

## Demo: Analyzing Measurement System Bias

In this video, we use the file Area MSA Exercise Final.jmp to demonstrate how to analyze bias in the Measurement Systems Analysis platform.

In this study, the measurement system of interest is the area of several objects, measured by different inspectors. The true value, or standard, is known.

To conduct this analysis, select the Measurement Systems Analysis platform from the Analyze menu under Quality and Process. Under Analysis Method, we select Gauge R&R.

Then enter Measured Value as the Y, Response, Inspector as the X, Grouping variable, and Part Number as the Part, Sample ID. Then, we enter Standard as the Standard.

To analyze bias, we select Gauge Studies and then Bias Report from the top red triangle.

We see that the average bias, which is the difference between the measurements and the true values, is -0.3731. On average, the measurements are below the true values.

The values Lower 95% and Upper 95% represent a confidence interval for the bias. This tells us that the average bias is in the range of -0.28 and -0.46.

The Measurement Bias Report by Standard shows a graph and statistics to study the average bias for the different standards. We learn, for example, that the measurements for Standard 4.4 are biased. On average, the measurements are 1.11 units below the true value of 4.4.

Note that, when we compare the measurements to the true value, we use the term bias. When we compare the measurements to the true value for different operators and different parts, we use the term measurement error, or simply error.

For additional graphs, we select Measurement Error Graphs from the red triangle for the Measurement Bias Report.

Here, we focus on the Measurement Error report by Inspector. This report shows the average error for the different inspectors. We can see, for example, that the average error for some of the inspectors is large, while the average error for other inspectors is very small.