

# Anatomy of a Bridge Deal

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Pete Matthews Jr – <http://3nt.xyz> – © March 15, 2013

Take my seat at a Flight A Sectional Swiss teams event. You are playing an expert standard system, with a 1NT opening showing 15-17 high card points (HCP). Your side only is vulnerable, and you, South, are dealer, holding

♠ A 8 5 3   ♥ J 9 6   ♦ Q 9 6   ♣ A K 8

You open 1♣, West passes, and partner invites game with 2NT. This bid shows 11-12 HCP. However, vulnerable games pay so well at International Match Point scoring (IMPs) that you will come out ahead in the long run if bid them when they are 40% or better. The rule at IMPs is to strain to invite game when vulnerable, and accept normally. As a corollary, with some 12 HCP hands, partner would drive to game, not invite. He may make this bid with some 10-counts, vulnerable, so expect North to have a hand worth 11 HCP.

This 2NT response will seldom contain a four card major suit. Also, by special agreement, partner could have responded 2♥ to show a game invitation in clubs. If he had five clubs, he would usually do that, so as to not miss a slam.

So what now? Well, despite the sterile 4-3-3-3 distribution, you have 14 HCP, best you can have in a balanced hand. It must be right to bid 3NT. That should be the normal contract.

But wait! East has bid 3♦. This sets up a fielder's choice. You can bid the game you were going to bid anyhow, and take your normal result. Or, you can double, trying for a better or safer result. You also know more: partner can only hold four diamonds when East has only six of them and West has none. So it's quite likely North is 3-3-3-4. If you pass this back to partner, he may decide to pass it out. Partner made a highly-descriptive, limited bid. It's your decision. What is it to be?

How much do you think you can get at 3♦ doubled? If you think 500 (down 3) likely, it must be right to take it. This game is not likely to be much better than 50%, could be worse. If they make 600 at the other table and you get 500, you only lose 3 IMPs. However, +500 at one table and +100 at the other is 12 imps. If you only get 300 (down 2), then you stand to lose 7 or win 9, depending on the result at the other table. So, if the game is 50%, these initial calculations show it is actually right to play for +300 at 3♦ doubled. If you only get 100 (down 1), then you lose 11 or win 5 – not as much fun.

This article is about more than just the question of what to do here. It's about how to determine the answer and prove it is correct. In case you don't care about the methods, I'll give you the answer now: it is always correct to double, unless you are absolutely certain that East has seven diamonds. Of course, I would not be writing this article if I had doubled – or if my partner had made 3NT.

## Analysis Using Bridge Buff 19

Bridge Buff is a software package with multiple components. The feature that applies to this problem is called Visual Deal. Doug Bennion, the author of Bridge Buff, has been quite responsive to my various questions. I'll be reviewing the other features of this package in an upcoming article.

Visual Deal was configured for:

1. The South hand ( $\spadesuit A853$   $\heartsuit J96$   $\diamondsuit Q96$   $\clubsuit AK8$ )
2. North with 2-3 cards in each major, 3-4 card in each minor, and 11 HCP.
3. Two scenarios:
  - a. East has 7+ diamonds and 10+HCP,
  - b. East has 4 hearts, 6+ diamonds and 10+HCP.

For each scenario, I told the program to deal and play 500 deals. For  $3\diamond$  doubled, the obvious  $\clubsuit K$  opening lead was specified. For 3NT, two methods were tested: double dummy leads, and rule-based leads with double dummy after that. The rule-based leads are not particularly strong, but are intended to offset the advantage that double dummy evaluation gives to defenders. Here is a table of results, by number of deals:

	-6	-5	-4	-3	-2	-1	0	+1	+2	
3DE (7)	0	5	78	203	151	53	10	0	0	800+ 17%, 500+ 57%
3NTN (7) rule	0	0	0	5	32	113	222	111	17	makes 70%
3NTN (7) DDL	0	0	0	3	32	183	210	66	6	makes 55%
3DE (4-6)	1	9	101	260	102	25	2	0	0	800+ 22%, 500+ 74%
3NTN (4-6) rule	0	0	0	0	18	208	226	46	2	makes 55%
3NTN (4-6) DDL	0	0	0	2	48	240	184	21	5	makes 42%

These results are not convincing – it may be right to bid on, especially if you think East has seven diamonds. The problem is, you really need to compare the results of playing the two contracts on the same set of deals, on a deal-by-deal basis. Score it as a team match with  $3\diamond$  doubled at our table, and the normal 3NT at the other table. (Assume the result will be the same for 3NT at either table.)

