for any single shot) is known (shown on the following page) and the Break Efficiency% is known (from the above) then the % Probability of accomplishing a Break and Run may be estimated for either a worst case run of 8 (*the exponent[8]*) or a run of 7 (*the exponent[7]*) if the group chosen is the same as a *single ball* pocketed on the break- using the following formulas (*do play with the numbers!*):

Best Case- Same Group%= Break Efficiency% x (Shot Probability%^7)
Worst Case- Different Group%= Break Efficiency% x (Shot Probability%^8)

This is one reason why conversion of BPI into Shot Probability%, as shown on the following page, is preferred. The % chance of a straight pool run of 100 would then equate to **Shot Probability%^100**. While a practicing and active Straight Pool "B" player, my last recorded 1990s *average* BPI was 6.89 (87.3%) with a high run of 67 in 1991. This equates to only a .0114% *average* chance of achieving that lifetime high run.

The Most Improved Player Award (MIP)

This award generally favors the lower handicaps but not always and essentially equates to the effort put forth to show improvement. **It is based upon a player's percentage of probability of pocketing any one ball** which is derived from their averaged BPI. The averaged BPI "A value" for a ***new player*** is the average of their ***first two (2) matches played*** while for an ***established player*** their "A value" is the ***archived overall average of all matches played during the most recent previous session*** in their record.

For all players, the "B value" is the overall averaged BPI value of all matches played during an active session. For the purposes of this award, all averaged values include all results and ***the best and worst records are never discarded***.

The BPI derived "B value" is compared against the BPI derived "A value" ***in terms of percentage of probability of pocketing any one ball*** and the player with the highest positive (or least negative) percentage difference wins the award.

Here's an example from our actual archives and one of the best practicing players in the league at the time:

This player had an averaged BPI of 2.57 ("A Value") during the previous session and finished the most recent session with an averaged BPI of 3.17 ("B Value"), a 23% BPI improvement. ***However, it's the improvement in Shot Probability that tells the true (statistical) story that <u>some players</u> may be interested in to gauge true improvement!***

The formula to convert BPI into the percentage of probability of pocketing any one ball (shot probability) is: 100* BPI/BPI+1. Therefore:

This player's converted "A Value" = 100* 2.57/3.57 = 71.989% Shot Probability
This player's converted "B Value" = 100* 3.17/4.17 = 76.019% Shot Probability
The difference yields a statistical B-A improvement of ***<u>only</u>*** + 4.03% Shot Probability

The calculation must be accomplished as shown and not by subtracting the A value BPI from the B value BPI and deriving probability improvement.

All player's values are then compared and the player with the most positive (or least negative) value of improvement wins the award.

For higher level players it is very difficult to realize improvement in terms of % of probability of pocketing any one ball without dedicated practice and exposure. This is because they are closer to 100% perfection where a lower handicapped player has more room for growth. Thus, in general, this award tends to favor lower handicapped players.

Another way to illustrate this is to consider a 9.00 BPI player (90% shot probability) that wishes to improve their shot probability by 9%. They would be required to increase their 9.00 BPI to a BPI of 99.0 to accomplish this! Perfection is not easy for humans.

Note: The H.I.P.L. has switched to using basic BPI improvement only to reward player improvement which may result in much larger values than reality. Release 2.00 only supports the Shot Probability% comparison. Please refer to the previous page.

CAN A LEAGUE BE RUN INDEPENTENTLY?

In my humble opinion the answer is yes but it's not easy. Remember that a professionally managed league often assesses fees in the form of membership dues and "taxes" on the players as they play their matches. These fees often pay the salaries and the overhead required to manage the league while eliminating some of the associated revenue that could otherwise be going directly back to the players. There is no such thing as free lunch and the professional organizations that manage leagues have the required talent and resources that are driven by a business model of franchisees providing a steady stream of income. They offer high quality league management for a price.

A successful independent league requires the talent and dedication of those managing the league and the support of an overwhelming majority of the players involved. A successful independent league absolutely requires certain individuals that have known talent to contribute their time and energy for the benefit of all. Without these ingredients an independent league may be destined to fail. ***Success is truly a team effort!***

It is hoped that the information provided is of value to those interested in starting their own handicapped independent 8-Ball league. The final version (1.10) of the original handicapping system worked very well along with the devised metrics and I was able to manage an entire 6 team league using multiple customized linked MS Excel spreadsheets to publish very detailed player stats and league financials with about 1.5 hours of effort per week and sometimes longer ***when essential Scoresheet "Quality Control" checks revealed errors.*** 6 teams seemed to be an excellent balance of revenue vs. player rewards.

Over time I'll be watching the results of this system, especially the results of any modifications and always carefully trying to make it better. However, I believe it has reached the point of "comfortable maturity". Once I'm convinced, I may spend the time to write the code required to further automate the processes of 8-Ball League Management and Handicapping leveraging upon these past experiences while developing a high quality outline. Writing an 8-Ball League Management package is time consuming and I must ensure that I have almost everything captured (de-bugging and revisions take time too!). It appears that a compiled GUI based application, perhaps with modules for different games will be the choice when I decide to attempt distribution ***and will carry licensing fees***. If I can do all of this before I visit that "big poolroom in the sky" then it would be great. If not, at least you have some information and considerable research that may be useful so you can try to do it on your own.

AUTOMATED SCORESHEET IMPORTS and QUALITY CONTROL

Through the years I have personally managed both Straight Pool and 8-Ball leagues but sometimes distributed software to others that have managed their own leagues without my involvement. What I have found is that often the scoresheets are filled with errors that are sometimes blatant and obvious. Nobody really likes to keep score and there is significant resistance in doing so.

Automating scoresheet imports into a master application represents significant risk unless each scoresheet is carefully screened for blatant and obvious errors. Somebody must take the time to ensure that as much quality as possible is present, otherwise the entries into the master application will simply result in a garbage in= garbage out (GIGO) scenario. The score keeper or methodology used must be "signed up" for the highest quality data recording that is practical but still likely less than perfect.

In the past when I was managing an 8-Ball League and responding to player complaints and concerns that the folks keeping score were doing so inaccurately, I would perform an audit process from time to time, especially when new teams were brought on. This process was very simple: I would announce an audit ahead of time, attend the match and keep score myself along with the designated score keepers then we would discuss and compare notes at the end of the match night. The results would often be very similar *because the teams audited knew an audit was coming and designated their most knowledgeable and focused team members to keep score.* As part of a diplomatic approach to the issue, at least I knew that someone on each team knew what they were doing and could easily "train" their team members, preferring to think of this as a "Train the Trainer" approach. *However, after an audit was over it would be anyone's guess who would actually keep score or even if they were properly trained to do so*. The audit process was heavily resisted by several and I was told by at least one individual to cease and desist on audits! Really?

It doesn't take much more than cooperation and a little extra time and focus to ensure a reasonable amount of quality for a scoresheet based handicapped league. Without it, the results are simply garbage in-garbage out (GIGO). It's a given that nobody likes to keep score but if you do- it's essential to try to pay attention and do so as accurately as possible as error entries have a significant impact on many. This includes player handicaps and player awards. Compliance is truly a team effort and league management can only offer guidance. If folks don't care then nothing further can be done and could render a statistically based system a complete waste of time.

Can automated scoresheet imports work? Maybe, but in my humble opinion a *human being* will likely need to screen them to ensure a practical level of quality.

ACKNOWLEDGEMENTS

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Helpful League Schedule Generators- Copyright©: http://www.printyourbrackets.com/
The Original v. 1.10 system rulebook, for reference purposes, may be found: HERE

NOTE: The author is not claiming that the 8- Ball handicapping system presented is the best. It's simply an easily manageable methodology that correlates to the ratings of a well-known and successful league and a system that from a purely statistical standpoint does the job very well. The devised metrics pass the common sense test. There may be several hundred ways of 8-Ball handicapping in use. This is just one of them.

Unless indicated otherwise, the author does not support modifications to the original handicapping system made after Session # 010 by the H.I.P.L. or any other party and is in no way connected with these changes even should the author be credited in their documentation with the modifying party bearing sole responsibility for success or failure. However, any revisions are believed to be of great value for tracking, reference and cause and effect relationships and will be entered into the metrics tables developed by the author as long as the modifying party's data remain available. The original system described is considered intellectual property with all documentation registered with the U.S. Library of Congress Copyright Office, legally "protected" under Copyright Law and may be used freely as long as credit is given to the author. This is a dynamically updated version of that original work, first published in 2007 and includes the results of additional research. It is assumed that all original works, free-of-charge and "sample" distributed computer applications or tools that contain Copyright © Notice under the author's name and any subsequent efforts by this author bearing such notification will continue to be legally accepted and binding under The Berne Convention Implementation Act of 1988, adopted by the U.S. on 1 March 1989 without the formality of continued registration. This includes any Straight Pool (14.1) handicapping and league management computer applications or tools previously distributed and published on electronic media containing Copyright © notification on or after 1991. And that these rights and wishes will continue to be respected.

This document may be used as a guide that contains real-world 8-Ball example scenarios of interest that may assist the end user with determining optimum methodologies and configuration parameters for any distributed software. Default methodologies and parameters are the recommended starting point and caution is advised if considering change.

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APPENDIX A

This section primarily deals with the design notes, development materials and certain supporting proofs that will eventually become a separate user document with certain portions placed within the help files of any distributed software.

