**VTAR vs DIP, PED, and PPS**

**VTAR is a bad stat:**

The Verses Team Average Rating (VTAR) equation measures points scored per jam in which a blocker plays against total points scored per bout. Theoretically, a blocker’s job is to reduce the number of points scored by the opposing team, but a blocker’s influence on the number of points their own jammer scores is tenuous.

VTAR = ((X-Y)/Z)-((A-B)/C)

X = Points Scored by your Jammer While you are playing

Y = Points Scored by opposing Jammer while you are playing

Z = Number of Jams you play

A = Your Team’s Final Score

B = Opposing Team’s Final Score

C = Number of Jams over the course of the bout

**Example 1:** Gotham Girls’ OMG WTF during 2014 WFTDA Championships vs Rose City

VTAR=((111-102)/25)-((147-144)/42)=0.288

VTAR=0.36-0.71=0.288

**Example 2:** Steel City’s Ally McKill during 2014 Division 1 Playoff #2 vs Toronto

VTAR=((71-108)/24)-((170-184)/48)=-1.25

VTAR=-1.54-(-.29)=-1.25

By rating a blocker based solely on points scored for and against, we are creating a picture that is incomplete, and not useful. Worse, it might paint a picture of poor performance that could lead to reducing an otherwise highly skilled player’s play time, or even cost them a roster spot.

Imagine Blocker Kitty is on the track. Two of her blocker friends and her jammer are in the penalty box, and she is facing a full strength opposing team with only one allied blocker. The stats will probably reflect poorly on Blocker Kitty, despite the fact that she had no ability to influence the major factors that put her in the position she is now in. Maybe she can redeem her VTAR in consecutive jams, but that one bad jam is part of the equation, and she’s stuck with it like a blemish on her credit report.

Conversely, imagine Blocker Kitty is on the track and is immediately sent to the penalty box. Despite being down a player, Blocker Kitty’s teammates manage to hold the opposing jammer to 0 points while their own jammer racks up 10 points over the course of the jam. Blocker Kitty looks like a superstar on paper despite having a negligible contribution to the results of the jam. The data disparity can be compounded if Blocker Kitty plays only a few jams over the course of the bout since each jam will have a heavier weight within the VTAR equation.

These hypothetical examples are just a few of the reasons why I believe the VTAR ranking system is almost completely useless, and blockers should be tracked differently.

**Alternative Ranking:**

In order to track a blocker’s performance, it may be necessary to shift your view of what a blocker is actually doing over the course of a jam. Contrary to popular perception, a blocker’s job is not to prevent the opposing jammer from scoring (well it is, but it’s not actually that simple). A blocker’s job is to do three primary things…

1: Delay the opposing jammer from escaping the pack during her initial pass (buy time for her own jammer to gain lead).

2: Assist her own jammer (countering the delaying efforts of opposing blockers).

3: Delay the opposing jammer from scoring points during her scoring pass (buy time for her own jammer to score points, or escape the pack)

While a blocker plays an important role in her own team’s score, the bulk of her performance should be measured against the opposing jammer instead of being linked to her own jammer’s ability to score. With this in mind, I have developed an equation that ranks blockers based on three different values.

**1: Delayed Initial Pass (DIP)** – Whether your jammer is racking up points pass after pass, or sitting in the penalty box, the longer it takes for the opposing jammer to escape the pack, the better. How your jammer is spending the time that you give her is important, but not something you have a great deal of influence over. The raw value for a player’s DIP is the average time it takes for the opposing jammer to escape the pack, and higher is better.

DIP = ΣA/X/B

A = Opposing jammer escape time for each jam that you are blocking.

B = The number of jams that you are playing as a blocker.

X = Number of blockers (4). (more on this later. You can’t have all the glory/responsibility. You have to share with your fellow blockers.)

**Example:** During a single jam (B), if it takes the opposing jammer 12 seconds to escape the pack (A), and there are 4 blockers on the track (X), 3 of those 12 seconds are a result of your individual effort.

**2: Pack Escape Differential (PED)** – Whether your jammer is stuck, or making scoring passes, the sooner she makes it out of the pack, the better. Much of this rating is dependent upon the ability of the jammer, but correlates to the blockers’ ability to make holes and convert to offense. The raw value for a player’s PED is your jammer’s average escape time minus the opposing jammer’s average escape time, and higher is better.

PED = ΣA/X/B-ΣC/X/B

A = Opposing jammer escape time for each jam that you are blocking.

B = The number of jams that you are playing as a blocker.

C = Your jammer’s escape time for each jam that you are blocking.

X = Number of blockers (4). (more on this later. You can’t have all the glory/responsibility. You have to share with your fellow blockers.)

You will notice that the PED is actually the opposing jammer’s delayed initial pass (DIP) minus your jammer’s delayed initial pass (DIP).