For these purposes, Visual Deal suffers from these weaknesses:

1. You cannot see the individual deals to judge whether they make sense. (You can see the distributions.)
2. Each time you run a simulation, you get a fresh set of deals. Doug says you can put in a deal number at the start to cause simulations to use the same set of deals, but by the time I got this information I had already moved on.
3. You cannot score the deals against each other. The results of the two contracts may be correlated – without actual scoring of the two results against each other, you don't get a true answer. (See the discussion of the IMPs won and lost in the first section.)
4. Bridge Buff does not use Portable Bridge Notation (PBN) and thus cannot be used with other programs.

## Analysis Using Dealmaster Pro, Bridge Composer, and GiB

Dealmaster Pro (DM Pro) is an extremely powerful but slow and quirky bridge dealing program. It can output all sorts of print and data formats, most significantly, Portable Bridge Notation (PBN).

Bridge Composer (BC) is a great dealing program that, for our club, has supplanted DM Pro to deal boards for our dealing machine. It also is a nifty editor for writing up deals. It is built on PBN and uses Bo Haglund's free, fast double dummy solver, DDS. Also, if you have a copy of GiB, you can tell it to bid and play one or all deals. Furthermore, it will start with any bidding and play information stored with the deal – and GiB updates the bidding with comments (visible in Notepad, but not in BC) as to what it thinks the bids mean.

GiB won the world computer bridge championship two years in a row, in the late '90s. Development of the CD version (which I bought around 2000) essentially ceased in 2006. Bridge Base Online (BBO), [bridgebase.com](http://bridgebase.com),

bought GiB and deployed it as their robot engine. BBO updates the bidding capabilities, but has not changed the playing engine. Other programs can probably play the hand better than GiB now, but I don't think any of them will play a whole file of PBN deals. GiB's play is OK, but substantially inferior to that of all players in this match.

To work on this problem, I told DM Pro to create 120 deals to these specifications:

**----- North Definitions N1->N1 -----**

**N1 Acc HP11-11 ♠ 2-3**

**♥ 2-3**

**♦ 2-4**

**♣ 2-4**

**-----South cards already dealt:-----**

**A 8 5 3**

**J 9 6**

**Q 9 6**

**A K 8**

**----- East Definitions E1->E20 -----**

**E1 Acc HP10-40 ♠ 0-4**

**DP14-99H ♥ 0-4**

**CN 3-12 ♦ 6-13 AJT,AKJT,AKJ,AKT,**

**KJT,**

**♣ 0-4**

**DstPts:(♦ ,5:1,6:2,7:3,8:4,9:5,10**

**:6,11:7,12:8,13:9)(♠ ♥ ♣ ,**

**0:3,1:2)**

This is self-explanatory, except the definitions for East: at least 10 HCP, at least 14 points including distribution, at least six diamonds headed by at least three honors, and at most four cards in any other suit. In order to get more shape into the East hands, I used both length and shortness distribution points: one for each diamond over five, two for a singleton, and three for a void (nothing for a boring doubleton).

Next, I culled out hands where it seemed inappropriate for East to bid: singleton A, K or Q, or doubleton QJ, when those high cards were required to get to the 10 HCP minimum, plus one hand with three side queens. (Some were culled in DM Pro, and some after the deals had been numbered. With a more detailed specification, I think I could have prevented singleton honors from being dealt.) Finally, I added the actual deal (number 110), as best we could reconstruct it. The ♦9, which can occasionally be worth a trick, may have actually been with East, but this does not change the problem as posed above.

Using a text editor (Notepad), I produced a file with all deals having dealer South, N-S vulnerable. After some more editing, I fed the file to Bridge Composer, validated the PBN, and double-dummied the results.

More editing produced two versions of this file, with these features for all deals:

1. The auction 1♣ – (Pass) – 2NT – (3♦); double – all pass. The obvious ♣K opening lead was entered.
2. The auction 1♣ – (Pass) – 2NT – (3♦); 3NT – all pass. No opening lead specified.

One file at a time, I caused GiB to play all the deals. (BC and GiB quit playing the deals in the first file, when I started the second file at the same time.) This took an hour or two per file.