Note: For the fall 2018 H.I.P.L. session (Session #23), all handicap trigger points were returned to the values shown in original Rev. 1.10 (now Rev. 1.11). However, starting with at least this session and perhaps earlier, it appears that the extra bonus point for making an 8 on break and the (8) extra bonus points for a break and run were modified and possibly applied as a percentage that varies based upon player ability. The exact methodology employed remains unknown and is not published on their website.

Note: For the fall 2019 HIPL session (Session 25) several handicap trigger points have again been modified. Their latest modified BPI handicap spreads are posted on their website at this link: http://www.hillsboro8ball.com/Fall2019.htm under the BPI Tab at the far left bottom. I am calling this Revision 9 for tracking and measurement purposes to determine if these changes yield any improvement over past results.

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TRACKING THE H.I.P.L. HANDICAP TRIGGER POINTS and SPREADS

      Over the course of time, the new H.I.P.L. Handicapping System underwent numerous compounding changes. Some of these changes may have been beneficial and others may have been known to cause problems. Therefore, in order to establish a cause and effect relationship it is essential to understand the parameter changes within this derivative system that have occurred during each individual session and attempt to relate these changes to the measured results for each individual session and any following sessions if at all possible. Session numbers are unique with benchmark results and the Handicapping System Revision numbers entered into *Table 2* earlier in this document. One may correlate these session results to the table below to determine the influence, if any, of any handicap bracket changes but *this is complex for those sessions where numerous other changes also occurred or when the compounding changes of previous sessions may have also influenced the results and must be approached with caution.*

      At the time, the revisions resulted in modifications to the spreads for all handicap brackets but it was discovered that these spreads were *not* accurately depicted within several most recently published *H.I.P.L. Rulebooks* which may be viewed **at this link.** Therefore, to determine the most recent handicap triggers being used and to track all these changes more accurately, I developed the table below based upon the data within the *New H.I.P.L. Handicap Calculator* which can be found **at this link.** This calculator was a modified version of the originally distributed calculator shown in *Appendix A Page 2* with the Copyright© notification, some rows and columns, and window dressing removed with headers and formulas slightly revised to reflect new trigger points. *Note that the average BPI values shown in the newest calculators are <u>baseline ratings only</u> and do not include any bias. The H.I.P.L. calculates bias and manages final handicaps on a separate weekly updated sheet that includes player wins, losses and match win percentages, etc. which is the recommended methodology to publish <u>all</u> important stats.*

Historical ESTIMATED Handicap Trigger Points used by the H.I.P.L.

Player Handicap	Min. AVERAGE M.B.P.I.	MIN % PROB of making 1 ball
7 (Session 016)	>= 3.597? [-5, -7]	>= 78.25%? [-5, -7]
6 (Session 016)	>= 2.409? [-5]	>= 70.67%? [-5]
5 (Session 005)	>= 1.71 [O]	>= 63.10% [O]
4 (Sess 013, 017 & 018)	> 1.257 [-3,-6,-7]	> 55.69% [-3,-6,-7]
3 (Sessions 017 & 018)	>= 0.927? [-6,-7]	>= 48.11%? [-6,-7]

Please refer to Appendix A Page 2 for the Original Values prior to all these changes

Notes:

Superscript values[#] indicate the Revision # when the HIPL Trigger Points were changed or first noted to change with the highlighted Session #s shown. These values are estimates only and may vary from session to session, are subject to change at any time, could remain unpublished and are updated if they happen to be noticed.

[O] = Original version 1.02 value. Refer to Appendix A Page 2 for all original values.

[-3,-6,-7] = Raised to 1.25 in Rev -3 (Session 013) with the latest values noted to be revised even higher to between 1.257 and 1.263 in Sessions #017 & #018.

[-6,-7] = Updated Rev -6 unpublished HC3 estimate first noted during REV -7.

Sample: Past Original Version 1.10 H.I.P.L Handicap Calculator

UPLOADED ON:	January 24, 2016		VERSION				HANDICAP CHANGES IN RED WITH YELLOW HIGHLIGHT																
HIPL Session:	Fall 2012		1.10				THE NEWEST B.P.I. INFORMATION IS ENTERED IN BLUE																
FIRST NAME	LAST NAME	TEAM #	PLAYER HANDICAP	SHOT %	AVE B.P.I.	BEST BPI	BPI -2	BPI -1	BPI 1	BPI 2	BPI 3	BPI 4	BPI 5	BPI 6	BPI 7	BPI 8	BPI 9	BPI 10	NEW BEST	HCAP BIAS	BIAS CODE *	DISCARDS MIN	MAX
01- Rob	Alexander	3	4	61.80%	1.62	3.82	1.50	1.70	1.76	1.25	1.80	1.47	1.73	1.11	1.75	1.75	3.82	1.47				1.11	3.82
15- Craig	Bubacz (New)	5	6	#DIV/0!	#####																	N/A	N/A
72- Bob	Mobile	6	5	71.40%	2.50	16.00	3.13	2.73	1.78	1.57	7.00	2.50	1.58	1.84	4.40	2.67	2.67	1.67				1.57	7.00
73- Gary	Morin	3	6	66.95%	2.03	8.25	1.29	2.21	3.09	2.19	2.17	2.00	1.70	1.93	2.50	1.58	2.21	1.77		1	CARRY	1.29	3.09
78- Bob	Olson	6	3	49.21%	0.97	1.78	1.23	0.70	1.05	0.74	1.15	0.90	1.11	1.08	0.81	1.04	0.58	1.11				0.58	1.23
97- Steve	Tosi	5	2	45.83%	0.85	1.20	1.07	1.10	1.05	0.50	0.54	0.57	0.84	0.81	0.73	0.91	0.84	1.20				0.50	1.20
100- Bret	Verdrager	3	4	54.28%	1.19	2.29	1.38	1.26	1.00	0.94	1.28	1.28	1.26	1.36	1.45	0.52	1.75	0.66				0.52	1.75
106- Jeff	Wright	1	3	52.15%	1.09	2.40	1.30	0.65	1.33	0.90	1.11	1.24	1.14	0.86	1.24	0.85	1.83	0.93				0.65	1.83
	GENERAL INFO		7	79.80%	3.95	Excellent risk management, accuracy, position, pattern strategy and ATTITUDE. Much practice!																	
	GENERAL INFO		6	72.53%	2.64	Good risk management, accuracy, position and pattern strategy. CONFIDENCE = Practice!																	
	GENERAL INFO		5	63.10%	1.71	Above average. Fair to good position & pattern strategy. Accuracy/ risk management need work.																	
	GENERAL INFO		4	53.05%	1.13	Most common level of all. The "finer points" of the game still need some "tuning".																	
	GENERAL INFO		3	48.19%	0.93	Practice and help from your friends will get you to level 4! It takes time and exposure.																	

HANDICAP BIAS CODES USED:
75%+ : Normal 75% or greater match WIN Bias.
HOLD : 1 MATCH hold to prevent a change of 2 levels in a match week.
CARRY : 75%+ WIN Bias carried from a previous session.
N/A : Player is a baseline 7, NO BIAS applies.
SP: Bias added when players "self-proclaim" themselves to be better than shown by their stats. *Must be approved by their captain.*

OLD ← ← ← ← → → → → NEW
↓
TRASHED

For players with 12 match records: The BASELINE HANDICAP is based upon the ROLLING TEN MATCH AVERAGE MBPI AFTER THE HIGH and LOW are removed. For all others, it's the simple average of up to 11 matches. The FINAL HANDICAP is the BASELINE HANDICAP plus any BIAS correction factor.
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NEW PLAYER ACTUALS (POPULATED for 2 MATCHES or 2 WEEKS- Whichever comes first!):

FIRST NAME	LAST NAME	TEAM #	PLAYER HANDICAP	SHOT %	AVE B.P.I.	BEST BPI	BPI 1	BPI 2	NEW BEST
15- Craig	Bubacz (New)	5		#DIV/0!	#DIV/0!	#####			
				#DIV/0!	#DIV/0!	#####			

1. The recommended default version 1.10 Handicap Trigger MBPI points are shown along with the computed probability of pocketing any one ball and some simple recommendations in case a player wishes to improve.

2. New players are frozen at the handicap shown in the upper calculator in (RED) for only two matches. After this, the values from the lower table mini-calculator are pasted into the upper calculator and whatever handicap value is attained, the new player will play at that handicap beginning on their third match. This offers the fastest possible adjustment just in case a new player is initially mis-rated.

3. False seeding for a full 12 matches is never used with the natural accuracy improving after more matches are completed.

4. Once 12 matches are entered, the computation discards the single highest and lowest BPIs achieved, subtracts these values from the total and averages the result by dividing by 10. The discards are color coded and listed in separate columns. This methodology was beta tested for 2 full sessions before being implemented with very few players impacted by a change in their handicap rating. For new players with less than 12 matches, an average of all entries (up to 11) is taken. The MS Excel COUNTA function assumes blank entries for matches not played and is used to determine the appropriate divisor and calculation to utilize via the simple formula: AVE. BPI= IF(COUNTA(BPI-2:BPI10) <12,SUM(BPI-2:BPI10)/COUNTA(BPI-2:BPI10),SUM(BPI-2:BPI10)-(MIN+MAX)/10).

5. The example shows a player with a +1 WIN carry bias from a previous session along with a "Bias Code" which explains the reasoning. The final handicap is thus the sum of the baseline handicap + bias which can be -1, 0 for HOLD or no entry and +1 for Win Bias. If the bias is negative, this will result in a subtraction.

