

NORTHROP GRUMMAN

DEFINING THE FUTURE

Analyzing Defects Can Tell a LOT About a Company

SEPG Conference 2007

March 26 - 29, 2007

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Agenda

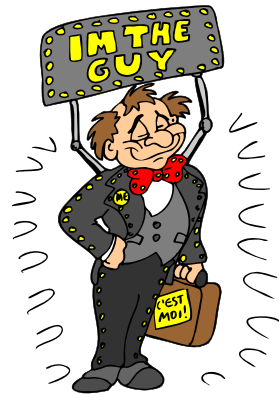
- **4 Stages of Denial**
- **Looking for the Story**
- **Power of Control Charts**
- **Example Using Real Data**



4 Stages of Denial

1

Arrogance



We're perfect. We're a fine tuned machine. Analyzing our defects is a waste of time.

2

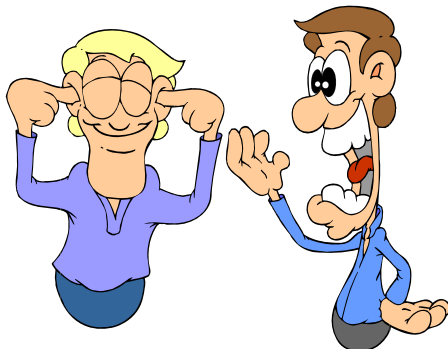
Defensiveness



We're not perfect, but I don't believe your analysis. Are you saying we're incompetent?

3

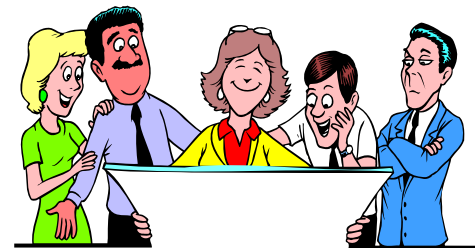
Resistance



I believe you, but we've survived for years. We don't need to change.

4

Skepticism



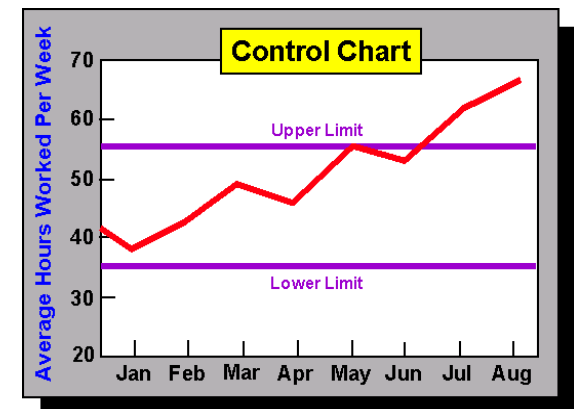
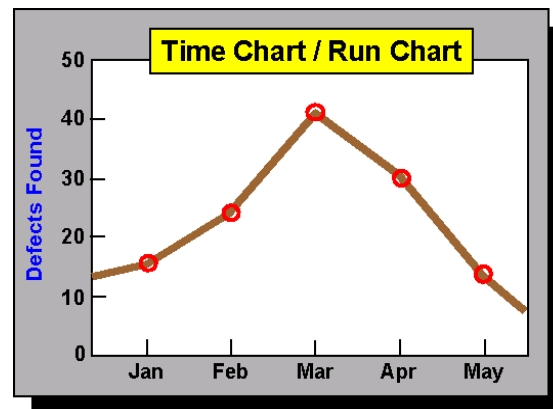
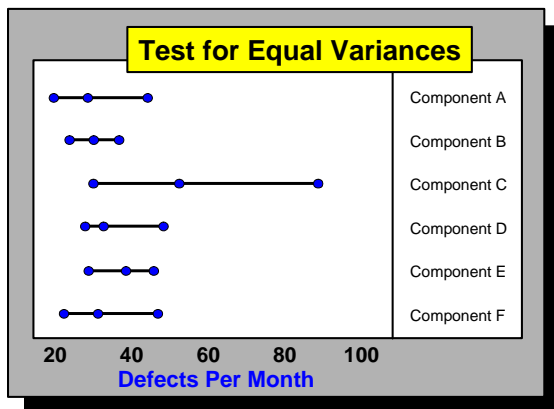
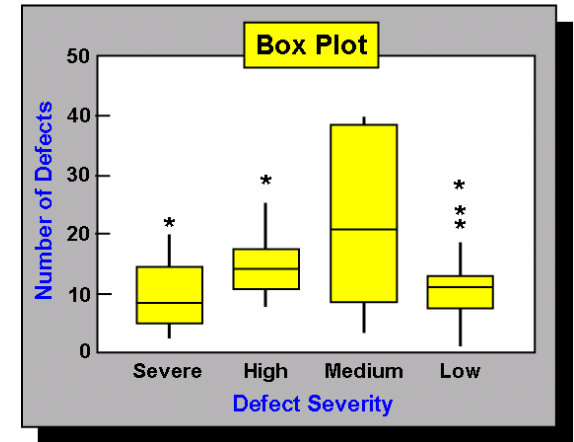
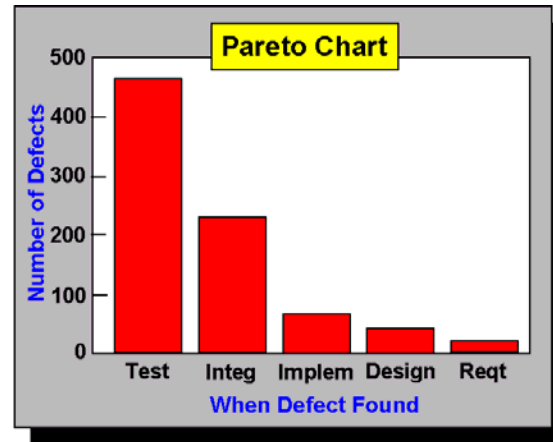
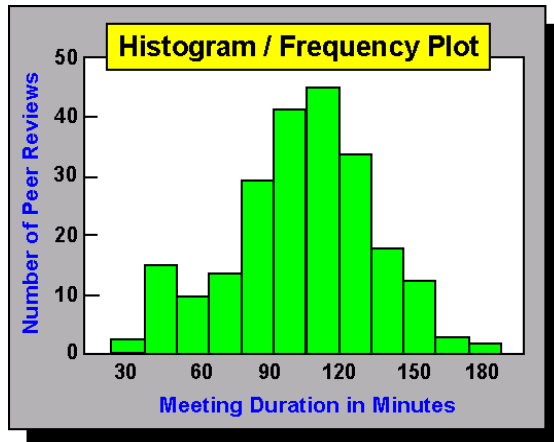
We really want to improve,... except for one person.