A PBN file is a text file, so I sent both files to a Linux system, converted the line endings with `dos2linux`, and ran them through a pipeline to extract one line for each deal containing the number of tricks taken:

```
grep 'Result "' filename | cut -f2 -d'"' > output-filename
```

(If you have Cygwin or some such package, you should be able to do this on Windows.) `unix2dos`, back to Windows, and I pasted each file into a column in Excel. (I'm not great with Excel, but I can get the job done.) Here is a summary of the results, with 3♦ doubled at our table, and 3NT at the other table:

Played by GiB	3DX		3NT		Net	IMPs	
	Tricks	Score	Tricks	Score		Plus	Minus
<b>Total</b>	678	45030	857	-10070	34960	815	169
<b>Average</b>	6.65	441.47	8.40	-98.73	342.75	7.99	1.66
			<b>Count</b>		<b>Net</b>	<b>Plus</b>	<b>Minus</b>
<b>Count (Matchpoints)</b>			106		44	75	31
<b>IMPs (all deals)</b>			106		646	815	169
<b>IMPs (West 6-4)</b>			42		264	326	62
<b>IMPs (West 7)</b>			7		-1	27	28

Count is the number of deals considered. Net is the combination of the totals of the Plus and Minus scores. ).

Next, I duplicated the spreadsheet on another tab. A slightly more complex Linux pipeline (translating multiple blanks to one) extracted the desired double dummy results from one of the PBN files, which I pasted into the spreadsheet, with these results:

Double Dummy	3DX		3NT		Net	IMPs	
	Tricks	Score	Tricks	Score		Plus	Minus
<b>Total</b>	661	49400	906	-27360	22040	601	188
<b>Average</b>	6.48	484.31	8.88	-268.24	216.08	5.89	1.84
			<b>Count</b>		<b>Net</b>	<b>Plus</b>	<b>Minus</b>
<b>Count (Matchpoints)</b>			106		20	63	43
<b>IMPs (all deals)</b>			106		413	601	188
<b>IMPs (West 6-4)</b>			42		191	253	62
<b>IMPs (West 7)</b>			7		-16	18	34

The double dummy results have a similar, less emphatic pattern to that of the GiB results. This provides limited validation of using double dummy simulations. Double dummy is so fast, you can do more deals.

Double is a clear winner, based on this set of deals. Overcalling on a 6-bagger is a losing proposition at any form of scoring, and having the more exciting 6-4 distribution probably makes things worse.

Seven deals is not enough to be conclusive, but it looks OK for East to bid on a 7-bagger. From South's point of view, double is correct if there is much of a chance that East has only six diamonds.

Since the conclusions were more emphatic with GiB's weaker play, you should not entertain a bid in any case against weaker players.

## Further Analysis

Once I had the method down, I ran the simulation again, permitting North to have five clubs. I trimmed the 120 deals down to 102, as above, producing these double dummy results:

Double Dummy (North may have 5 ♣)		3DX		3NT		IMPs		
		Tricks	Score	Tricks	Score	Net	Plus	Minus
<b>Total</b>		666	40460	875	-27260	13200	526	307
<b>Average</b>		6.53	396.67	8.58	-267.25	129.41	5.16	3.01
						<b>Net</b>	<b>Plus</b>	<b>Minus</b>
<b>Count (Matchpoints)</b>						-2	50	52
<b>IMPs (all deals)</b>						219	526	307

The possibility of a fifth club in the North hand reduces the net IMPs for doubling three diamonds from 413 to 219, comparing double dummy results. Even with these favorable circumstances, it is correct to double – except possibly with strong opponents at Matchpoints.

At the same time, I was able to use these methods to run 100 additional deals with North permitted to have a 5-card minor and declaring 3NT without competition. The contract made (double dummy) on 52 of the deals (52%). Without competition, it is clearly correct to accept the invitation to 3NT.

A curiosity: fewer than one in 100,000 deals qualified for the initial 120 deals in the simulation where North was restricted to holding at most four clubs. When North was permitted to have a fifth club, it took about 30,000 deals to find one meeting the criteria, taking maybe five minutes for 120 deals. Dealing without restrictions on the East hand produced 100 deals almost instantaneously.

For those who are interested, the spreadsheet and PBN files for this study are available on the web site, at <http://web.mit.edu/mitdlbc>.