6. Due to several complaints, I also added the "SP Bias" category requiring team captain approval and placing risk directly on the entire team for those players that feel they are better than their stats show. If the team captain wanted to take the chance then I could manually increase the player handicap by any amount. One player was rated as a 4, never won a single match and continuously complained they should be a 6! "SP Bias" never had to be utilized and stopped the angry calls.

NEW PLAYER EVALUATION USING MODIFIED ver. 1.10 SPREADSHEET

UPDATED ON: February 12, 2016			VERSION	PUBLISHED and UNPUBLISHED HANDICAP TRIGGER POINT CHANGES AFTER REV 1.10 are by the HIPL[2]																		
HIPL Sessions: 16 & 17			1.10	MATCHES WITH A DIFFERENCE ARE SHOWN IN BOLD GRAY																			
FIRST NAME	LAST NAME and STARTING H'CAP	TEAM #	PLAYER HANDICAP	WIN %[1]	AVE B.P.I.	BEST BPI	BPI -2	BPI -1	BPI 1	BPI 2	BPI 3	BPI 4	BPI 5	BPI 6	BPI 7	BPI 8	BPI 9	BPI 10	NEW BEST	HCAP BIAS	BIAS CODE *	MIN	MAX
New Player 1	Session 16 Complete	4	3	7.7%	0.978	1.77	1.19	1.04	0.78	0.44	0.79	1.18	1.19	1.00	0.89	1.77	0.80	0.92		0		0.44	1.77
New Player 2	Session 17 Test HC2	4	#DIV/0!	N/A	#####	0.00														####		N/A	N/A
New Player 3	Session 17 Complete	4	3	41.7%	1.050	1.64	0.53	0.88	0.72	1.29	1.38	1.03	1.23	1.64	1.06	1.08	0.91	0.92		0		0.53	1.64
New Player 4	Session 17 Test HC2	4	2	33.3%	0.583	0.73			0.73	0.41	0.61	OK								0		N/A	N/A
New Player 5	Session 17 Test HC3	2	2	50.0%	0.909	1.58		0.68	0.71	1.58	1.06	0.71	0.53	1.39	0.92	0.80	0.71	OK		0		N/A	N/A
New Player 6	Session 17 Complete	5	4	50.0%	1.477	3.43	2.00	1.30	0.76	1.94	0.96	0.93	1.82	1.08	1.53	1.39	3.43	1.82		0		0.76	3.43
New Player 7	Session 17 Test HC2	7	2	0.0%	0.707	1.00			1.00	0.76	0.60	0.63	0.75	0.50	OK					0		N/A	N/A
New Player 8	Session 17 Test HC3	7	3	36.4%	1.040	1.32	1.27	0.60	0.93	0.79	1.06	1.30	0.89	1.18	1.15	0.95	1.32	OK		0		N/A	N/A
New Player 9	Session 17 Complete	4	3	16.7%	0.936	1.24	0.63	0.92	0.56	0.83	0.89	1.10	0.74	1.04	1.24	1.16	0.90	1.15		0		0.56	1.24
New Player 10	Session 17 Test HC3	3	4	45.5%	1.515	1.45	1.45	0.77	0.88	1.18	0.89	1.13	0.77	1.40	1.20	6.00	1.00	DIF	6.00	0		N/A	N/A
New Player 11	Session 17 Test HC2	7	2	0.0%	0.473	0.55			0.55	0.40	0.47	OK								0		N/A	N/A
New Player 12	Session 17 Test HC2	3	2	37.5%	0.929	1.23			1.09	1.13	0.90	1.23	0.62	0.64	0.65	1.17	DIF			0		N/A	N/A
Player 13 (U4)[2]	Session 17 Complete	7	3	25.0%	1.105	1.63	1.19	1.20	1.63	1.05	1.11	0.86	0.63	0.88	1.33	1.09	1.18	1.16		0		0.63	1.63
New Player 14	Session 17 Test HC3	7	3	62.5%	1.095	2.00			0.92	2.00	0.84	1.09	1.32	0.83	0.83	0.93	OK			0		N/A	N/A
			#DIV/0!	0.0%	#####	0.00														####		N/A	N/A
			#DIV/0!	0.0%	#####	0.00														####		N/A	N/A

GENERAL INFO UNPUBLISHED TRIGGER![2]	7	79.76%	3.94	Excellent risk management, accuracy, position, pattern strategy and ATTITUDE. Much practice![2]
GENERAL INFO UNPUBLISHED TRIGGER![2]	6	72.53%	2.64	Good risk management, accuracy, position and pattern strategy. CONFIDENCE = Practice![2]
GENERAL INFO UNPUBLISHED TRIGGER![2]	5	63.10%	1.71	Above average. Fair to good position & pattern strategy. Accuracy/ risk management need work[2].
GENERAL INFO UNPUBLISHED TRIGGER![2]	4	55.56%	1.25	Most common level of all. The "finer points" of the game still need some "tuning"[2]
GENERAL INFO UNPUBLISHED RANGE![2]	3	48.19%	0.93	Practice and help from your friends will get you to level 4! It takes time and exposure[2].

* HANDICAP BIAS CODES USED:
75%+ : Normal 75% or greater match WIN Bias.
HOLD : 1 MATCH hold to prevent a change of 2 levels in a match week.
CARRY : 75%+ WIN Bias carried from a previous session.
N/A : Player is a baseline 7, NO BIAS applies.
SP: Bias added when players "self-proclaim" themselves to be better than shown by their stats. *Must be approved by their captain.*

OLD ← —————————————————— NEW
TRASHED

For players with 12 match records: The BASELINE HANDICAP is based upon the ROLLING TEN MATCH AVERAGE MBPI AFTER THE HIGH AND LOW are removed. *For all others, it's the simple average of up to 11 matches. The FINAL HANDICAP is the BASELINE HANDICAP plus any BIAS correction factor.*
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Note[1]: Player win percentages outside the 40% - 60% range goal are in highlighted RED font. U4[2]: Player would be HC4 on BPI # 4 using the published handicap trigger.
NEW PLAYER ACTUALS (POPULATED for 2 MATCHES or 2 WEEKS- Whichever comes first!):

FIRST NAME	LAST NAME and STARTING H'CAP	TEAM #	PLAYER HANDICAP	SHOT %	AVE B.P.I.	BEST BPI	BPI 1	BPI 2	NEW BEST	UNDER THE ORIGINAL SYSTEM (ALL VERSIONS WITHOUT FALSE SEEDING)[2] — HCx is the *captain "assigned" starting handicap* for a new player
New Player 2	Session 17 Test HC2	4	#DIV/0!	#DIV/0!	#####					
New Player 3	Session 17 Test HC3	4	2	41.35%	0.705	0.88	0.53	0.88		This player would have played at the handicap 2 shown **HERE** on *THEIR THIRD MATCH*
New Player 4	Session 17 Test HC2	4	2	36.31%	0.570	0.73	0.73	0.41		This player would have played at the handicap 2 shown **HERE** on *THEIR THIRD MATCH*
New Player 5	Session 17 Test HC3	2	2	41.00%	0.695	0.76	0.68	0.71		This player would have played at the handicap 2 shown **HERE** on *THEIR THIRD MATCH*
New Player 6	Session 17 Test HC2	5	4	62.26%	1.650	2.00	2.00	1.30		This player would have played at the handicap 4 shown **HERE** on *THEIR THIRD MATCH*
New Player 7	Session 17 Test HC2	7	2	46.81%	0.880	1.00	1.00	0.76		This player would have played at the handicap 2 shown **HERE** on *THEIR THIRD MATCH*
New Player 8	Session 17 Test HC3	7	3	48.32%	0.935	1.27	1.27	0.60		This player would have played at the handicap 3 shown **HERE** on *THEIR THIRD MATCH*
New Player 9	Session 17 Test HC3	4	2	43.66%	0.775	0.92	0.63	0.92		This player would have played at the handicap 2 shown **HERE** on *THEIR THIRD MATCH*
New Player 10	Session 17 Test HC3	3	3	52.61%	1.110	1.45	1.45	0.77		This player would have played at the handicap 3 shown **HERE** on *THEIR THIRD MATCH*
New Player 11	Session 17 Test HC2	7	2	32.20%	0.475	0.55	0.55	0.40		This player would have played at the handicap 2 shown **HERE** on *THEIR THIRD MATCH*
New Player 12	Session 17 Test HC2	3	3	52.61%	1.110	1.13	1.09	1.13		This player would have played at the handicap 3 shown **HERE** on *THEIR THIRD MATCH*
Player 13 (U4)[2]	Session 17 Test HC3	7	3	54.44%	1.195	1.20	1.19	1.20		This player would have played at the handicap 3 shown **HERE** on *THEIR THIRD MATCH*
New Player 14	Session 17 Test HC3	7	4	59.35%	1.460	2.00	0.92	2.00		This player would have played at the handicap 4 shown **HERE** on *THEIR THIRD MATCH*

Note: The handicap trigger points for the above "original calculator" were modified as per the published values shown on the H.I.P.L website per "General Information Rules and Guidelines" Revision 6 dated 8/31/2015. The <u>actual handicap trigger points were known to be different</u> from these published values at the time of this evaluation. Player names are kept confidential. *In addition, the H.I.P.L. had modified the Eight on Break and the Break and Run portions of the main MBPI formula to calculate bonus points where the bonus points were reduced. Break and Run bonus points were halved in some cases but not all and may be tied to MBPI.*

