



Diamond Dollars Case Competition

Developing a Strategy for Pitching Usage

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This case was prepared by Vince Gennaro and is developed solely for the purpose of a case discussion. It contains various assumptions that are generated for illustrative purposes and is not intended to serve as a source of primary data.

In recent seasons, we've begun to see an evolution in pitching usage by MLB teams. We've seen the best bullpen arms deployed in situations other than the traditional closer role, as teams show a willingness to use the top relievers in high leverage situations, even if it's the 6th, 7th, or 8th inning. Over the last season we witnessed another level of innovation in the way pitchers were used to start games. Several teams experimented with using a pitcher who profiled as a relief pitcher to start games. These pitchers typically pitched just the first, or in some cases a second inning, before another pitcher (often a starting pitcher) entered the game.

In 2018, 91 games were started by 28 different pitchers who averaged 1.6 innings or less, per game started. Six of these 28 pitchers were with the Tampa Bay Rays. The Rays' pitchers accounted for 55 of the 91 starts. The LA Angels tried it six times, with a different pitcher each time. Liam Hendriks of the Oakland A's started 8 games and threw a total of $8\frac{2}{3}$ innings in his starting roles. An additional ten pitchers started a game with a two-inning stint.

For the first time in several decades, we're seeing significant changes in how pitching staffs are constructed. Perhaps the 2018 Indians and Rays present the greatest contrast:

- The Indians used just 7 different starting pitchers. Their top 4 starters (measured by games started) accounted for 122 starts and 773 innings pitched. *Each one of them* averaged at least 6.2 IP per start. (Only 14 pitchers in MLB averaged 6.2 or more innings per start and the Indians had 4 of them) Their top 5 starters accounted for 141 starts.
- The Rays employed 17 different starting pitchers. Their top 4 starters (measured by games started) accounted for just 89 starts and 370 IP. No one who started a game for the Rays averaged more than 5.8 innings per start. Their top 5 starters accounted for 100 starts.
- Perhaps the ultimate stat that summarizes the difference between the way the two clubs pitching staffs were constructed: The Rays got 5+ innings from their starting pitcher in just 70 games; the Indians starters went 5+ innings in 141 games.

While there has been much said and written about the opener and optimizing pitching usage in general, the discussion has been predominantly opinion-driven and lacking of true analysis. There are at least two legitimate reasons for the lack of objective dialog on the topic:

- The answer to questions surrounding optimal pitching deployment tend to be situational. It's highly dependent on the quality of the personnel, the depth and configuration of the roster, ambiguity around workload tolerance and viable usage patterns, unforeseen developments such as injuries, and even the mindset and flexibility of the pitchers on the staff.
- A second reason is that the data to thoroughly address these issues is not fully available in the public domain. So, there is no doubt robust analysis going on within certain MLB organizations that is not finding its way into the public domain.

This case aims to introduce objective analysis into the pitching usage question in order to elevate the public dialog to a higher plane. In this case I'm asking you to *lay out a strategic framework for an MLB team to make decisions about the optimal way to deploy their pitching assets*. More specifically:

- Define a strategy (or multiple strategies) that MLB teams can follow to assess the optimal way to deploy their pitching assets over the course of a 162-game schedule. The Indians and Astros may be advised to follow a different strategy than say, the Rays or Twins. Support your strategies and assertions with analysis using primarily 2018 season data. You can define broader strategic principles that any teams should follow, or you can define your strategies in the context of a specific 2018 MLB team.
- Any strategy should be built on a set of assumptions, such as workload assumptions and usage limitations for both starting pitchers and relief pitchers. In other words, it would be unreasonable to suggest a top relief pitcher could pitch the first two innings (or any two innings) in 80 games of the 162-game schedule. It's perfectly acceptable to stretch the boundaries of current usage, but an entirely different matter to prescribe monumental increases in workload. Be sure to define any key assumptions associated with your strategies.
- The data component of this case is to analyze and model your proposed strategies to estimate their effectiveness. How are your strategies expected to ultimately impact team run prevention and ultimately team performance?
- As you develop strategies, you should assume an environment that permits a maximum of 13 pitchers on the active roster at any point in time. Also, you should assume a modification to an MLB team's ability to shuttle pitchers between the minor leagues and the major league club. Today the rules allow a pitcher to be sent to the minor leagues and be eligible for recall to the major league team after 10 days. Given the on-going discussions between MLB and the MLBPA, assume that rule will change to 15 days. This will *somewhat* reduce the reliance on expanding the pitching roster by shuttling pitchers back-and-forth between the ML club and the minor league affiliate.
- Be sure to identify the risks and obstacles to implementing your strategy. What resistance do you expect and what are the potential failure points of your strategy?
- For the purpose of your strategy development, *ignore the postseason*. The postseason is a sprint, while the regular season is a marathon. The postseason is about getting the ball in the hands of your best pitchers as often as is possible. There is an entirely different strategy and approach for the postseason.

