

Dealing with three-chow fans

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From the author

There is no "normal" capacious name for a three-chow structure. In the text we will use a term "three-chow fan" ("3CF").

Three-chow fans

There are $3 * 7 = 21$ possible chows, 7 chows in each suit, from 1-2-3 to 7-8-9. Amongst MCR fans one can find several three-chow fans, see the table.

Suits	Fan #	Fan name	Step	Example
1	23	Pure Triple Chow	0	
1	28	Pure Straight	3	
1	30	Pure Shifted Chows	1	
1	30	Pure Shifted Chows	2	
3	39	Mixed Straight	3	
3	41	Mixed Triple Chow	0	
3	51	Mixed Shifted Chows	1	

General considerations

According to the fans statistics **every third** winning hand contains a three-chow fan. So, these fans are needed to be recognized and get build. The impatient reader will say "What's so hard about that?" We agree that it is not so hard to build ONE simple 3CF. And what about TWO 3CF's at the same time? Can one put two 3CF's in your hand? Two fans will significantly increase the hand's chances of winning. It can be done? And if so, **why** does it work?

Balance of sets








Regular hand has four sets and a pair. Three-chow fan takes THREE sets. Logically, two 3CF's should take $3 * 2 = 6$ sets. Too much, cannot fit in hand! Where is the catch?







The first and the most obvious consideration is: at least one set should be the same in two different 3CF's. Can two be the same?


Two CANNOT, this follows from the principles of counting hand from the "Green Book", for

example, if the hand has  ,  ,  , then both 

, , , and , , , cannot be counted for the same fan # 51 "Mixed Shifted Chows".





If one set matches, then the waiting hand may look like , , , , , This hand is waiting for two different tiles,  and .



- , , , fan #51 «Mixed Shifted Chows»;
- , , , fan #39 «Mixed Straight».







The trick is that until the winning tile is added to the hand there is NO last chow in hand, but there is some kind of "element" of two tiles  that can create two different chows with different winning tiles.


One can write some "formula" for a given hand:

- 1 "double-use" chow + 2 chows + 2-tile element + pair + winning tile = three-chow fan (one of two possible) + chow + pair

Let's change slightly the previous hand by replacing the pair with two tiles added to the 2-tile element from two sides, the hand is , , , .

This hand also is waiting for the same two different tiles,  and .

- , , , fan #51 «Mixed Shifted Chows»;
- , , , fan #39 «Mixed Straight».




This time, the 4-tile element  can create two different chows by "unfastening" the extra tile.




One can write some "formula" for a given hand:




- 1 "double-use" chow + 2 chows + 4-tile element + winning tile = three-chow fan (one of two possible) + chow + pair

Consider a one-tile-before-the-wait hand (in riichi such a hand is called "iishanten", "one replacement"):

, , , , .




To declare mahjong, we need to get in hand either two tiles  and  discarding  for fan




#41 «Mixed Triple Chow», or two tiles  and  discarding  for fan #51 «Mixed Shifted Chows». Again, let's count the sets, the dragon pung is clearly "superfluous", it is not included in any three-chow fan. So, what happens to the balance of tiles and chows for two fans? How

come one can fit 2 3CF's in just THREE sets? The answer to the question is two elements,  and  and , each of which can turn into two variants of chow when adding a tile.

Consider one more hand:









To declare mahjong, we need to get in hand either two tiles  and  discarding  for fan

#41 «Mixed Triple Chow», or two tiles  and  discarding  for fan #51 «Mixed Shifted Chows». The same story, but only this time we have as many as three elements, from each of which you can get chow, and either by getting a tile or by discarding a tile.

Structural elements

It's time to systematize the "elements" that were used in hands building. We will call them "structural elements", abbreviated as SE, or simply "elements". Let us denote by the letters A, B, C, D, E the consecutive numbers of the tiles in the same suit, then all the elements variants (yielding one chow) can be presented in the table.