**Example:** During a single jam (B), if it takes your jammer 20 seconds to escape the pack (C), with 4 blockers on the track (X) the right half of the equation is 5. During this same jam (B), if it takes the opposing jammer 24 seconds to escape the pack (A), and there are 4 blockers on the track (X), the left half of the equation is 6. 6 seconds minus 5 seconds is a 1 second differential that you are responsible for.

**3: Points per Second (PPS)** – A blocker has a direct impact on the opposing jammer’s ability to score. Some jams are short, and others stretch for an entire two minutes so there isn’t much value in tracking points by jam. Instead it is more accurate to track points over time. The raw value for a player’s PPS is to take the number of points scored by the opposing jammer divided by the time of the jam.

PPS = (ΣP/X)/(ΣT/X)

P = Points scored against you during each jam that you are a blocker

T = Time of each jam that you are a blocker (seconds)

X = Number of blockers (4). (more on this later. You can’t have all the glory/responsibility. You have to share with your fellow blockers.)

**Example:** You spent 600 seconds of a bout blocking (T) with 4 blockers on the track (X), so 150 seconds of that time belong to you. While you were blocking 40 opposing points were scored (P), but again only ¼ of those points – 10 – were a result of your actions. So your PPS is 0.066. Or, another way to see that number is that it takes 15 seconds for the opposing jammer to score 1 point against you.

**Weight:**

Another limitation of the VTAR system is an inability to understand how penalties might impact a player’s ranking. In the first example above, Blocker Kitty’s rating is suffering because two of her blocker friends as well as her jammer are all stuck in the penalty box. She’s largely helpless, and her VTAR rating is suffering.

Obviously, fewer penalties are better than more penalties, but tracking penalties alone doesn’t help because there are many things to consider. Often blockers start jams in the penalty box which stretches their impact over multiple jams. Sometimes penalties aren’t “all bad” either. If Blocker Kitty earns a back block penalty, but that penalty bought her jammer enough time to get lead, than that penalty was a “good penalty”.

So, in order to understand the impact of penalties we weigh individual blockers by the percentage of their playing time they spend in the penalty box as **Initial Weight**. A penalty-free player would have an iWT of 1, and players who earn penalties would have an iWT of less than 1. The equation for this is:

iWT = 1-(ΣPen\*30)/ΣT

Pen = Your Penalties

30 = 30 seconds per penalty

T = Play time per jam.

We can then take each of the raw equations above and adjust them based on a player’s iWT.

DIP = ΣA/X/B becomes DIP = (ΣA/X/B)\*iWT

PED = ΣA/X/B- ΣC/X/B becomes PED = ((ΣA/X/B)\*iWT)- ((ΣC/X/B)/iWT)

PPS = (ΣP/X)/(ΣT/X) becomes PPS = ((ΣP/X)/iWT)/(ΣT/X\*iWT)

**DIP Example:** During a single jam (B), if it takes the opposing jammer 12 seconds to escape the pack (A), and there are 4 blockers on the track (X), 3 of those 12 seconds are a result of your individual effort. However, because of your penalties, you are only on the track 95% of the time (iWt=0.95), so you’re actually only responsible for 2.85 seconds.

**PED Example:** During a single jam (B), if it takes your jammer 20 seconds to escape the pack (C), with 4 blockers on the track(X) the right half of the equation is 5 seconds. But, because of penalties, you are only on the track 90% of the time (iWT=.9), so 5 is inflated to 5.55 seconds…

In other words, because of your time in the penalty box, it took your jammer .55 seconds longer to escape the pack than it would have had you been there.

During this same jam (B), if it takes the opposing jammer 24 seconds to escape the pack (A), and there are 4 blockers on the track (X), the left half of the equation is 6. But again because of your penalties, you are only on the track 90% of the time (iWT=.9) we have to adjust that time down from 6 seconds to 5.4 (6\*.9=5.4).

In other words, because of your time in the penalty box, it took the opposing jammer .6 seconds less time to escape the pack than it would have had you been there.

5.4 seconds minus 5.55 seconds is a -.15 second differential that you are responsible for. Even though your jammer made it out of the pack first, and you helped her, your penalties actually cost your team .15 seconds of lead jammer.

**PPS Example:** You spent 600 seconds of a bout blocking (T) with 4 blockers (X), so 150 seconds of that time belong to you. But you are only on the track 96% of the time because of penalties (iWT = 0.96) so only 144 seconds belong to you.

While you were blocking, or sitting in the penalty box, 40 opposing points were scored (P). But again only ¼ of those points – 10 – were your fault. But because of your time in the penalty box, the 10 points you are responsible for is inflated by your iWT to 10.4.

So the 10.4 points scored against you is divided by your 144 seconds of play time. So your PPS is 0.072 or 1 point per 13.9 seconds of play time.