Metrics Takes Patience,... Don't Give Up

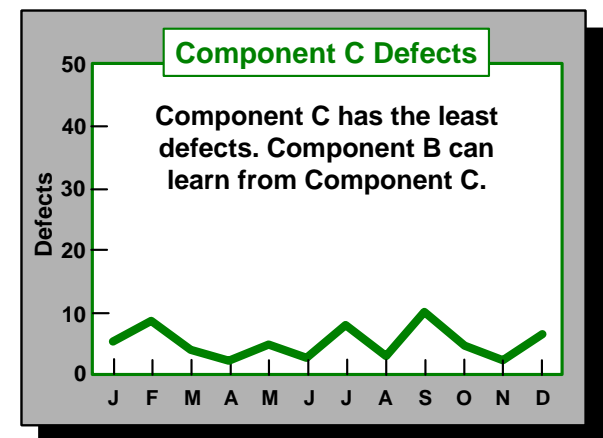
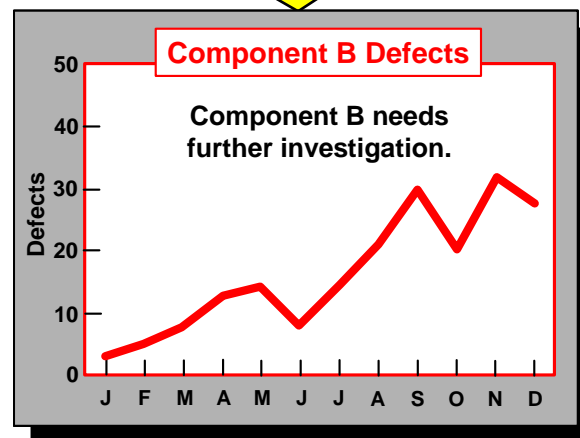
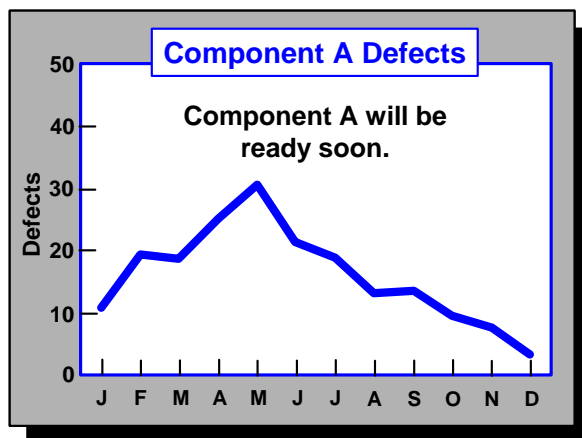
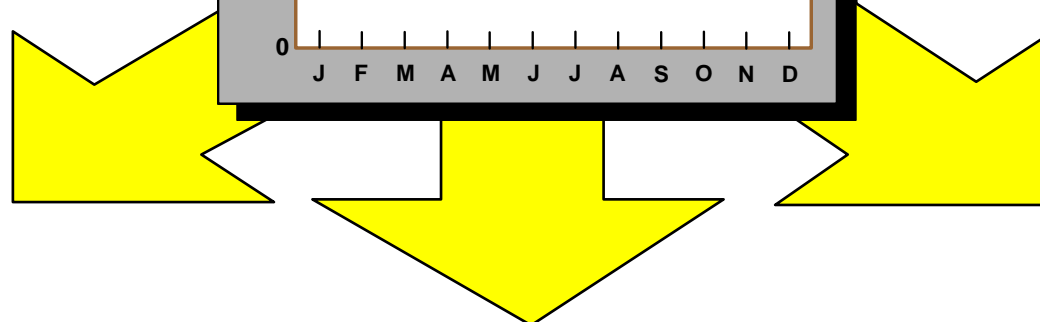
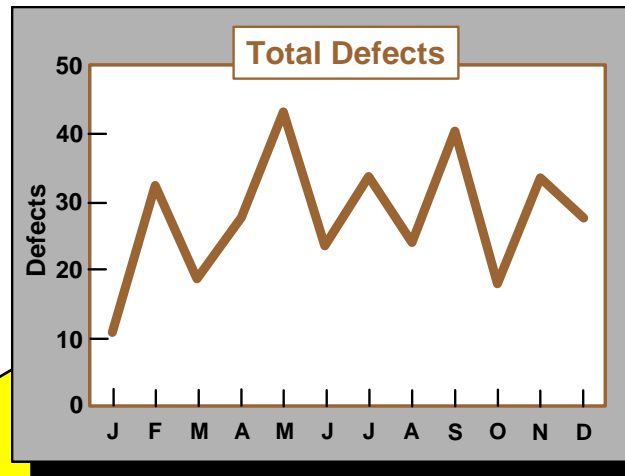