COMPARISON OF NEW PLAYER NON-SEEDING vs. SEEDING METHODS

UPDATED ON: February 12, 2016			VERSION 1.10			ORIGINAL SYSTEM WITH BIAS and NO SEEDING — HIPL Sessions: 17 — HIGHLIGHTED VALUES DISAGREE WITH NEW SYSTEM AFTER WEEK 2 [2,3]											
FIRST NAME	LAST NAME and STARTING H'CAP	TEAM #	WINNING PERCENT	AVERAGE HC	BEST HC	1	2	3	4	5	6	7	8	9	10	11	12
New Player 2	Session 17 Test HC2	4	N/A	#DIV/0!	0												
New Player 3	Session 17 Test HC3	4	41.67%	3	3	2	2	2	2	2	3	3	3	3	3	3	3
New Player 4	Session 17 Test HC2	4	33.33%	2	2	2	2	2	2								
New Player 5	Session 17 Test HC3	2	50.00%	2	4	2	2	2	4	4	4	3	3	3	3	2	
New Player 6	Session 17 Test HC3	5	50.00%	4	4	4	4	4	4	4	4	4	4	4	4	4	4
New Player 7	Session 17 Test HC2	7	0.00%	2	2	2	2	2	2	2	2	2					
New Player 8	Session 17 Test HC3	7	36.36%	3	3	3	3	3	3	2	3	3	3	3	3	3	3
New Player 9	Session 17 Test HC2	4	16.67%	3	3	2	2	2	2	2	2	2	2	2	2	2	3
New Player 10	Session 17 Test HC3	3	45.45%	4	4	3	3	3	3	3	3	3	3	3	3	4	4
New Player 11	Session 17 Test HC2	7	0.00%	2	2	2	2	2	2								
New Player 12	Session 17 Test HC2	3	37.50%	2	4	4	4	3	3	3	3	3	2	2			
Player 13 (U4)[2]	Session 17 Test HC3	7	25.00%	3	4	3	3	3	4	4	3	3	3	3	3	3	3
New Player 14	Session 17 Test HC3	7	62.50%	3	4	4	4	4	4	4	4	4	3				

Note: Win percentages outside the range of the 40% - 60% goal are in highlighted RED font

UPDATED ON: February 12, 2016			VERSION REV -6			NEW SYSTEM WITH BIAS and RUNNING AVERAGE SEEDING (RAS) — HIPL Sessions: 17 — HIGHLIGHTED VALUES DISAGREE WITH ORIG. SYSTEM AFTER WEEK 2 [2,3]											
FIRST NAME	LAST NAME and STARTING H'CAP	TEAM #	WINNING PERCENT	AVERAGE HC	BEST HC	1	2	3	4	5	6	7	8	9	10	11	12
New Player 2	Session 17 Test HC2	4	N/A	#DIV/0!	0	MID	MID	MID	RAS	RAS	RAS	RAS	RAS	RAS	RAS	RAS	RAS
New Player 3	Session 17 Test HC3	4	41.67%	3	3	3	3	3	2	2	3	3	3	3	3	3	3
New Player 4	Session 17 Test HC2	4	33.33%	2	2	2	2	2	2	RAS	RAS	RAS	RAS	RAS	RAS	RAS	RAS
New Player 5	Session 17 Test HC3	2	50.00%	3	4	2	2	3	4	4	3	3	3	3	2	2	RAS
New Player 6	Session 17 Test HC3	5	50.00%	4	4	3	3	3	4	4	4	4	4	4	4	4	4
New Player 7	Session 17 Test HC2	7	0.00%	2	2	2	2	2	2	2	2	2	RAS	RAS	RAS	RAS	RAS
New Player 8	Session 17 Test HC3	7	36.36%	3	3	3	3	3	3	2	3	3	3	3	3	3	3
New Player 9	Session 17 Test HC2	4	16.67%	2	3	2	2	2	2	2	2	2	2	2	2	2	3
New Player 10	Session 17 Test HC3	3	45.45%	3	3	3	3	3	3	3	3	3	3	3	3	3	3
New Player 11	Session 17 Test HC2	7	0.00%	2	2	2	2	2	2	RAS	RAS	RAS	RAS	RAS	RAS	RAS	RAS
New Player 12	Session 17 Test HC2	3	37.50%	3	3	3	3	3	3	3	3	3	2	3	RAS	RAS	RAS
Player 13 (U4)[2]	Session 17 Test HC3	7	25.00%	3	4	3	3	3	4	3	3	3	3	3	3	3	3
New Player 14	Session 17 Test HC3	7	62.50%	3	3	3	3	3	3	4	4	4	3	RAS	RAS	RAS	RAS

Notes[1]: Handicaps shown in green are for the _NEXT match_ to be played if there is no discrepancy between both systems after Match #2!

[2,3] Players possibly initially mis-rated for 1st 2 Matches (Happens for both systems): 5 Total Players Potentially Impacted: 15

[2,3] Total different Player handicap discrepancies by match #s AFTER Match #2: 7 Total Players Potentially Impacted: 16

The above table shows the results of the comparison, in terms of actual handicaps over time, between the original system which uses simple rolling averages with no seeding and the new H.I.P.L. system which uses false seeding values for a full 12 matches for new players joining the league. Player names are kept confidential.

The author considered this to be an excellent opportunity to track and record the progress of a large number of new players using two different handicapping methodologies when dealing with new players. Further explanations are given on the following page.

HOW TO READ THE TABLES and SYSTEM DIFFERENCES

A. The starting handicap for a new player, assigned by the team captain, is shown for each player and subject to change afterwards. If there is a discrepancy between this starting value and the actual player BPIs during that player's first 2 matches then those first 2 matches are color coded in RED in the associated match columns. Neither system can adjust handicaps properly so early on for a mis-rated new player. This is always a concern when subjective (human) decisions determine an _initial handicap_. A tally is shown indicating the number of players potentially impacted by initial mis-ratings. It's important to try to rate new players accurately!

B. For Match #3, the original v. 1.10 system immediately assigns a player handicap based upon the average BPI for their first 2 matches offering the fastest possible response for a potentially mis-rated player. A player is allowed to advance or decline _MORE THAN 1 handicap level only on their 3rd match_ as an initial adjustment in case they were initially mis-rated and no bias HOLD is applied. If the win/loss results of a player's 3rd match are 100%, then WIN Bias will be applied and realized on their 4th match for the first time. Under Rev -6 for Match #3: A player played at the handicap based upon a seeded value that is halfway between the upper and lower bounds of their captain's initially assigned handicap spread (MID). What is the lower bound for a 2? Is it really zero? I have never witnessed a zero BPI in any pool game! What is the upper bound and midpoint for a 7? Regardless, the seeding with _false values_ must be expected to cause _latency_ and delay the adjustment of player handicaps in the early portions of league play. Differences in handicaps between both systems are shown, _on or after match #3_ as highlighted RED font and a separate running tally of potentially impacted players is shown assuming that each difference could impact both the player and a different opponent.

C. For Match #4, WIN Bias and Bias HOLD (preventing a player from changing handicap levels more than 1 level between subsequent matches) for both systems are in effect. Rev -6 took the running average of all previous matches played and seeded all remaining matches with this false value, shown as Running Average Seeding (RAS) in the table. This seed value continuously changed as more matches were played, up to 12. This method continues to allow latency in adjusting the earlier match handicaps due to the effect of the large quantity of false values that followed but became more accurate over time as real data began to fill the database over time as that new data were entered. Original v. 1.10 continues to handicap based upon a simple running average of only those matches actually played with no seeding. Then, once 12 matches are completed, the best and worst BPIs are removed and the player handicap is based upon the average of the remaining 10 matches. Previous 2 full session Beta tests of this match #12 final anjustment indicated minimal impact to the overall player population. For Rev. -6, this adjustment is constant from the start as all 12 matches are already fully "seeded". EXAMPLE*: On Player #10's 10th match a 6.00 BPI was recorded, a remarkable performance (!) based upon a prior 9 match running average BPI of 1.074! This player would be required to have won 2 matches (16 completes) in 2.666 average innings as there was no eight on break or break and run recorded. The original system would have raised this player's handicap from 3 to 4 for the next match (10 match running average 1.567 BPI) as a full 12 matches were not yet completed while the new 12 match fully "seeded system" held the player to a handicap 3 as this match was discarded by the algorithm. If this performance was real, then perhaps the player deserved the + handicap increase? If it was an error then most systems output garbage with garbage input (GIGO). Scoresheet accuracy is very important!*

D. For _upcoming matches_ where the handicaps for both systems are in agreement, the handicap values are color coded in GRN: 3 otherwise, in the case of disagreement, they are color coded in highlighted RED: 3

E. The running average handicaps that are in disagreement are also color coded in highlighted RED: 3 otherwise bold black 3

NOTE: Comparisons with v. 1.10 are based upon published handicap MBPI trigger points only. The MBPI trigger points for handicaps 3,4,6 and 7 had changed forcing the spreads for all handicap levels to change with this information unpublished at the time. For (U4) players, the new Handicap 4 trigger point was the reason for any discrepancy between the systems on Match 5.