SE	Example	Transformation formula	Variants
BC		$BC + A = ABC$ $BC + D = BCD$	2
AC		$AC + B = ABC$	1
BCE		$BCE + A - E = ABC$ $BCE + D - E = BCD$ $BCE + D - B = CDE$	3
ACD		$ACD + B - D = ABC$ $ACD + B - A = BCD$ $ACD + E - A = CDE$	3
ACE		$ACE + B - E = ABC$ $ACE + D - A = CDE$	2
ABCD		$ABCD - A = BCD$ $ABCD - D = ABC$	2

One can write three simple formulas (after the hyphen is the number of tiles in SE):

- SE-2 + 1 tile = chow;
- SE-3 + 1 tile – 1 tile = chow;
- SE-4 – 1 tile = chow.

The SE's presented above are not exotic, three SE's with multiple chow options can create even three three-chow fans, significantly increasing the possibility to quickly declare mahjong, for example, let's consider the following 7 tiles in three suits:



One can "see" fans:

- — #41 «Mixed Triple Chow»;
- — #41 «Mixed Triple Chow»;
- — #51 «Mixed Shifted Chows».

Triangulation

In this article, we will use the term “triangulation” in the context of creating “pivotal” chows, that is, those pairs of chows that can form a three-chow fan when the last, “closing” chow is added.

Let’s consider any two chows out of 21 possible. Question: can these chows be used TOGETHER in any three-chow fan? For instance:

- a) and ;
- b) and ;
- c) and .

In a case a) there are no options, these two chows CANNOT be used together to build a three-

chow fan. In case b) one can build fan #39 «Mixed Straight». Case c) is special: one can build fan #30 «Pure Shifted Chows» in TWO variants,

(step 1) and (step 2).

Why do we need this, to check the possibility of “closing” chow? The question is rhetorical since correctly placed (or collected in hand) chows significantly increase the chances of building a three-chow fan in the end. How does it work? Consider three pivot chows (“triangulation”):

and and

Which fans are “traced” through **each of the three** pairs of chows presented? The answer is:


- + — fan #41 «Mixed Triple Chow»;
- + — fan #39 «Mixed Straight»;
- + — fan #39 «Mixed Straight».


Let’s make a reservation right away, we DO NOT have a third chow, “closing” the three-chow fan, in our hand yet! We only increase the chances of getting it. For example, a full hand may


look like Depending on which tile comes into the hand, the player will be able to choose from three or two (if there is a pair) development options.


Test


And now a little test. For all hands, you must specify ALL variants of the third, "closing" chow that can be used to build a three-chow fan based on TWO chows from the hand. Stay alert!


a) 


b) 

c) 

d) 

e) 

f) 

g) 

Answers

The test examples have been specially selected to demonstrate the possibilities of combining different chows. Answers show only the closing chows:

a) 1 chow —  , less than one chow is impossible to have;

b) 2 chows —  ,  ;

c) 3 chows —  ,  ,  ;

d) 4 chows —  ,  ,  ,  , 2 chow variants occur at both ends of "Mixed Shifted Chows";

e) 5 chows —  ,  ,  ,  ,  , 2 chow variants occur for different steps of "Pure Shifted Chows", and also 2 chow variants occur at both ends of "Mixed Shifted Chows";

f) 6 chows —  ,  ,  ,  ,  ,  ,  , 2 chow variants occur for different steps of "Pure Shifted Chows", and also 2 chow variants TWICE (for various variants of the fan) occur at both ends of "Mixed Shifted Chows";

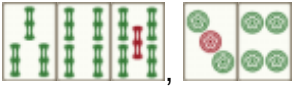
g) 7 chows —  ,  ,  ,  ,  ,  ,  ,  , 3 chow variants occur for different steps of "Pure Shifted Chows"



and "Pure Straight", and also 2 chow variants TWICE (for various variants of the fan) occur at both ends of "Mixed Shifted Chows".

A little about the defense

"Triangulated" chows, in addition to the ability to develop hands for the player himself, pose big problems to opponents. Suppose a player with the melded sets is waiting, which tiles are "potentially dangerous" to discard?

For example, for a hand with melded sets  "potentially

dangerous" to discard are ALL tiles of "closing" chows, that is tiles from ,

, . Why? Because if the "closing" chow is already in the hand, then the question for defense is not to get into a pair (there is no information at all in this case), and, if there is a pair and 2 tiles of the missing chow in the closed hand, then ANY of 9 tiles can lead to the opponent's "Hu".