You might look at 20 graphs before you find one golden nugget.

Try Different Graphs to Find the Story



Disaggregate to Find the Story



Introduction to Control Charts

What's the average minutes from home to the LAX gate?

Home on Sunday

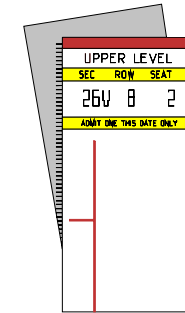


Redondo Beach

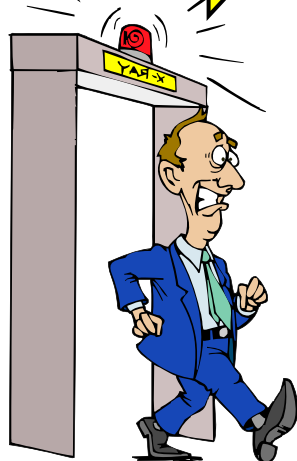
Drive (7.3 Miles)



Kiosk



Security



Walk to Gate

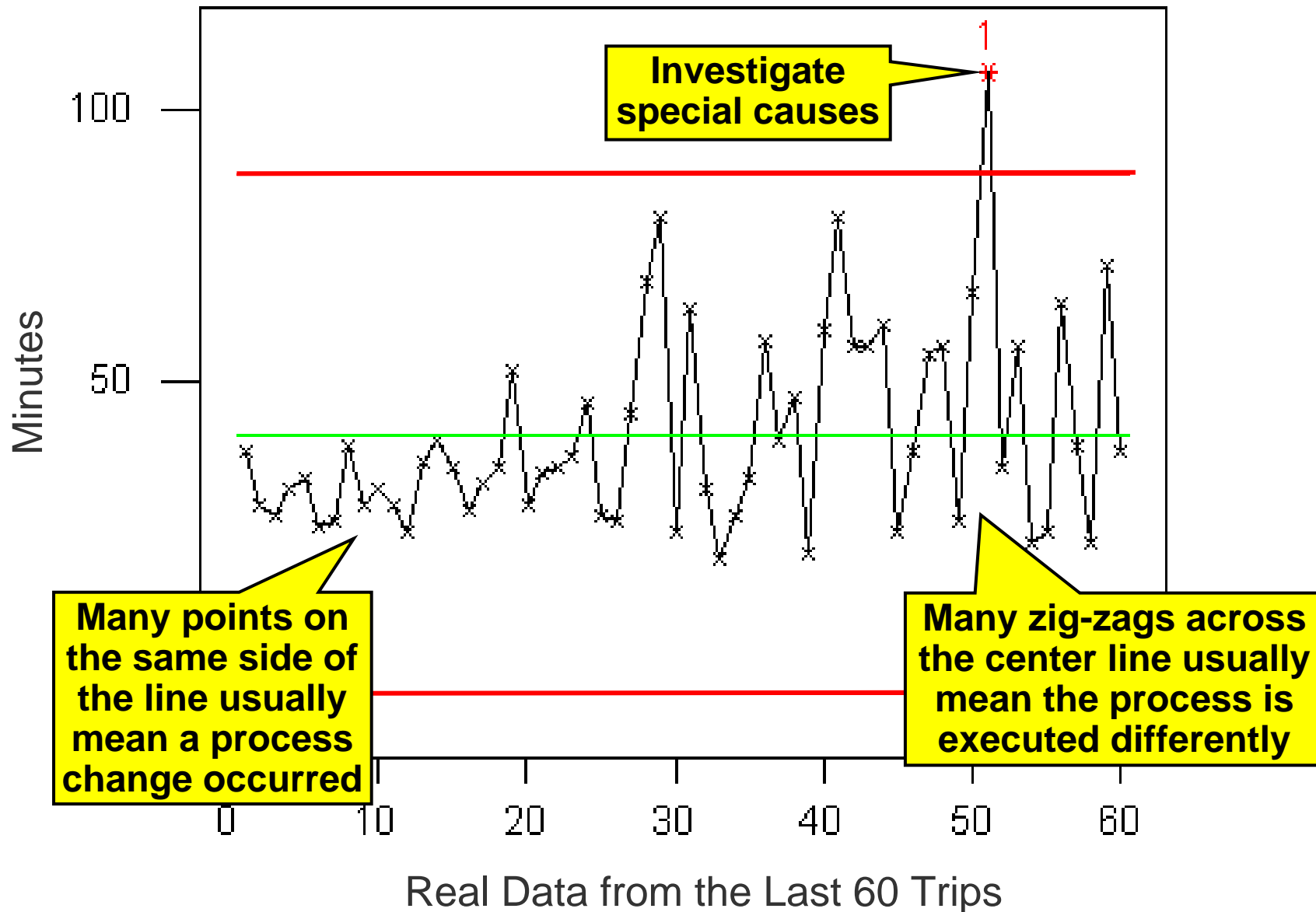
Terminal 6-7



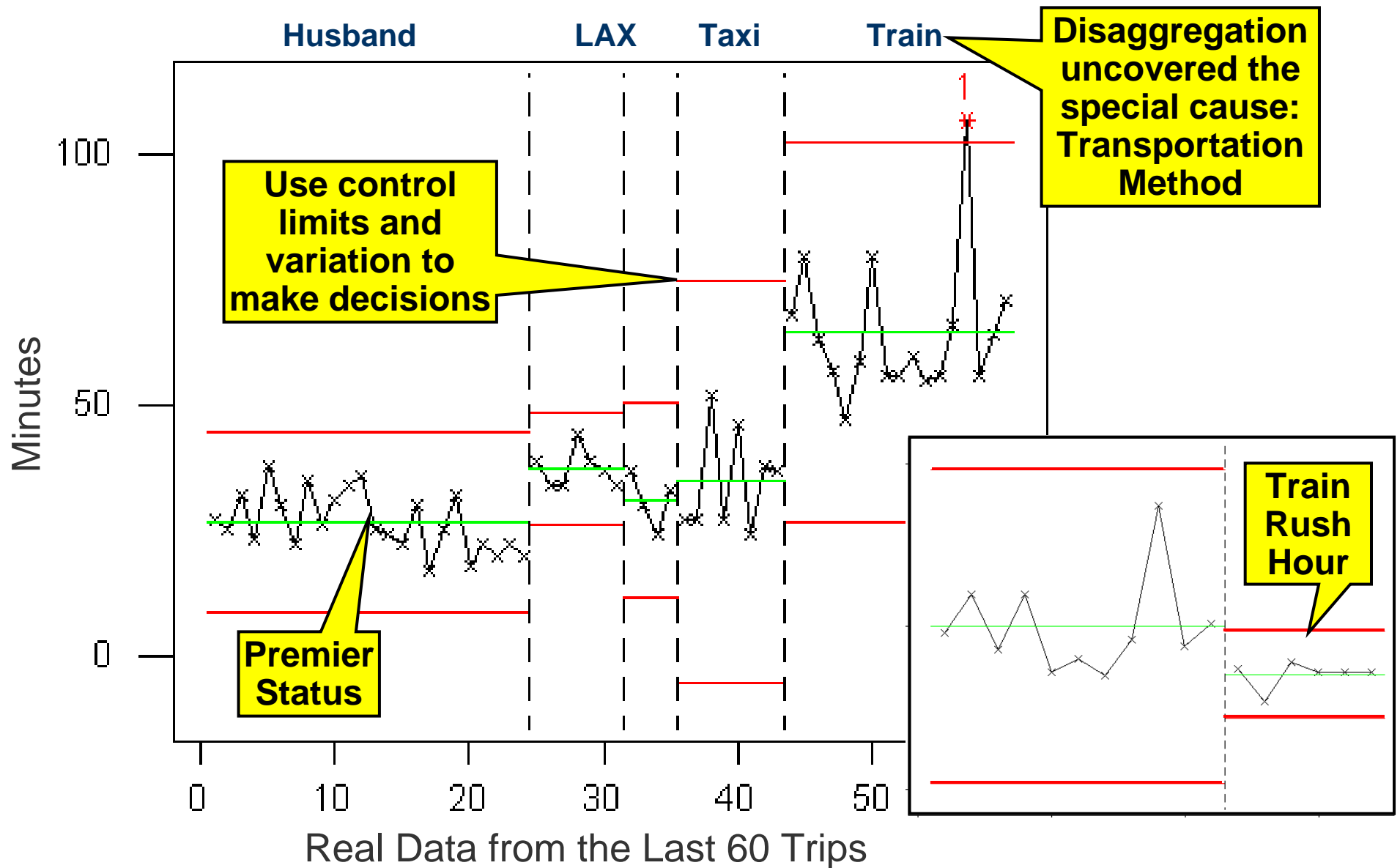
Sit at Gate



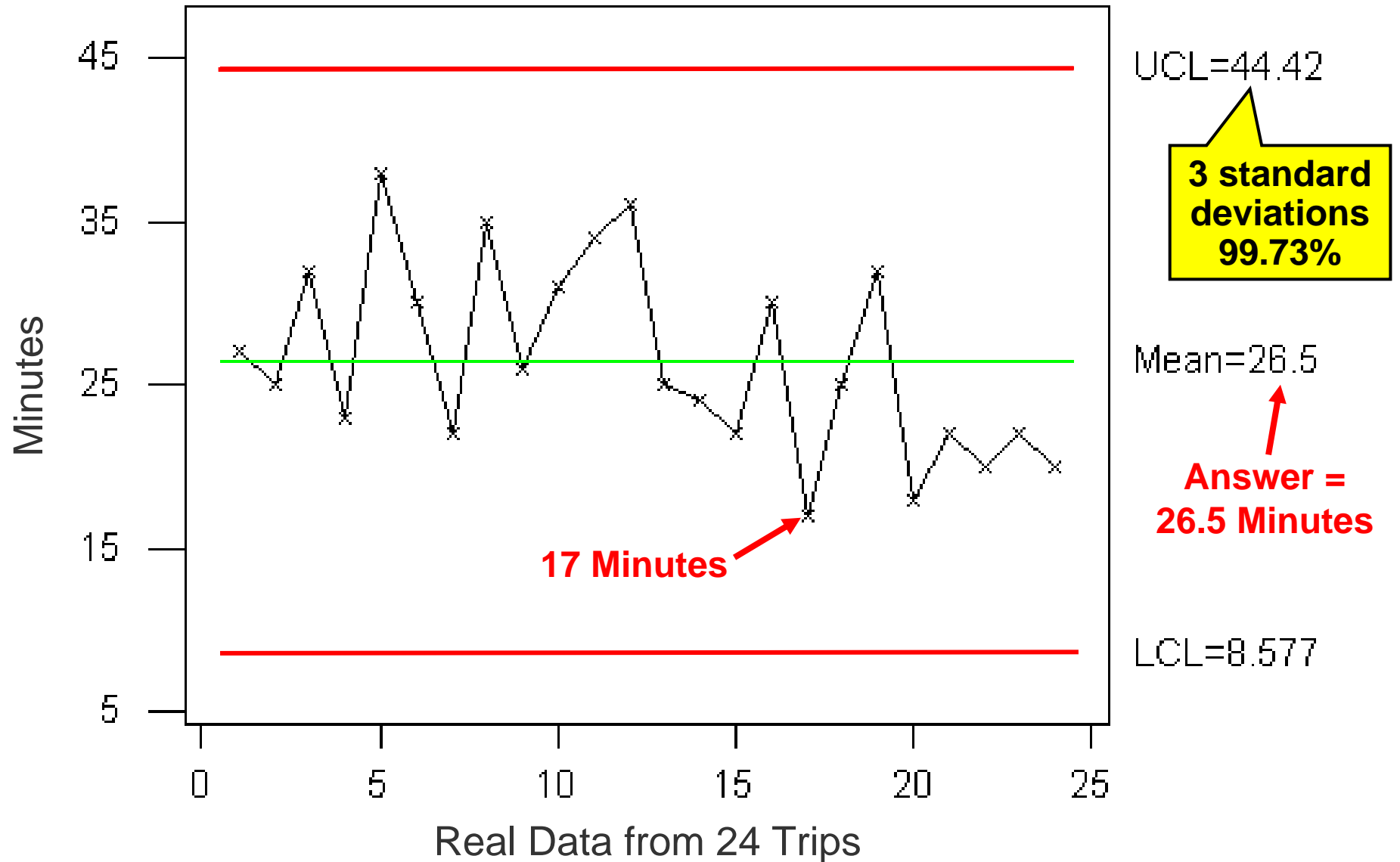
Understand Special Causes



