

MeG MAXIMUS Shatter and Shove modification proposal A statistical analysis

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1. Introduction

There is a proposition of handling Shatter and Shove in Maximus as they are treated in Pacto. That would mean NO BONUS on neighbouring files. Instead, an extra die is rolled IN THE FILE where the Shatter/Shove occurred (GREEN die for Shatter, WHITE die for SHOVE).

This proposition was tested locally during a 4-games Helvetica event, and as I understand, all participants (Roger Pitfield, Adrian Pitfield, Richard Jeffrey-Cook, Jacques Wilputte, Bernard Bouchon, Denis Mercier) were satisfied that it increased the speed of the game without unbalancing fights. They also felt that it made it easier by not having to strategically choose a file ; it even allowed for rolling several dice together, there again gaining time. That was the feeling Huub Stegeman and me also had after our single game of testing it (but with many tests, the game being Galatian vs Seleucid).

I also ran some statistics, discussed below. All data are in the attached Excel file.

2. Methodology

a. Average wounds per die

I used an average amount wounds per die, counting Skull as 2 Wounds.

Values are thus :

Probability of wound		
BLACK	0,167	1 Wound out of 6 faces
WHITE	0,333	2 Wounds out of 6 faces
GREEN	0,667	2 Wounds + 1 Skull out of 6 faces = 4 Wounds
YELLOW	0,833	3 Wounds + 1 Skull out of 6 faces = 5 Wounds
RED	1,167	3 Wounds + 2 Skull out of 6 faces = 7 Wounds

b. Initial claim differential and assumptions

The calculations were run with the simplifying assumption that all files fight with the same claims. I have no reason to believe that different claims would modify the global trends observed, but I am not prepared to affirm there would not be local differences.

Likewise, these calculations assume the opponent has no Shatter or Shove. If he did, the number of one's suffered wounds from opponent must be extrapolated from one's inflicted wounds in the same conditions.

c. Scenarios evaluated

I ran calculations for both inflicted and suffered wounds.

This was done for all possible values of initial claim differential, from -7 (rolling BLACK vs opponent RED+RED) to +7 (rolling RED+RED vs opponent BLACK).

3 scenarios were assessed :

- A single file which Shatters/Shoves.
- A file which Shatters/Shoves and has 1 neighbour.
- A file which Shatters/Shoves and has 2 neighbours.

3. Results

a. Shove

Total amount of wounds inflicted and suffered :

Differential of claims	Fighting as	Versus	SHOVE as +1 with 0 neighbours		SHOVE as extra WHITE in same file with 0 neighbours		SHOVE as +1 with 1 neighbour		SHOVE as extra WHITE in same file with 1 neighbour		SHOVE as +1 with 2 neighbours		SHOVE as extra WHITE in same file with 2 neighbours	
			Inflicted	Suffered	Inflicted	Suffered	Inflicted	Suffered	Inflicted	Suffered	Inflicted	Suffered	Inflicted	Suffered
-7	BLACK	RED & RED	0,167	2,333	0,500	2,333	0,333	4,333	0,667	4,667	0,500	6,333	0,833	7,000
-6	BLACK	RED & YELLOW	0,167	2,000	0,500	2,000	0,333	3,833	0,667	4,000	0,500	5,667	0,833	6,000
-5	BLACK	RED & GREEN	0,167	1,833	0,500	1,833	0,333	3,333	0,667	3,667	0,500	4,833	0,833	5,500
-4	BLACK	RED & WHITE	0,167	1,500	0,500	1,500	0,500	2,667	0,667	3,000	0,833	3,833	0,833	4,500
-3	WHITE	RED	0,333	1,167	0,667	1,167	0,667	2,000	1,000	2,333	1,000	2,833	1,333	3,500
-2	WHITE	YELLOW	0,333	0,833	0,667	0,833	0,667	1,500	1,000	1,667	1,000	2,167	1,333	2,500
-1	WHITE	GREEN	0,333	0,667	0,667	0,667	1,000	1,333	1,000	1,333	1,667	2,000	1,333	2,000
0	GREEN	GREEN	0,667	0,667	1,000	0,667	1,333	1,000	1,667	1,333	2,000	1,333	2,333	2,000
1	GREEN	WHITE	0,667	0,333	1,000	0,333	1,500	0,667	1,667	0,667	2,333	1,000	2,333	1,000
2	YELLOW	WHITE	0,833	0,333	1,167	0,333	2,000	0,667	2,000	0,667	3,167	1,000	2,833	1,000
3	RED	WHITE	1,167	0,333	1,500	0,333	2,667	0,500	2,667	0,667	4,167	0,667	3,833	1,000
4	RED & WHITE	BLACK	1,500	0,167	1,833	0,167	3,333	0,333	3,333	0,333	5,167	0,500	4,833	0,500
5	RED & GREEN	BLACK	1,833	0,167	2,167	0,167	3,833	0,333	4,000	0,333	5,833	0,500	5,833	0,500
6	RED & YELLOW	BLACK	2,000	0,167	2,333	0,167	4,333	0,333	4,333	0,333	6,667	0,500	6,333	0,500
7	RED & RED	BLACK	2,333	0,167	2,667	0,167	4,667	0,333	5,000	0,333	7,000	0,500	7,333	0,500