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SUMMARY OF TESTS AND CHANGES

As the final system design approached completion, the table below was built as an organizational checklist to summarize all the concepts and methodologies employed by the original system that were tested *to date,* in some cases verified under the new H.I.P.L. system and that must be supported (=[S] *but not necessarily HIPL methodology*). Changes beyond version 1.10 to be implemented that are believed to offer a high probability of true enhancement are indicated by a superscript value[X] and may not necessarily be the same as the methods employed by the H.I.P.L. The final release v 2.00 will contain new features and options that will allow limited but reasonable parameter customization. Some items are inter-related with others. There are 2 sessions per year in the example.

TABLE OF OVERALL CONCEPTS, TESTS and CHANGES

Original 5 Year System Item	H.I.P.L. 7 Year Test Results/ Differences
M.B.P.I. Based System	Tested, verified and RETAINED for 25 total Sessions
RACE GRID	Tested and RETAINED for 25 total Sessions
CALC: Player Database	Must support worst case # matches for 2x sessions MIN
CALC: New Player Ratings	Modified: See new H.I.P.L. rulebook
CALC: 12 Match Baseline	Tested/ Verified and RETAINED for 16+ total Sessions
CALC: 8 on BRK 1 Bonus pt.	Modified Calculation
CALC: 8x B&R Bonus pts.	Modified Calculation
Final HC: **WIN** Bias[2]	*Modified many times*. *Now hits on Week 5 vs. Week 4*
Final HC: Win **CARRY** Bias[1]	Tested MANY times. **ENHANCED** & reintroduced.
Final HC: Bias **HOLD**[2]	Permanently eliminated after Session 18
Final HC: **LOSS** Bias[2]	**OPTION NEVER TESTED ON EITHER SYSTEM**
Baseline HC Trigger Points[2]	Modified Rev.9 starting Fall 2019 (Sess. #025)
Baseline HC Spreads	Refer to above. *ALL* reset and published.
Awards: MVP[S]	RETAINED FOR ALL SESSIONS
Awards: Effective Break[S,2]	REV-8 MODIFIED- Actual break attempts recorded
Awards: Most Improved %[S]	MODIFIED to BPI Improvement only
Awards: Patches[S]	DISCONTINUED after 1st 10 Sessions
MGMT: Metrics Generation[S]	Generated in tabular form
MGMT: Quality Control[S]	?
MGMT: Scoresheet[S]	REV-8 Upgraded to include break attempts
MGMT: Rules[S]	Revision 7 Published 9/11/2018
Rules: Maximum Handicaps[S]	RETAINED (*past attempts to void bias portion of HC*)
Rules: Playoffs 2x Player max	MODIFIED: *Player may play only once or team forfeit*
Info: Detailed Player Stats[S]	Now published on new website.
Financial Report Generation[S]	Non-published. *Some may not wish to publish this info.*
ORG: Pre-session Meetings	ONGOING but format may have changed
SOCIAL: Banquet	ONGOING and modified as required by budget
Per Player COST	Increase of 16.7% (Less man-hours Development Costs)
Cost v. Benefit (CBA)	**Please refer to this LINK**

Note[1]: An improved method of implementing CARRY Bias is added as rev. 1.11 to the original system (rev. 1.10) to be included in release v 2.00. Please refer to *Page 5*.
Note[2]: Alternate calculation options available in compiled release version 2.00.

GOALS OF INITIAL RELEASE 2.00

As can be seen from the preceding table, a form of a punch list, there are many items that constitute the overall management effort required for even a small 8-Ball League like the HIPL, used as an example throughout this document. This particular league has realized a remarkable number of revisions over a relatively short period of time, often backtracking on methodologies. These changes can be very expensive in terms of the personal time required to implement change vs. the true benefits derived.

The goal of the initial release (2.00) of this system software is to ease the management burden for any league as much as practical while allowing reasonable flexibility to implement change in those areas most likely to be considered candidates for change. It is impossible to capture everything and continuous updates and revisions to any distributed software must be avoided. As most of the items subject to change are shown to be related to player handicap rating details with a goal of "equalization" amongst players with a significant spread of talent, any release must also contain a built-in metrics module that will allow league management some level of analyzing the impact of any change and to make an informed decision that could lead to improvement. The system must not be micromanaged but managed carefully and with patience. Making multiple changes at once introduces significant risk when there are interrelationships.

Initial release 2.00 will include a rudimentary and *optional to use* (in order to not annoy the user) anti-GIGO, better than nothing, form of Quality Control that will flag certain types of common blatant errors and allow a human user the option to correct or not, based upon the player matchups. *Automated scoresheet imports will not be supported __in the initial release__ due to the proven high risk of error*. These most common 8-Ball scoresheet error tests, some similar to Straight Pool League experiences, will include and are not limited to:

- *Autocorrected* 0 MOB entry if 8 on Breaks or Break and Runs are entered
- An abnormal discrepancy in the amount of innings reported by both players
- An abnormal discrepancy for a player's calculated MBPI vs. their database stats
- A discrepancy in games won based on the player's handicap race grid lookup
- Team Maximum Handicaps Rule exceeded! Please contact the teams to resolve!

The plan for initial release 2.00 is that it will be only a small and likely central utility in the league management arsenal. Major formal report generation will be limited. However, exports of .dat, .csv and .txt files will be supported which may be imported into application templates better suited for web publication or conversion to pdf format. These days, league management is expected to have the business software required to create formal reports, know how to use it and publish this information on the Web. This will help to contain the cost of the utility itself.

This background project has been in the planning phase for many years, several outside the H.I.P.L. have expressed an interest and the final outline is beginning to solidify. It will still be some time before the first new line of code is written for this *compiled stand-alone application* (replacement compiler needed). Until then, I expect to learn even more. Initial development and conceptual testing are in MS Excel 2013.

SYSTEM METRICS

As an important part of this handicapping system, a series of continuously updated analysis of metrics were developed to allow the user the ability to track the results of each session from start to end. The tabular tracking is explained earlier. In addition, a results plot is generated to provide additional valuable information and archived at the end of each session. I chose to place these archives on the original league website. All of this information is used to determine if future revisions are in order that may benefit an entire league or if there is a potential problem.

The plot shown below is an example of one of the best session results obtained. It indicates that only one player had below 30% match wins and three players had 75% or more match wins and will carry win bias into the next session. The remaining 30 players fall into a tightly restricted match win percentage zone of 30 – 70%. This is referred to as win distribution spread or simply "distribution" throughout this document.

To the author, this represents a positive sign of an effective and fair handicapping system for a session of only 18 weeks duration and the value of metrics.