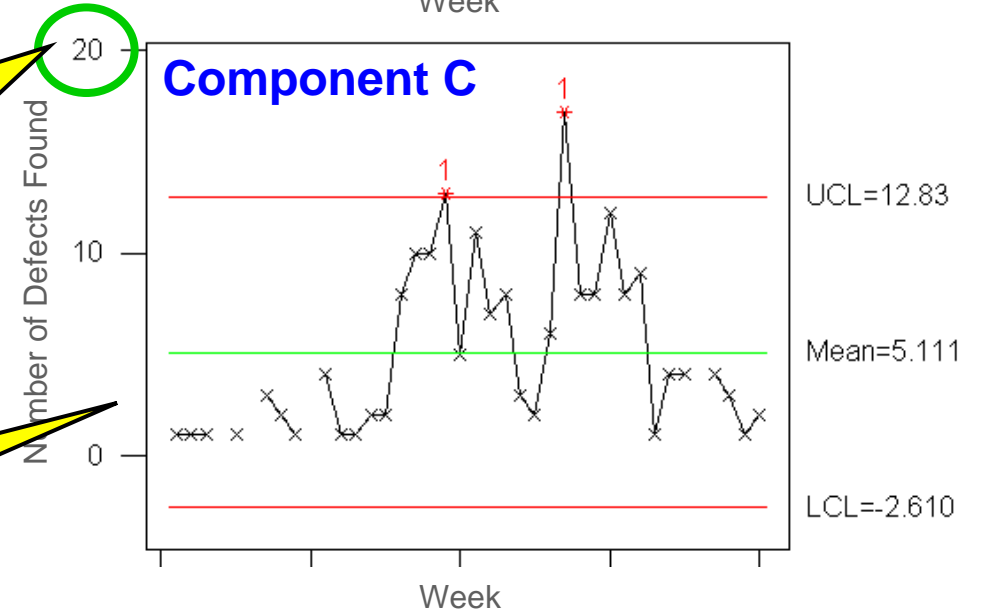
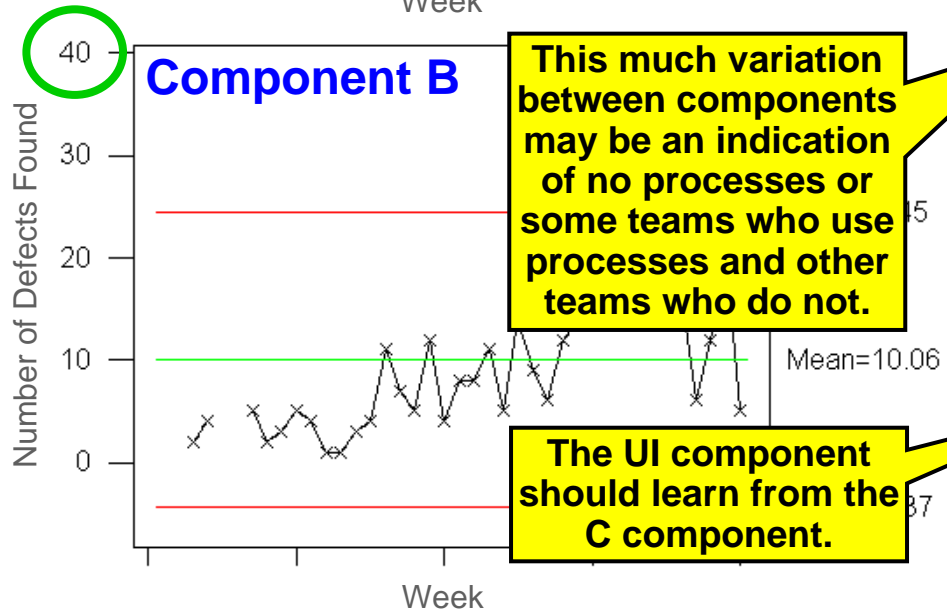
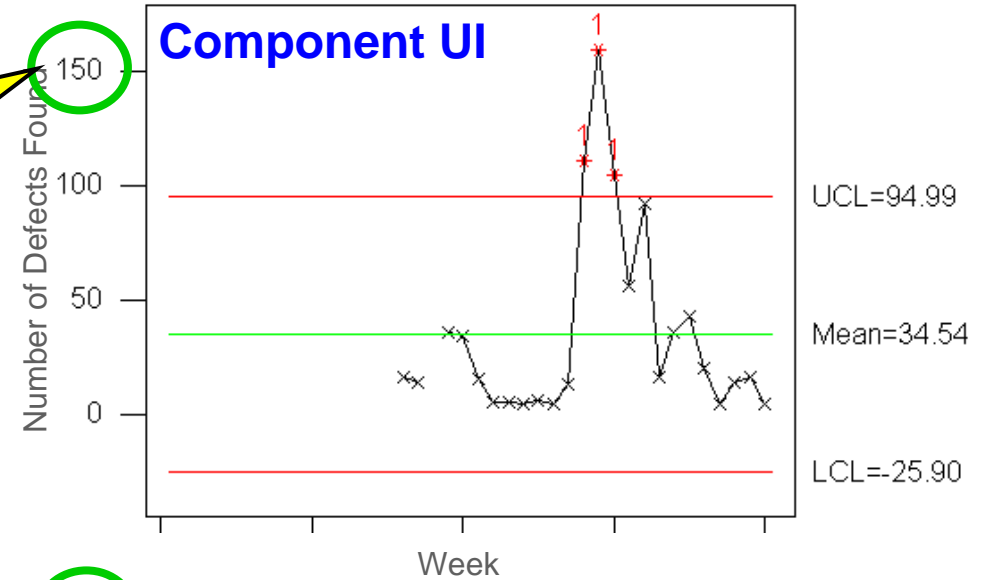
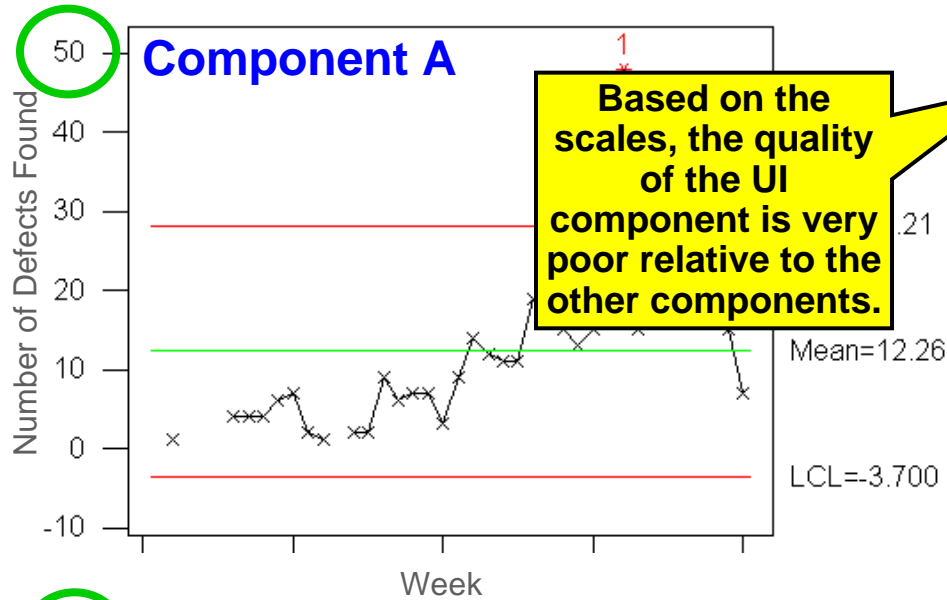
Use Control Charts to Make Decisions