Averaged amount per fighting file :

WHEN DIVIDED BY NUMBER OF FIGHTING FILES														
Differential of claims	Fighting as	Versus	SHOVE as +1 with 0 neighbours		SHOVE as extra WHITE in same file with 0 neighbours		SHOVE as +1 with 1 neighbour		SHOVE as extra WHITE in same file with 1 neighbour		SHOVE as +1 with 2 neighbours		SHOVE as extra WHITE in same file with 2 neighbours	
			Inflicted	Suffered	Inflicted	Suffered	Inflicted	Suffered	Inflicted	Suffered	Inflicted	Suffered	Inflicted	Suffered
-7	BLACK	RED & RED	0,167	2,333	0,500	2,333	0,167	2,167	0,333	2,333	0,167	2,111	0,278	2,333
-6	BLACK	RED & YELLOW	0,167	2,000	0,500	2,000	0,167	1,917	0,333	2,000	0,167	1,889	0,278	2,000
-5	BLACK	RED & GREEN	0,167	1,833	0,500	1,833	0,167	1,667	0,333	1,833	0,167	1,611	0,278	1,833
-4	BLACK	RED & WHITE	0,167	1,500	0,500	1,500	0,250	1,333	0,333	1,500	0,278	1,278	0,278	1,500
-3	WHITE	RED	0,333	1,167	0,667	1,167	0,333	1,000	0,500	1,167	0,333	0,944	0,444	1,167
-2	WHITE	YELLOW	0,333	0,833	0,667	0,833	0,333	0,750	0,500	0,833	0,333	0,722	0,444	0,833
-1	WHITE	GREEN	0,333	0,667	0,667	0,667	0,500	0,667	0,500	0,667	0,556	0,667	0,444	0,667
0	GREEN	GREEN	0,667	0,667	1,000	0,667	0,667	0,500	0,833	0,667	0,667	0,444	0,778	0,667
1	GREEN	WHITE	0,667	0,333	1,000	0,333	0,750	0,333	0,833	0,333	0,778	0,333	0,778	0,333
2	YELLOW	WHITE	0,833	0,333	1,167	0,333	1,000	0,333	1,000	0,333	1,056	0,333	0,944	0,333
3	RED	WHITE	1,167	0,333	1,500	0,333	1,333	0,250	1,333	0,333	1,389	0,222	1,278	0,333
4	RED & WHITE	BLACK	1,500	0,167	1,833	0,167	1,667	0,167	1,667	0,167	1,722	0,167	1,611	0,167
5	RED & GREEN	BLACK	1,833	0,167	2,167	0,167	1,917	0,167	2,000	0,167	1,944	0,167	1,944	0,167
6	RED & YELLOW	BLACK	2,000	0,167	2,333	0,167	2,167	0,167	2,167	0,167	2,222	0,167	2,111	0,167
7	RED & RED	BLACK	2,333	0,167	2,667	0,167	2,333	0,167	2,500	0,167	2,333	0,167	2,444	0,167

b. Shatter

Total amount of wounds inflicted and suffered :