HANDICAPPING ACCURACY ASSESSMENT FOR SESSION 007- FINAL
65% of 34 players have won 40-60% of their matches
Handicaps are based upon **v1.02** B.P.L brackets + 75% Match Win Bias
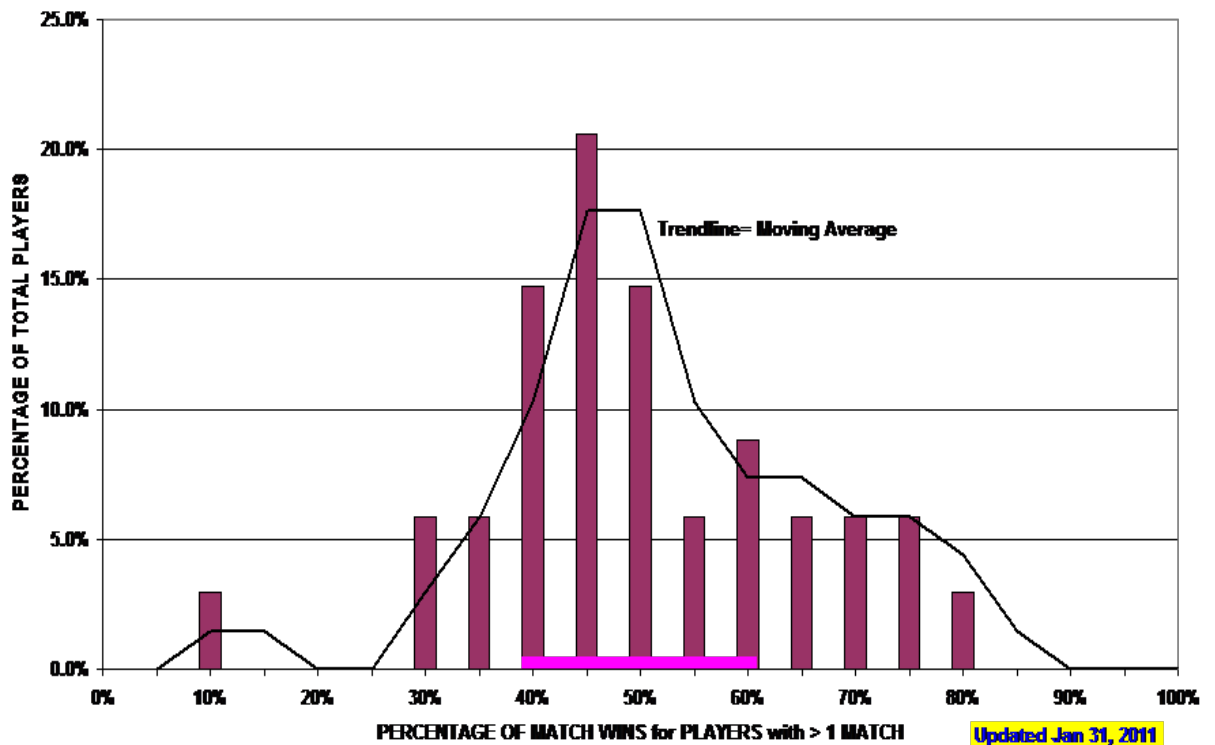
SESSION EVOLUTION
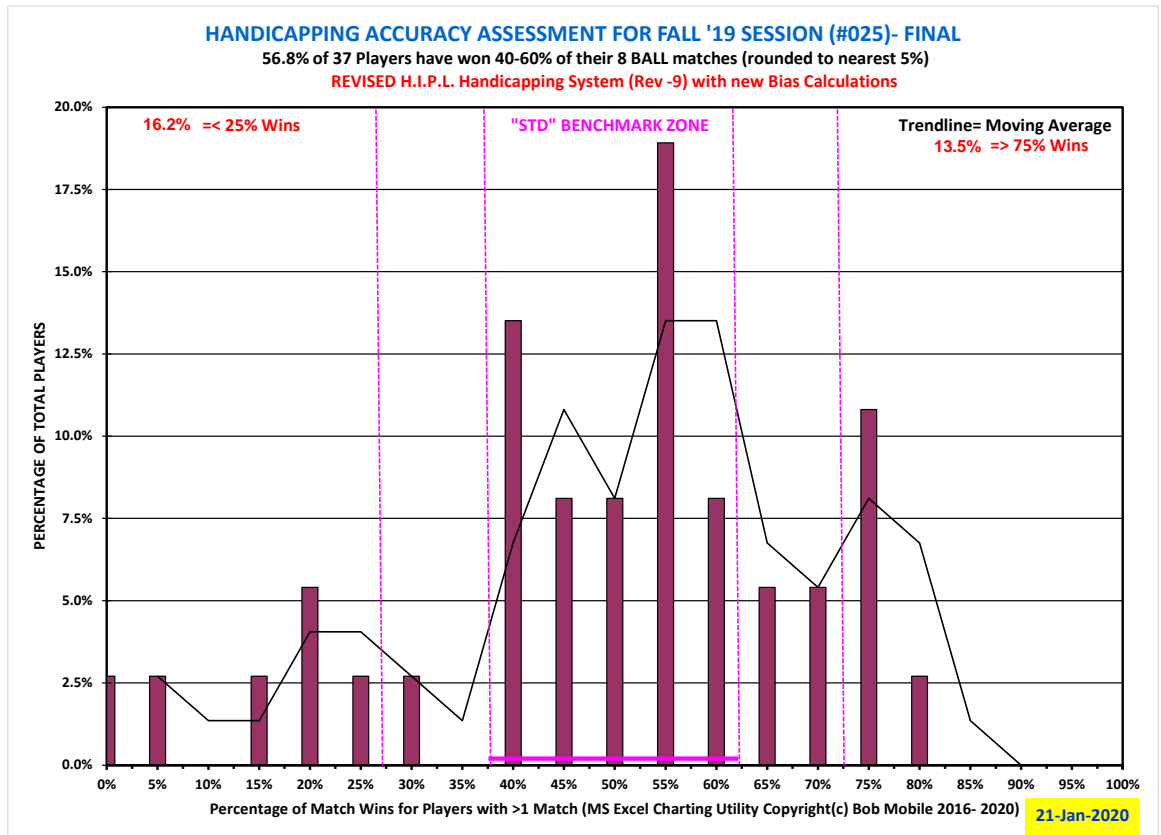
As each session evolves, the plotted distributions are captured at key time intervals, and placed on the league website for review by all parties. Over time, the plot should migrate closer to the 40% - 60% (pink) win zone if things are working well. The final outcome should show ***strong*** evidence of handicapping system "control" with a relatively tightly restricted plot centered near 50% match wins and there are always a few outliers. The example below depicts the results of a past session. When a session is completed, the plot was placed in an archive and added to a pull down menu for future reference. ***Note: Win Percentages are rounded to the nearest 5% so that the true determination of the 40-60% "Win Zone" statistic is actually 37.5- 62.499%. This is acceptable for the "STD" metric as everything is relative for comparison purposes.*** Player percentages for =< 25% and =>75% Match wins are now displayed on the chart.

PLOT OF MOST RECENT SESSION RESULTS with CHARTING UTILITY

HANDICAPPING ACCURACY ASSESSMENT FOR FALL '19 SESSION (#025)- FINAL
56.8% of 37 Players have won 40-60% of their 8 BALL matches (rounded to nearest 5%)
REVISED H.I.P.L. Handicapping System (Rev -9) with new Bias Calculations

16.2% =< 25% Wins — "STD" BENCHMARK ZONE — Trendline= Moving Average — 13.5% => 75% Wins

Percentage of Match Wins for Players with >1 Match (MS Excel Charting Utility Copyright(c) Bob Mobile 2016- 2020) 21-Jan-2020

TABULAR CHANGE TRACKING

Charting session results presents a great visual but sometimes a tabular method of tracking can be beneficial for comparison purposes. Therefore, I have settled on tracking three key areas in terms of player match wins to determine handicap efficiency and to determine if changes may offer improvement: Player 40-60% Match Wins (STD) and Players with =<25% Match Wins and => 75% Match Wins as a good handicapping system should move the players in these two zones closer to the 40 – 60% match win zone. As always, *patience and caution is advised when considering revision as even the same methodology will produce different results over time.* Any system must not be overly harsh on the players. The stronger players should appreciate the challenge the system offers. Over time, all players will realize an improvement in their game. The goal is a quality system with repeatable results. All three values are automatically generated within the MS Excel Charting Utility under the League Data Tab and will also be included in the new Revision 2.00 release of compiled software.

	MATCH WIN DISTRIBUTION SPREADS vs. SESSION				
SESSION #	BIAS REV.	PLAYERS	40-60% Wins	=< 25% WINS	=> 75% WINS
001	Rev 0.00	27	61.0%	11.1%	11.1%
002	Rev 1.00	25	54.0%	12.0%	**20.0%**
003	Rev 1.00a	23	52.2%	8.7%	8.7%
004	Rev 1.01	24	62.5%	8.3%	0.0%
005	Rev 1.02	**21**	66.7%	9.5%	4.8%
006	Rev 1.02	37	45.9%	10.8%	8.1%
007	Rev 1.02	34	64.7%	2.9%	8.8%
008	Rev 1.10	37	**43.2%**	16.2%	8.1%
009	Rev 1.10	36	55.6%	**16.7%**	5.6%
010	Rev 1.10	35	45.7%	11.4%	2.9%
011	Rev -1	39	**38.5%**	10.3%	7.7%
012	Rev -2	39	56.4%	7.7%	7.7%
013	REV -3	36	66.7%	??	??
014	REV -3	33	61.0%	??	??
015	REV -4	33	60.6%	9.1%	12.1%
016	REV -5	**32**	53.1%	6.3%	12.5%
017	REV -6	38	53.0%	??	??
018	REV -7	45	46.7%	11.1%	8.9%
019	REV -8	35	48.6%	14.3%	5.7%
020	REV -8	34	44.1%	8.8%	8.8%
021	REV -8	36	61.1%	13.9%	5.6%
022	REV -8+	39	51.3%	**23.1%**	12.8%
023 Wk #17	REV -8+	36	55.6%	13.9%	8.3%
024	REV -8+	37	54.1%	13.5%	10.8%
025	REV -9	37	56.8%	16.2%	**13.5%**
	Min/Max/Best/Worst values highlighted for easy visual reference				

MS Excel Pool League Charting Utility (p/o System Metrics)

MS Excel Charting Utility BETA v. 1.00 © 2016 Bob Mobile

Designed to support League Management System v. 2.00 and greater CSV export format

---

PLAYER   **B.P.I. derived Shot Probability Charting**

PlayerChart.txt MUST be placed here: C:\Users\Bob Mobile\My Documents

	LAST ACTIVE *PLAYER* CHART	
	8 BALL CHART:	ACTIVE
	9 BALL CHART:	INACTIVE
	STRAIGHT CHART:	INACTIVE

PUSH to — **IMPORT PLAYER DATA**

PUSH to — **GO TO ACTIVE CHART**

LEAGUE   **Handicapping Assessment Charting (presently up to 100 players supported)**

LeagueChart.txt MUST be placed here: C:\Users\Bob Mobile\My Documents

---

Enter CUSTOM TEXT that will be displayed in the LEAGUE CHART header area[1]

Enter TITLE here: HANDICAPPING ACCURACY ASSESSMENT FOR Spring '16 SESSION (#018)-WEEK #11

Enter 3rd Line here: REVISED H.I.P.L. Handicapping System (Rev -7) with modified WIN Bias

NOTE[1]: IF THE IMPORTED FILE CONTAINS ANY HEADER TEXT, IT WILL OVERRIDE THE ABOVE!

TITLE TEXT MATCH: NO   **3rd LINE TEXT MATCH:** YES

Please delete any DROPOUT ENTRIES under the League_Data Tab when starting a new league!

