

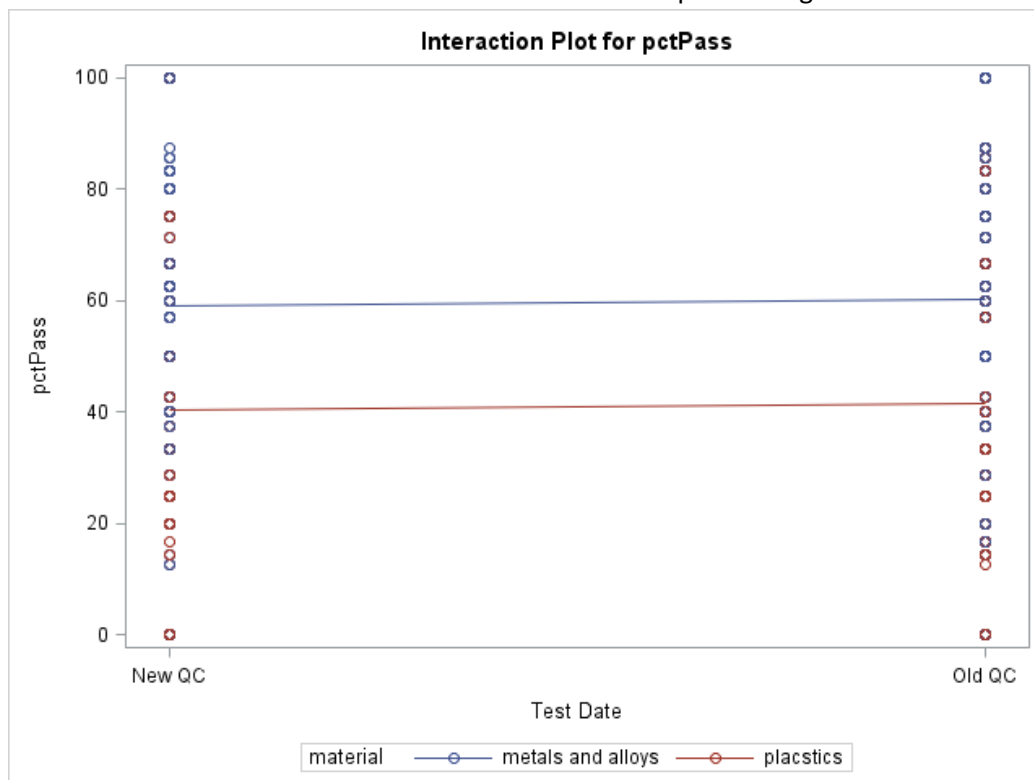
# Modeling Results

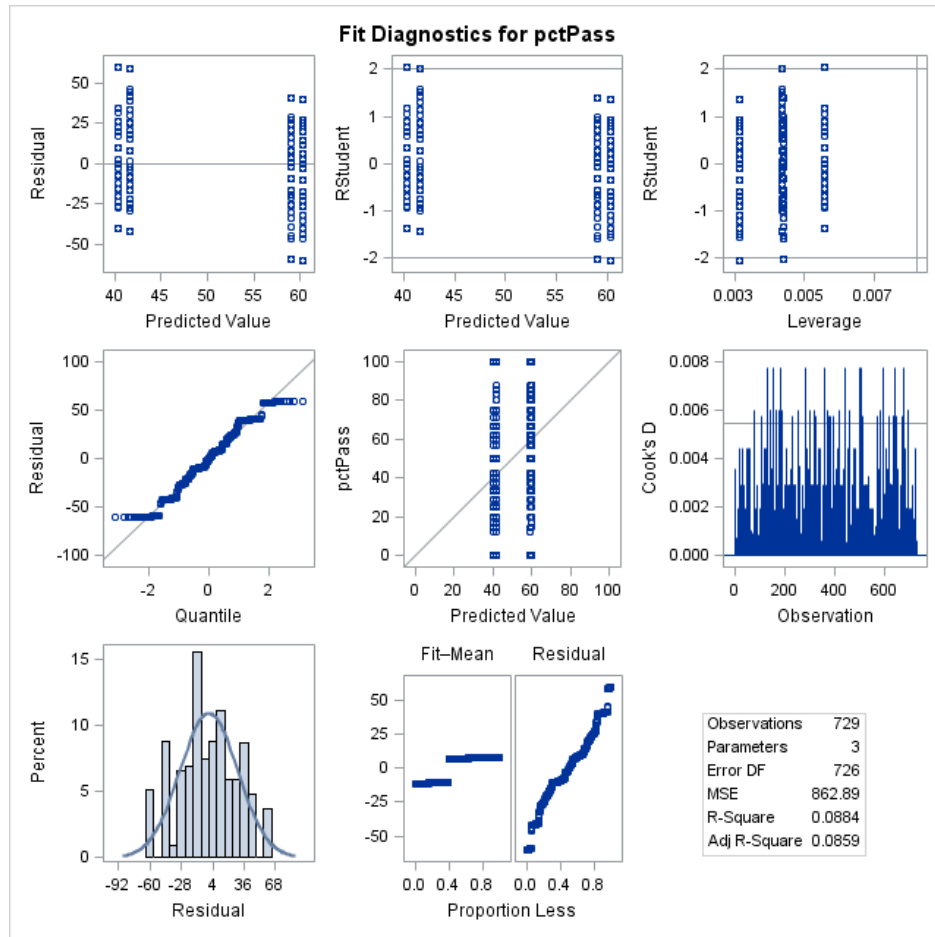
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We can see from our regression model, interpreting from the parameter, that on average, products that are made of plastics under the old quality control method have 41.65 percent chance of passing the test. With the new quality control method, products of all materials on average have 1.31 percent less of a chance to pass the test when compared to the old method. And metals and alloys on average have 18.62 percent higher chance of passing the quality control test regardless of the test method. Our QC parameter is not statistically significant while the materials parameter is, indicating that the passing rate difference between the old and new quality control methods is not significant.

Parameter	Estimate	Standard Error	t Value	Pr >  t
Intercept	41.65 B	1.939	21.48	<.0001
New QC	-1.31 B	2.229	-0.59	0.5568
Old QC	0.00 B	NA	NA	NA
material metals and alloys	18.62 B	2.225	8.37	<.0001
material plastics	0.00 B	NA	NA	NA

The interaction plot between the two variables suggests very little evidence of multicollinearity, therefore we will not remodel with an interaction term to improve the goodness of fit.





Our diagnostics plots suggest that our model mostly fir the assumption of linear regression. The limitation includes difficulty in interpretation of residuals due the nature of categorical variables, and our model appears to have a pattern between the residuals, indicating that the assumption of independent residuals may be violated. The residuals display tails on the QQ normal plot, and have several potential outliers. We can see that the residual does display constant variance. Therefore, our model is overall appreciate, although the adjusted r-squared suggest that the model explains very little variation of the dataset.

Overall, we conclude that the difference in passing rate between the quality control tests are not significant, and metals and alloys on average have a higher passing rate than plastics. We also observed that there is no evidence of interaction between the two variables, suggesting that the both tests have consistent passing rate between the different materials.