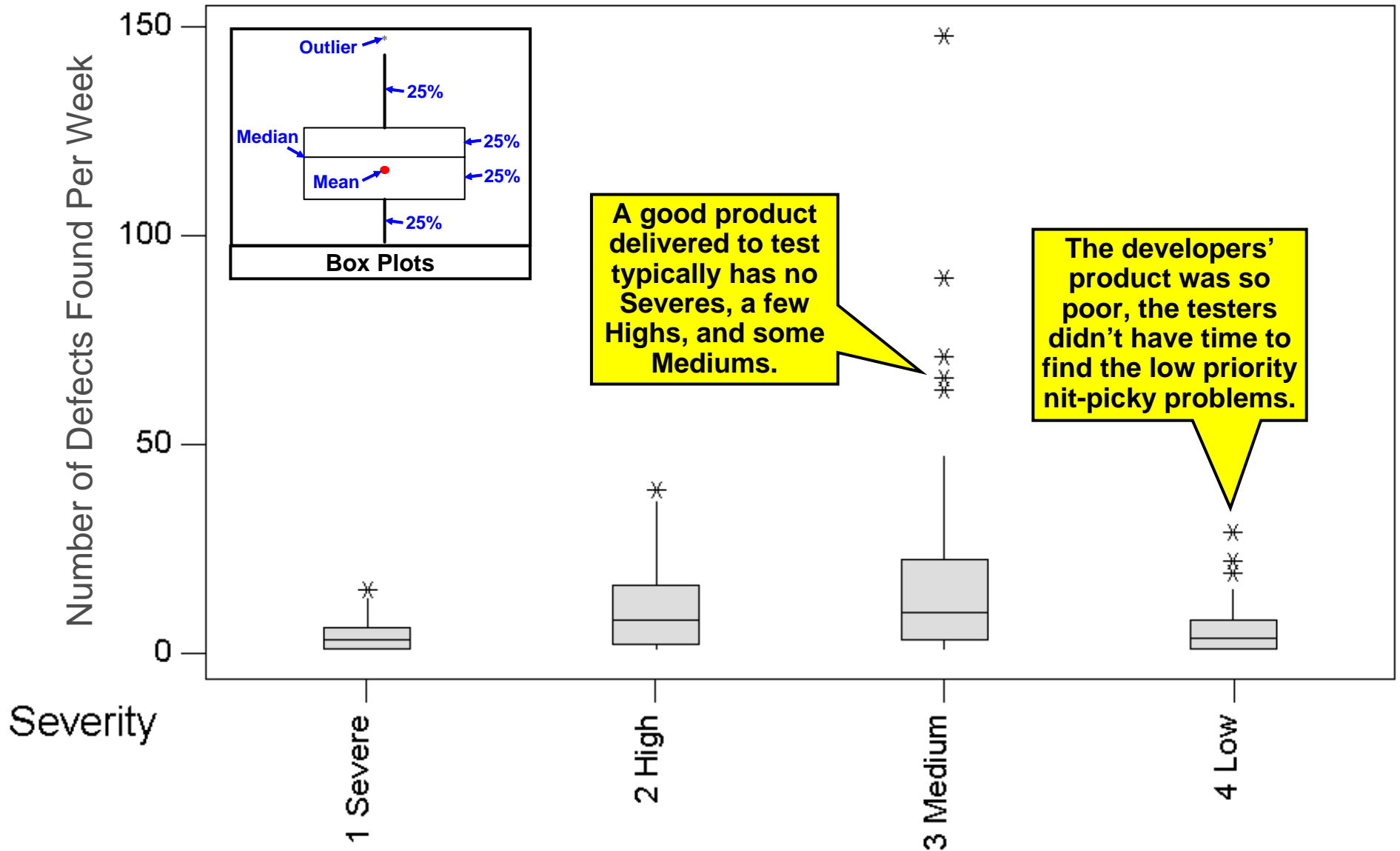
Use Control Charts to Predict the Future



