

%TBA (Percent of Total Bases Advanced) and REC (Run Expectancy Change)

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My project will be to look at an alternative to the RBI stat, %TBA (name is a work in progress). This stat will aim to measure the same thing RBI does, being a measure of how you advance runners that are already on base, but instead weight the advances on total number of bases and divide it by the total chances a player has in order to eliminate the 3 and 4 hitter bias of RBI. The equation looks something like the following:

$$\%TBA = \frac{\text{Total Bases Advanced}}{\text{Total Possible Bases Advanced}}$$

Total Bases Advanced will be calculated by counting the number of bases all runners on base and the hitter advance. For example, a double with no one on would net 2 total bases advanced. A single with a runner on second base who scores would net 3 total bases advanced (1 for the single + 2 for the second to home).

In order to calculate the Total Possible Bases Advanced, you just calculate the total number of bases advanced if every player scored (a home run, essentially). If you were to break apart the equation, you'd end up with:

$$\%TBA = \frac{\sum_{\text{Home}}^{3\text{rd}} \text{Player end base} - \text{player starting base}}{\sum_{\text{Home}}^{3\text{rd}} 4 - \text{player starting base}}$$

This will then result in a percentage that indicates how good a player is at advancing runners without producing outs (as an out would count as a 0 bases advanced out of 4 possible for the batter). This metric is also independent of how good a team is since it is out of total chances instead of just a raw counting stat.

I will also be looking at REC (Run Expectancy Change), a similar stat that instead weights the change in expected run outcome of an at bat. Using the following table on the next page:

Base Runners			2010-2015		
1B	2B	3B	0 outs	1 outs	2 outs
—	—	—	0.481	0.254	0.098
1B	—	—	0.859	0.509	0.224
—	2B	—	1.1	0.664	0.319
1B	2B	—	1.437	0.884	0.429
—	—	3B	1.35	0.95	0.353
1B	—	3B	1.784	1.13	0.478
—	2B	3B	1.964	1.376	0.58
1B	2B	3B	2.292	1.541	0.752

And then using the following equation, we will estimate the total run contribution of a player:

$$REC = \sum_{AB\ 1}^{AB\ n} (RE24\ Post\ AB - RE24\ Pre\ AB) + Runs\ Scored$$

This gives us an approximation of the total run contribution of a player, partially independent of team success and opportunity (a player with more opportunities to score a higher RE24 difference has a higher REC ceiling). This stat can also be used to estimate the bWAR (batting WAR) contribution to the WAR total, using the fact that between 9 and 10 runs are used per win, we can take a players REC and divide by that number (which will be calculated later).

My plan for presenting these stats is to allow the user to export all recent players in a spreadsheet (or as recent as the Retrosheets database allows me to go), as well as inspect individual players values.