Differential of claims	Fighting as	Versus	SHATIER as +2 with 0 neighbours		SHATIER as extra GREEN in same file with 0 neighbours		SHATIER as +2 with 1 neighbour		SHATIER as extra GREEN in same file with 1 neighbour		SHATIER as +2 with 2 neighbours		SHATIER as extra GREEN in same file with 2 neighbours	
			Inflicted	Suffered	Inflicted	Suffered	Inflicted	Suffered	Inflicted	Suffered	Inflicted	Suffered	Inflicted	Suffered
-7	BLACK	RED & RED	0,167	2,333	0,833	2,333	0,333	4,167	1,000	4,667	0,500	6,000	1,167	7,000
-6	BLACK	RED & YELLOW	0,167	2,000	0,833	2,000	0,333	3,500	1,000	4,000	0,500	5,000	1,167	6,000
-5	BLACK	RED & GREEN	0,167	1,833	0,833	1,833	0,500	3,000	1,000	3,667	0,833	4,167	1,167	5,500
-4	BLACK	RED & WHITE	0,167	1,500	0,833	1,500	0,500	2,333	1,000	3,000	0,833	3,167	1,167	4,500
-3	WHITE	RED	0,333	1,167	1,000	1,167	0,667	1,833	1,333	2,333	1,000	2,500	1,667	3,500
-2	WHITE	YELLOW	0,333	0,833	1,000	0,833	1,000	1,500	1,333	1,667	1,667	2,167	1,667	2,500
-1	WHITE	GREEN	0,333	0,667	1,000	0,667	1,000	1,000	1,333	1,333	1,667	1,333	1,667	2,000
0	GREEN	GREEN	0,667	0,667	1,333	0,667	1,500	1,000	2,000	1,333	2,333	1,333	2,667	2,000
1	GREEN	WHITE	0,667	0,333	1,333	0,333	1,833	0,667	2,000	0,667	3,000	1,000	2,667	1,000
2	YELLOW	WHITE	0,833	0,333	1,500	0,333	2,333	0,500	2,333	0,667	3,833	0,667	3,167	1,000
3	RED	WHITE	1,167	0,333	1,833	0,333	3,000	0,500	3,000	0,667	4,833	0,667	4,167	1,000
4	RED & WHITE	BLACK	1,500	0,167	2,167	0,167	3,500	0,333	3,667	0,333	5,500	0,500	5,167	0,500
5	RED & GREEN	BLACK	1,833	0,167	2,500	0,167	4,167	0,333	4,333	0,333	6,500	0,500	6,167	0,500
6	RED & YELLOW	BLACK	2,000	0,167	2,667	0,167	4,333	0,333	4,667	0,333	6,667	0,500	6,667	0,500
7	RED & RED	BLACK	2,333	0,167	3,000	0,167	4,667	0,333	5,333	0,333	7,000	0,500	7,667	0,500

Averaged amount per fighting file :

WHEN DIVIDED BY NUMBER OF FIGHTING FILES

Differential of claims	Fighting as	Versus	SHATIER as +2 with 0 neighbours		SHATIER as extra GREEN in same file with 0 neighbours		SHATIER as +2 with 1 neighbour		SHATIER as extra GREEN in same file with 1 neighbour		SHATIER as +2 with 2 neighbours		SHATIER as extra GREEN in same file with 2 neighbours	
			Inflicted	Suffered	Inflicted	Suffered	Inflicted	Suffered	Inflicted	Suffered	Inflicted	Suffered	Inflicted	Suffered
-7	BLACK	RED & RED	0,167	2,333	0,833	2,333	0,167	2,083	0,500	2,333	0,167	2,000	0,389	2,333
-6	BLACK	RED & YELLOW	0,167	2,000	0,833	2,000	0,167	1,750	0,500	2,000	0,167	1,667	0,389	2,000
-5	BLACK	RED & GREEN	0,167	1,833	0,833	1,833	0,250	1,500	0,500	1,833	0,278	1,389	0,389	1,833
-4	BLACK	RED & WHITE	0,167	1,500	0,833	1,500	0,250	1,167	0,500	1,500	0,278	1,056	0,389	1,500
-3	WHITE	RED	0,333	1,167	1,000	1,167	0,333	0,917	0,667	1,167	0,333	0,833	0,556	1,167
-2	WHITE	YELLOW	0,333	0,833	1,000	0,833	0,500	0,750	0,667	0,833	0,556	0,722	0,556	0,833
-1	WHITE	GREEN	0,333	0,667	1,000	0,667	0,500	0,500	0,667	0,667	0,556	0,444	0,556	0,667
0	GREEN	GREEN	0,667	0,667	1,333	0,667	0,750	0,500	1,000	0,667	0,778	0,444	0,889	0,667
1	GREEN	WHITE	0,667	0,333	1,333	0,333	0,917	0,333	1,000	0,333	1,000	0,333	0,889	0,333
2	YELLOW	WHITE	0,833	0,333	1,500	0,333	1,167	0,250	1,167	0,333	1,278	0,222	1,056	0,333
3	RED	WHITE	1,167	0,333	1,833	0,333	1,500	0,250	1,500	0,333	1,611	0,222	1,389	0,333
4	RED & WHITE	BLACK	1,500	0,167	2,167	0,167	1,750	0,167	1,833	0,167	1,833	0,167	1,722	0,167
5	RED & GREEN	BLACK	1,833	0,167	2,500	0,167	2,083	0,167	2,167	0,167	2,167	0,167	2,056	0,167
6	RED & YELLOW	BLACK	2,000	0,167	2,667	0,167	2,167	0,167	2,333	0,167	2,222	0,167	2,222	0,167
7	RED & RED	BLACK	2,333	0,167	3,000	0,167	2,333	0,167	2,667	0,167	2,333	0,167	2,556	0,167