PUSH to — **IMPORT LEAGUE DATA**

LAST ACTIVE *LEAGUE* CHART		CHART HEADERS USED
for 8 BALL	ACTIVE	IMPORT OVERRIDE- SEE ABOVE
for 9 BALL	INACTIVE	N/A
for STRAIGHT	INACTIVE	N/A

PUSH to — **GO TO LEAGUE CHART**

HELP   **PUSH to Get HELP and INSTRUCTIONS**
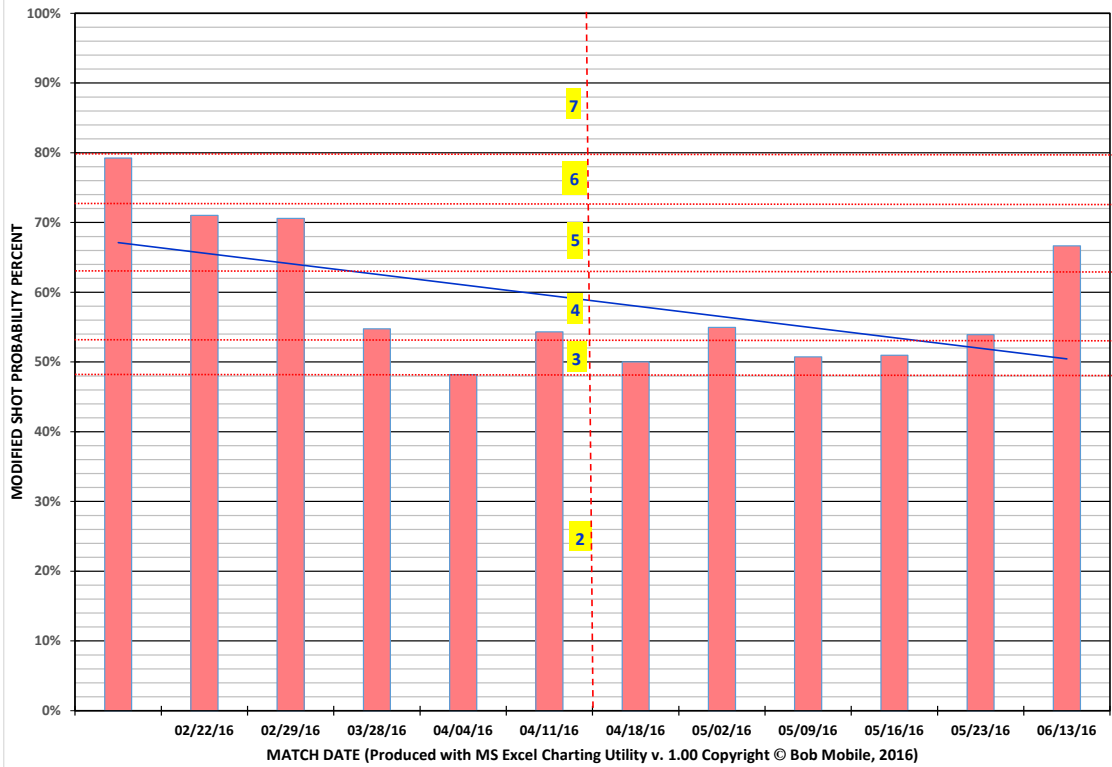
HELP

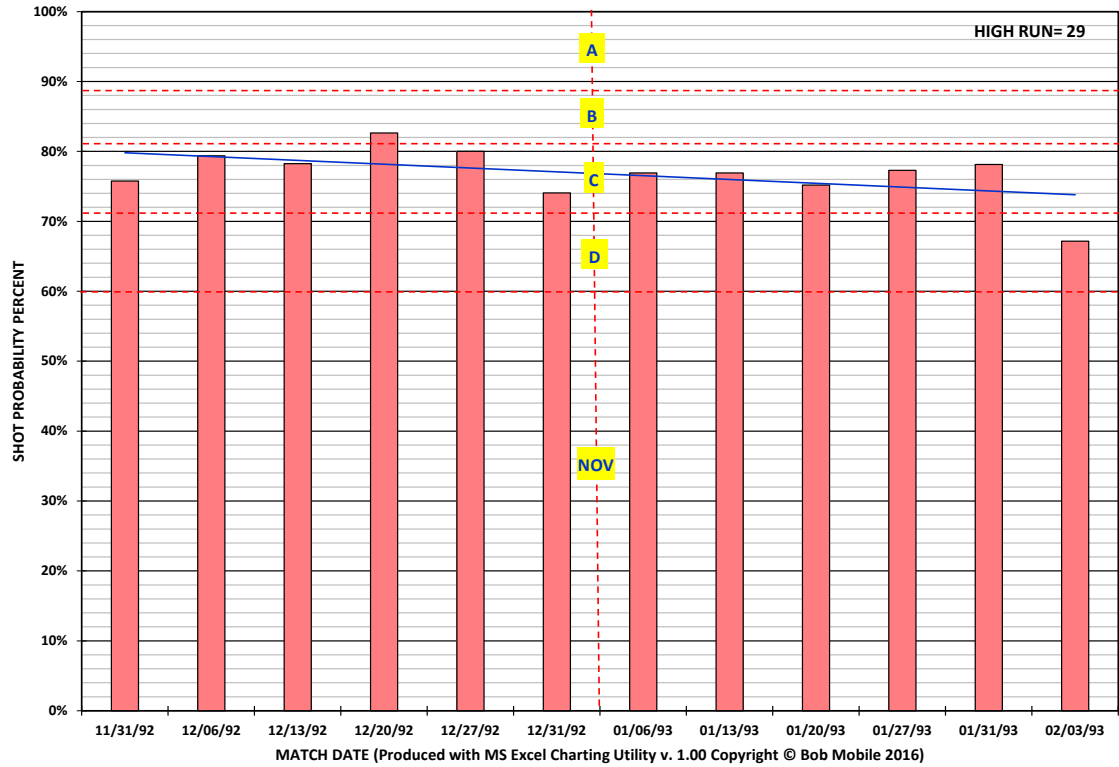**Please read the INSTRUCTIONS before 1st time use!**

Please enter your user license code here: **KBTT-1SEE-ITS0-XAT1**

Designed to support Pool League Management System Software exports, this user friendly freeware utility is written in Excel 97- 2003, compatible with higher versions of Excel ***when run in the compatibility mode*** and may be downloaded **HERE** and saved to a directory of your choice. ***Security settings must allow MACROS and EDITING***. Help and Instructions are included by pushing the HELP button. The utility produces both Player Charts and League Handicapping Efficiency Charts. Examples of player charting for different games with marked player ratings are shown on the following page.

8-BALL POOL CHART for: Anonymous 8-Ball Player

MODIFIED SHOT PROBABILITY PERCENT

MATCH DATE (Produced with MS Excel Charting Utility v. 1.00 Copyright © Bob Mobile, 2016)

STRAIGHT POOL CHART for: Bob Mobile

HIGH RUN= 29

SHOT PROBABILITY PERCENT

MATCH DATE (Produced with MS Excel Charting Utility v. 1.00 Copyright © Bob Mobile 2016)

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QUALITY CONTROL: INNINGS COMPARATOR

For the most part and in a perfect situation, the outcome of a game of Straight Pool based upon the scoring system developed by the author would result in one player having one inning more than their opponent. ***But things become far from perfect*** for this scoring system when multiple innings could be counted as errors and charged against one player and not the other, safety play situations, etc. Therefore, to assist with the analysis and development of this 8-Ball routine, a custom calculator was developed and tested using active league, real-world innings data with the results of a ***portion of the sample*** shown below. ***The results are interesting for just this one of several Quality Control checks***. Missed Break and Run (8 bonus points)/ 8 on Break errors would likely not be caught unless patch awards are issued and the player wonders where their patch is. So they do help for ***Quality Assurance purposes*** if the errored record is ultimately corrected.

If the Quality Control option is enabled ***and*** the Innings Comparator is turned on ***then*** after a sufficient number of samples are obtained (0 for a new league), the comparator will automatically activate and flag the user with a message that the innings data for the match entered exceeds the error threshold. The user may accept the potentially errored data or not and if not either attempt to fix it on the spot or fix it later via editing (a refreshed remaining error log is generated that may be consulted). ***The triggering threshold is a dynamic value*** that will change as more historical data are entered, essentially becoming auto-customized for a particular league's discipline. Some leagues may be sloppy, others may not but in all cases the comparator should never become an annoyance by being overly aggressive. Otherwise folks will simply turn it off.

TOTAL Test Matches Sampled:	252	INNINGS COMPARATOR TESTS: For HIPL Session # 018			
Average Player Innings Dev. %:	14.70%	DATA$_{least}$: Player A v. B For ALL Matchups in test records			
Ave. Inn. MAX Dev.% Removed:	14.13%	DATA$_{most}$: Same as above *worst case record removed*			
Lowest Innings Deviation %:	0.00%	For all records		Accounts for 16.27%	
Most Blatant Dev. % of record:	157.89%	WORST CASE For ONE Match in test record			
TOTAL Exceeding DATA$_{least}$:	82	Initial Match Error Entry Flags test for release 2.00			
DATA$_{least}$ FLAGGED Matches:	32.54%	Resulting in potential calculated player BPI entry errors			
© Bob Mobile Last Updated On:	06/24/16	with most recent data and overall summary test results.			