**Consider:** Another way to look at iWT is as a percentage of a player. If Blocker Kitty has an iWT of .9, think of her as 90% of an entire player, because 10% of the time she’s sitting. But she’s still 100% of a point. So you could conceivably have 4 players on the track, but because of the impact of penalties, from a statistical perspective, there’s only 3.6 players blocking.

**Adjusted Weight:**

So, what happens to the missing players? If Blocker Kitty is on the track 90% of the time, we don’t just throw that 10% away, we use it to adjust the weight of Blocker Kitty’s teammates. While her stats are impacted negatively by her time in the penalty box, her teammates’ stats go up. This is how this formula diminishes the impact of situations where Blocker Kitty is all alone on the track while her friends are in the penalty box. She’s is carrying the weight of her penalized friends with her **Adjusted Weight**, or aWT. So, the equation for aWT is this:

aWT =1- (ΣiWT-iWT)/(BL-1)+iWT

ΣiWT = the iWT of every player who blocks during the bout.

iWT = your initial weight

BL = the number of players who block during the bout.

The resulting aWT will be somewhere near 1 for each player, with some players slightly above (players with fewer penalties), and other players slightly below (players with many penalties). So we can then replace everyone’s iWT with aWT in the statistical equations I mentioned previously:

DIP = (ΣA/X/B)\*iWT becomes DIP = (ΣA/X/B)\*aWT

PED =((ΣA/X/B)\*iWT)- (ΣC/X/B)/iWT becomes PED =( (ΣA/X/B)\*aWT)- (ΣC/X/B)/aWT

PPS = ((ΣP/X)/iWT)/(ΣT/X\*iWT) becomes PPS = ((ΣP/X)/aWT)/(ΣT/X\*aWT)

Fun fact… even though some players are tracked at more than 100% and others are tracked at less than 100%, the entire team is tracked at exactly 100%. The weight of each player can be shifted around within the team, but the team average will never weigh more or less than 100%.

**Consider:** Another way to look at aWT is that some players are required to do more work than others. If Blocker Kitty is on the track with three blockers, they all share the work and responsibility for what happens at 100%. However, if someone goes to the penalty box, Blocker Kitty and her two remaining friends must share the burden at 133% while the penalized blocker is at 0% for 30 seconds.

**Unquantifiable Factors:**

**Drawing Penalties:** The penalties of the opposing team are factored into the equations in the form of time. If the opposing jammer goes to the penalty box, she goes there because of the actions of all blockers (even though it looks like only one person drew a cut). If the opposing jammer is sitting in the penalty box before she made it through her initial pass, the time she is sitting will factor into each blocker’s DIP (30 free seconds of time she has yet to make it through) and PPS (she’s sitting, not scoring points). If she went to the penalty box after she made it through her initial pass, the time she is sitting will factor into each blocker’s PPS.

**Jammer vs Jammer:** Sometimes Jammers will take action that will impact the statistical performance of their blockers. Imagine a Jammer hits their opposing jammer out of bounds, draw a cut, and suddenly she’s on a power jam… stats go up for everyone! Unfortunately it is very difficult to accurately evaluate the impact of an allied Jammer on blocker performance. This is an admitted limitation of both the VTAR equation as well as the DIP, PED, and PPS equations I have developed. So, if your jammer does something that severely negatively impacts the opposing jammer, just thank her for padding your stats after the jam, and carry on.

**Actionable Data:**

What does it all mean, and how can you use it to help improve your blocker’s performance? Rating blockers in this way has never been done before, so that is a question that can’t be fully answered. But when discussions about player performance are had, platitudes born of emotion become a common theme:

She needs to *step it up* if we’re gonna win this game!

* In what way should she step it up? Should she skate faster? Should she pick up her 4 teammates and skate around the track with them on her shoulders so she’s both the jammer and the pack at the same time?

She needs to *get physical* if she’s gonna get lead jammer.

* Roller derby is a physical game. I’m guessing that your jammer is not refusing to make physical contact with other players, so what’s the actual problem?

She *needs to execute* when she’s blocking.

* So you’re telling me that I need to do the thing that I am trying to do? Thanks for the insight!

It is my hope that I can replace platitudes with valuable content with this method of ranking blockers:

* Your iWT is very low, which means you need to work on reducing the penalties you receive during a game.
* Your aWT is very high, which means you have very few penalties. Good job!
* Your DIP is a little low, which means the opposing jammer is getting out a little too quickly. Perhaps we could look at starting you in a different lane.
* Your PED is fantastic! That means your jammer is getting out of the pack quickly, and you are holding the opposing jammer for a long time. Do you have any tricks you could share with the team?
* The opposing team is scoring a lot of PPS against you. Perhaps the lineup that we’ve been playing you in is not ideal.

Thank you, and I hope you will find value in my system