4. Interpretation

a. Inflicted wounds

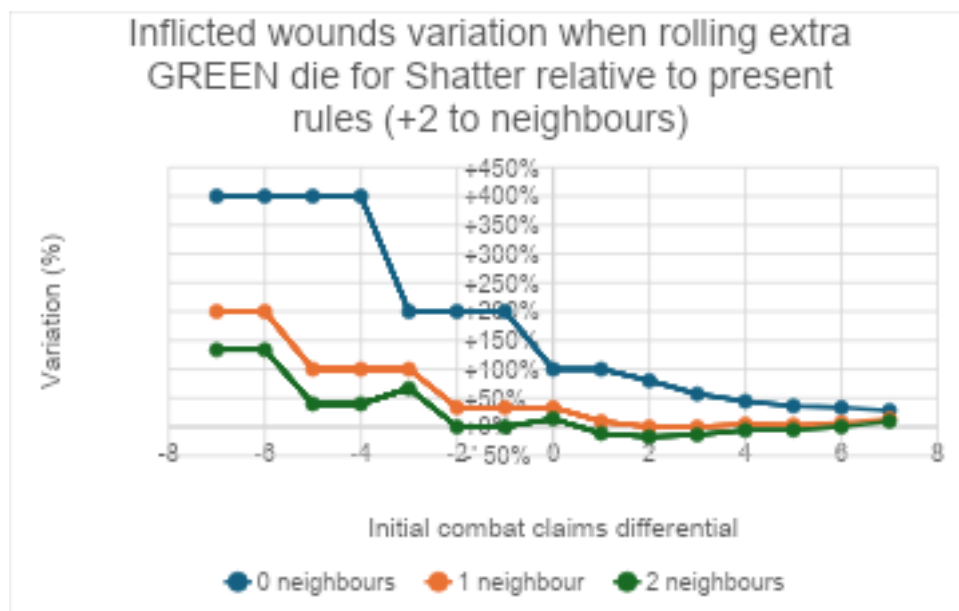
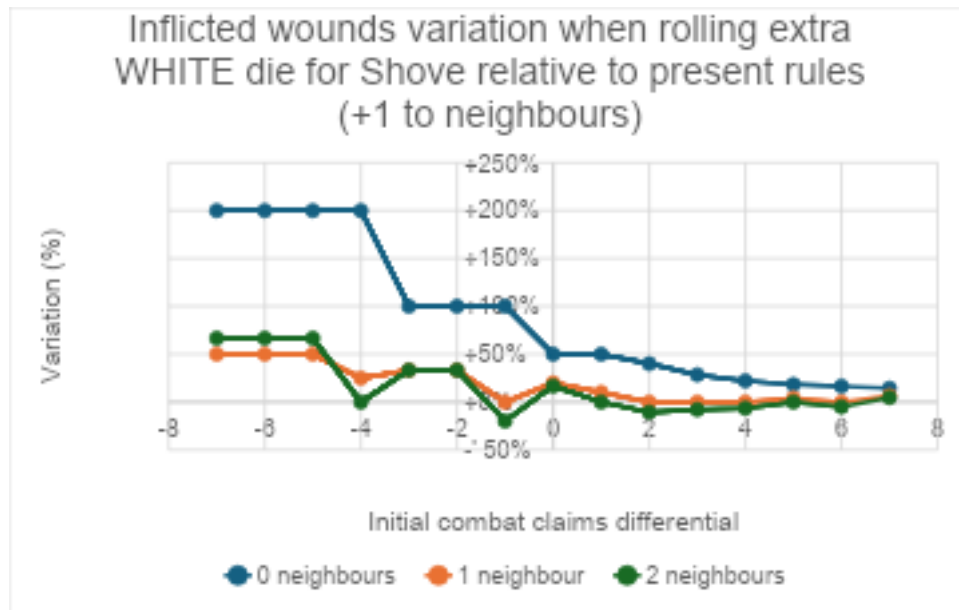
We can observe that, compared to the present rules (bonus to neighbours), the proposal usually results in more or equal number of inflicted wounds.