The Case Problem

To summarize, your assignment is to layout a comprehensive strategy regarding the optimal way to deploy pitching over the course of the regular season. You are permitted to use any publicly available data, but you are not permitted to seek outside help (meaning anyone other

than your team members) as to analytical tools and techniques. This means you cannot contact anyone from MLB, mlb.com, or Statcast to acquire data that is not already on the web. You may scrape data from websites, if there is data that can benefit your efforts.

This case admittedly carries more ambiguity than some of the previous Diamond Dollars cases. However, there is still a need to deeply explore the data to support any strategy you recommend. One of the differences from a typical case is that you have greater control in *defining which data and which analysis* will best inform your proposed strategy. My cases are always a combination of data analysis and critical/strategic thinking, this one may be tilted a just bit more toward the latter.

You may choose to define a pitcher usage strategy for a specific 2018 team that indicates how certain starting pitchers and relief pitchers would have been deployed differently, in order to improve run prevention. (I suggest using 2018 since we have a fixed roster of pitchers. The 2019 rosters are still taking shape). Perhaps you have evidence that a one-inning opener for 40% of a team's starts is one key principle a specific team should follow. Alternatively you may believe that three-inning starts for 60% of your teams starts is a beneficial approach. If you do use a specific team, be mindful of time on the disabled list. So, it would not be appropriate to recommend that Madison Bumgarner should have had 32 starts instead of just 21, as he missed 1/3 of the season due to injury.

Another approach is for you to create several different pitching strategies and declare which 2018 MLB teams should have matched up with each of your strategies. Whichever direction you choose, the judges will be interested in how you processed thru the issues of determining the optimal deployment of an MLB pitching staff, based on its personnel.

Your output for this case assignment should be in the form of a powerpoint presentation to support a 20-minute oral presentation to a panel of judges, followed by a 10-minute Q & A by the judges. The presentation should include:

- **Your process**—the methodology used in developing your strategic framework and evaluating its impact on overall team performance, including:
 - The way in which you structure your analysis—is it consistent with the problem you pose and is it laid out logically?
 - The criteria you used to evaluate the data and draw conclusions
 - The statistical tools and techniques you employed to analyze your strategic recommendations
 - Your assessment of the risks associated with a your strategy recommendations
- **Your strategy/strategic framework**—the conclusions and recommendations for how to deploy pitching assets. Does your analysis support your recommendations? You should also include the limitations of your analysis and the risk factors associated with your recommendations, as well as obstacles to implementation.
- **Your creativity**—while you will not have time to go into detail on all of your analysis, did you think "outside the box" and address the problem you posed in a creative way and/or did you present your findings in a creative, effective way.

The judge's criteria will focus on the quality of your *decision process* and your *strategic framework* more than any single "right" answer. The ideal decision process has a logical

flow, and is inclusive of the key factors that are expected to have a true impact on any decision that results from your analysis. More specifically, there are several key areas that will be a focus for the judges:

- Your framing of the problem. In other words, you should begin your presentation by informing the judges of the problem you are solving
- Your overall methodology and process for analyzing and evaluating the data that supports your strategic framework for optimally deploying a pitching staff
- Your conclusions, which include the specific strategies you recommend and their estimated impact on run prevention and overall team performance
- Your overall level of creativity in addressing the problem
- The quality and clarity of the presentation of your analysis and recommendations. It's critical to carefully and strategically choose *what* to present and share with the judges. Storytelling is a critical aspect of influencing decisions through analytics.

A final comment regarding "rules" of the case and the competition:

- The intent of the competition is that team members are competing against other team members. This means that assistance from professors or non-members of the team is not permitted. Also, do not contact any MLB team or league personnel, or any other experts or non-experts, for advice on any of the case issues.
- You are encouraged to use the internet to help you with the case, particularly as a source of data, but be prepared to add your own insights, including quantitative analysis to the material you choose to draw from on the internet.
- One of the most common pitfalls for Case Competition participants is the over-reliance on analysis published on the leading analytical websites. While it is often valuable to consider these analyses, student teams have lost points by relying solely on these sites for answers to key case questions. We are looking to understand *your* analyses of the case questions, without an over-reliance on other peoples' thinking.

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