SAMPLE WEEK #	TABLE # MATCH #	PLAYER A INNINGS	PLAYER B INNINGS	PCT of DEVIATION	POSS ERROR	NOTES: *Includes items that would NOT be caught by this test alone*
1	1-1	12	11	9.09%	1 INN.	**Non-flagged= # Innings deviation**
16 TRIG	1-2	32	32	0.00%	0 INN.	Occurs somewhat frequently see above
19.44%	1-3	20	19	5.26%	1 INN.	**1 INN. Accounts for 28.17% of all**
Less MAX	1-4	6	6	0.00%	0 INN.	***8 on Break but 0 MOB***
15.18%	2-1	17	16	6.25%	1 INN.	Within reason
	2-2	12	11	9.09%	1 INN.	Within reason
	2-3	28	30	7.14%	2 INN.	2 inn. discrepancy but high inn. count
	2-4	17	26	52.94%	1	**1 indicates flagged and counted**
	3-1	9	8	12.50%	1 INN.	Low inning count= typically accurate
	3-2	21	23	9.52%	2 INN.	Still within reason
	3-3	12	22	83.33%	1	**Large 10 inning discrepancy!**
	3-4	9	16	77.78%	1	***1 x Break and Run not credited***
	4-1	16	15	6.67%	1 INN.	Within reason
	4-2	15	19	26.67%	1	**4 Inning discrepancy**
	4-3	5	5	0.00%	0 INN.	Low inning count= typically close
	4-4	22	21	4.76%	1 INN.	Within reason
2	1-1	25	23	8.70%	2 INN.	Still within reason
32 TRIG	1-2	8	8	0.00%	0 INN.	Low inning count= typically close

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INNINGS COMPARATOR ALGORITHM: DYNAMIC TRIGGER POINTS

The Innings Comparator decisions are somewhat complex when attempting to attain the goal of a practical quality solution that is not overly aggressive with support for multiple types of games (8-Ball, Straight Pool, etc. via in place "hooks") and automated scoresheet imports in the future. The output error flags from the Innings Comparator *will require human intervention* but that intervention must be minimized and optional.

For any supported league based games and with a focus on 8-Ball, using the common scoring systems developed by the author, *if* the Quality Control Option is enabled (non-default) *and* the Innings Comparator is enabled (default), there are two choices of aggression: LEAST AGGRESSIVE (default) and MOST AGGRESSIVE. The actual *next match week trigger points* are a dynamic 2nd Order smoothed prediction using 2 period (2 week) moving average forecasting that automatically "learns" and begins providing output after 2 match weeks are completed unless *optionally automatically* pre-seeded for the first 2 match weeks of a new session by the user in the Quality Control Panel.

FLAGGED POTENTIAL ERROR OVERALL TEST RESULTS

Error Forecasting Methodology differences for		252	Matches		
Least Aggressive		Least Aggressive		Most Aggressive	
MOVING AVERAGE		2 WEEK M.A.		2 WEEK M.A.	
Matches	PCT	Matches	PCT	Matches	PCT
82	32.54%	65	25.79%	72	28.57%

2 Week Moving Average Smoothing Tests with Outputs starting for Week #3 Entries

SMOOTHED INNINGS DEVIATION TRENDS vs. TIME TESTS: H.I.P.L. Spring 2016 Session #18

15
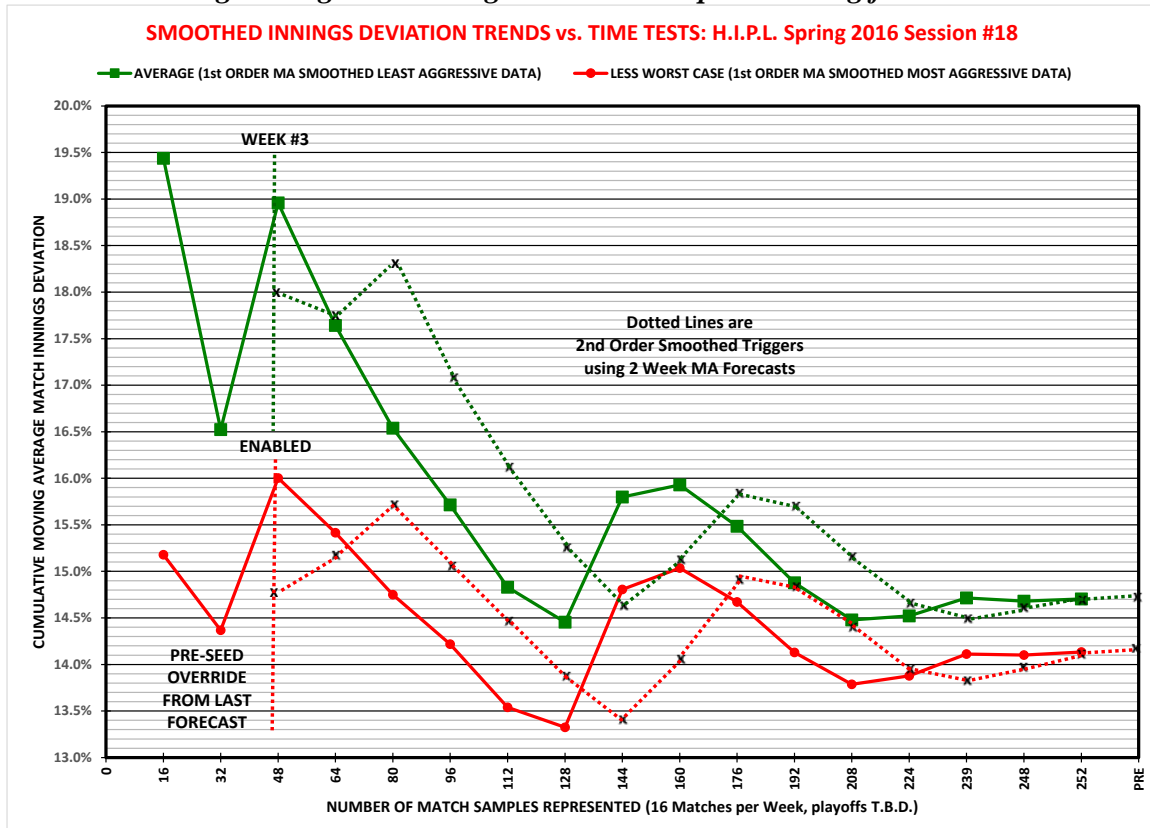
QUALITY CONTROL: OUT OF RANGE B.P.I.

If Quality Control is enabled (non-default) *and* BPI Checks are enabled in the Quality Control Panel (default) *then* regardless of the supported game, this test will flag any entries that are potentially out of bounds. This test, presently being simulated in MS Excel, is designed to detect potential errors and even perhaps *sandbagging* not previously detected by the Innings Comparator by testing the ratio of overall completes versus reported innings based upon each player's unique BPI history profile spread.

Although still under development, some examples for players with a full 12 match history are:

Player #1 12 match history with a 6.00 calculated BPI about to be entered
Previous 12: 0.88, 1.18, 0.89, 1.13, 0.77, **1.40**, 1.20, 1.05, 1.00, **0.73**, 0.84 & 1.17
Result: For this particular player's 12 match profile, any calculated BPI greater than **2.53** would be flagged as a potential error. A 6.00 calculated BPI is well beyond the threshold.

Player #2 12 match history with a 0.88 calculated BPI about to be entered
Previous 12: 2.00, 1.77, 2.11, 2.50, 2.44, **1.48**, 1.64, 2.19, 2.26, **3.10**, 1.94 & 2.13
Result: For this particular player's 12 match profile, any calculated BPI less than **0.99** would be flagged as a potential error. A 0.88 calculated BPI is beyond the threshold.

The above results are subject to change as this routine is still being refined, presently based upon **173** 12 match (non-false seeded) records for handicaps 2 – 6, across multiple leagues across the US and Canada going back to 2003. As always, the user may accept potentially bad data, fix it on the spot or opt to fix it later by referring to a continuously refreshed error log and editing the record.

Failure to repair a potentially defective record will result in that player's record being "contaminated" for a 12 match duration until the recently entered defective record rolls out of scope. This test is based upon shot probability spreads between the highest and lowest in a constantly evolving 12 match player history compared against a conservative and "seasoned" spread expectation that is common to all handicap levels.

In terms of sandbagging, those players and/or teams that engage in such activity can destroy an entire league. When I was a member of the local area TAP Advisory Board, every meeting I attended had sandbagging as the main topic of discussion and I found this to be annoying because it does not take a genius to beat any system. The system is simply an honor system that all parties should adhere to but there will always be those that may try to fool or beat the system to meet the goals of their own personal agenda, whatever that might be.

AMENDMENT TO RULES REQUEST

During a recent session, an altercation outside one of the host establishments ensued resulting in one person being quite seriously injured. This is totally unacceptable! This type of behavior must be sanctioned!

I am no longer managing this league and my opinions may not mean much any longer but my recommendation is to write sanctions into the rules: If you do this then all parties involved take off for a full session. If it continues, you're **out of the league.**

I have expressed this to your present H.I.P.L. league director and to one of the parties involved in the conflict and requested that he return to active playing in the league. We shall see how this turns out. This is not good and must be addressed as it leaves a lasting negative impression.

Years ago when my interest was high, I played in four leagues: Straight Pool (various locations), Around the World & 9-Ball (in Manchester, NH) and 8-Ball (TAP locally). [This is what happened](#) to a good player and a good guitarist from our local Cercle National Club. I've played against him and his dad, Andy many times in competition. This is no good and many lives can be ruined! The key take-away from this episode is how quickly *RAGE* can develop into tragedy. We need to rise above this!

Please be advised that there are 300 – 400 teams around the USA watching what is going on here at this time. Self - management is the goal and sometimes things need to be fixed.