In the rare cases where it decreases, it is the result of both conditions being met :

- Shove/Shatter in a file with 2 neighbours (i.e. central file of a 3-wide unit).
- Highly favourable combat claim differential in the first place.

Hence, the fights being (slightly) negatively impacted by the proposal are those where the player has, and retains, a very high chance of winning the fight anyway.

This can be correlated with the relative variation of wounds inflicted :



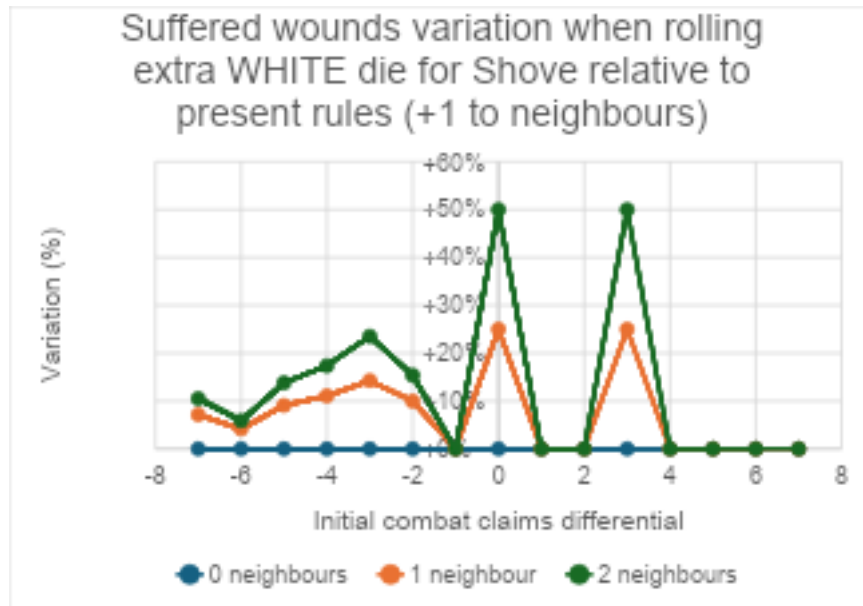
From this, we confirm that the proposal :

- Is highly advantageous when 1 file fights without neighbours, either because only one fighting or because last file of the fight (an expected result given this situation presently gives no benefit).
- Results in higher wounds inflicted even with 1 neighbour.
- Ranges from very attractive to slightly unfavourable with 2 neighbours, depending on combat claims.

b. Suffered wounds

We can observe that, compared to the present rules (bonus to neighbours), the proposal means that the number of suffered wounds is often increased, and otherwise remains constant (including the few cases where the number of inflicted wounds decreases).

We can also correlate with the relative variation of wounds suffered:



These confirm that the proposal results in :

- Identical suffered wounds when fighting with no neighbours (an expected result given there is presently no way a Shatter/Shove can propagate if no neighbours).
- Higher suffered wounds when fighting with neighbours (because no bonus to neighbours which could degrade opponent's GREEN to WHITE or WHITE to BLACK).
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c. *Ratio of inflicted to suffered*

Another metric of interest is the evolution of wounds inflicted to wounds suffered :

Here as well, we can observe that the proposal usually results in an increased number of inflicted wounds relative to suffered wounds. It is another confirmation of what we observed before.

The same exception as before appears as well : highly favourable odds with Shove/Shatter in the central file of a 3-wide unit sometimes results in reduced amount of inflicted wounds relative to suffered wounds.

5. Conclusion

From a statistical point of view, the proposal usually results in more wounds both inflicted and suffered. Combats are more lethal for everyone, and therefore are resolved faster.

The few cases where less wounds are inflicted, whether relatively to number of dice rolled or to suffered wounds, are the ones where the difference is the smallest, relatively to the inflicted wounds under the current system (bonus to neighbours).