**Quality Control Caselet**

Everybody seems to disagree about just why so many parts have to be fixed or thrown away

after they are produced. Some say that it’s the temperature of the production process, which needs to be held constant (within a reasonable range). Others claim that it’s clearly the density of the product, and that if we could only produce a heavier material, the problems would disappear. Then there is Ole the site manager, who has been warning everyone forever to take care not to push the equipment beyond its limits. This problem would be the easiest to fix, simply by slowing down the production rate; however, this would increase costs. Unfortunately, rate is the only variable that the manager can control. Interestingly, many of the workers on the morning shift think that the problem is “those inexperienced workers in the afternoon,” who, curiously, feel the same way about the morning workers.

Ever since the factory was automated, with computer network communication and bar code readers at each station, data have been piling up. After taking MGT585 class, you’ve finally decided to have a look. Your assistant aggregated the data by 4-hour blocks and then typed in the AM/PM variable, you found the following description of the variables:

• **temperature**: measures the temperature variability as a standard deviation during the time of measurement

• **density**: indicates the density of the final product

• **rate**: rate of production

• **am**: 1 indicates morning and 0 afternoon

• **defect**: average number of defects per 1000 produced

Questions

1. Identify the statistical data types, do you need dummy variable. Yes/ No?
2. Run descriptive statistics?
3. Identify a dependent variable.
4. Generate a scatterplot. Interpret the relationships between other variables and the dependent variable. What “obvious conclusions” can you draw?
5. Predict defect from each of the predictor variables separately, e.g., defect from temp, defect from density, defect from rate, etc. Which of the predictors are significant in the simple linear regressions?
6. “Interestingly, many of the workers on the morning shift think that the problem is “those inexperienced workers in the afternoon,” who, curiously, feel the same way about the morning workers.” Do you think the claim by morning shift workers is true?
7. How would you present your findings to your manager Ole?