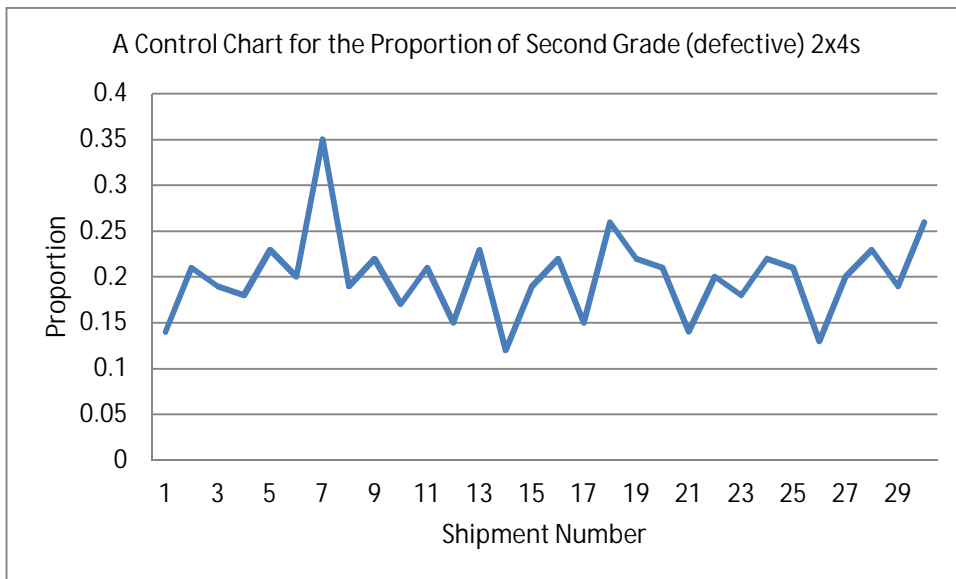


Stat 254 – Control Charts

1. The manager of a building-supplies company randomly samples incoming lumber to see whether it meets quality specifications. From each shipment, 100 pieces of 2×4 lumber are inspected and judged according to whether they are first (acceptable) or second (defective) grade. The mean of the proportions for the past 30 shipments was found to be 0.20.
 - a) Calculate the upper and lower control limits for the p control chart, and sketch those limits on the graph below.



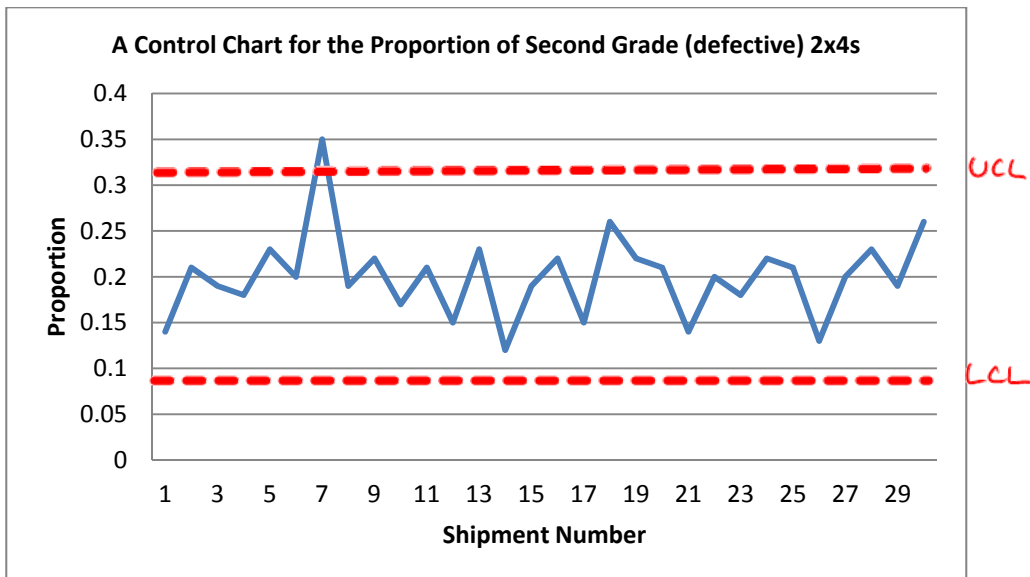
- b) Looking at the graph, would the manager have any reasons to be concerned about the defect rate for any individual shipment?
- c) Looking at the graph, would the manager have any reasons to be concerned about the defect rate overall for the last 30 shipments?

Solution:

- a) Calculate the upper and lower control limits for the p control chart, and sketch those limits on the graph below.

$$\hat{p} = 0.20$$
$$SE = \sqrt{\frac{pq}{n}} = \sqrt{\frac{(0.2)(0.8)}{100}} = 0.04$$

$$\text{so } UCL = \hat{p} + 3SE = 0.32$$
$$LCL = \hat{p} - 3SE = 0.08$$



- b) Looking at the graph, would the manager have any reasons to be concerned about the defect rate for any individual shipment?

Shipment #7 certainly seems iffy.

- c) Looking at the graph, would the manager have any reasons to be concerned about the defect rate overall for the last 30 shipments?

However, the rest of the shipments seem to be well within the control limits, so the manager shouldn't be concerned overall.