Disaggregate by Components

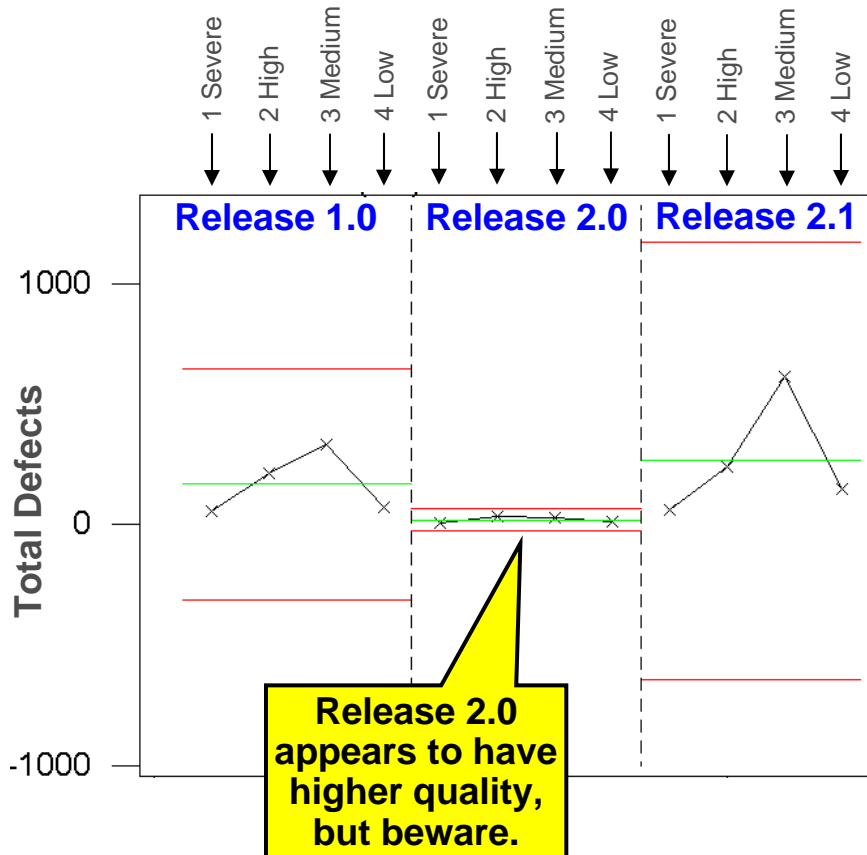


Disaggregate by Severity

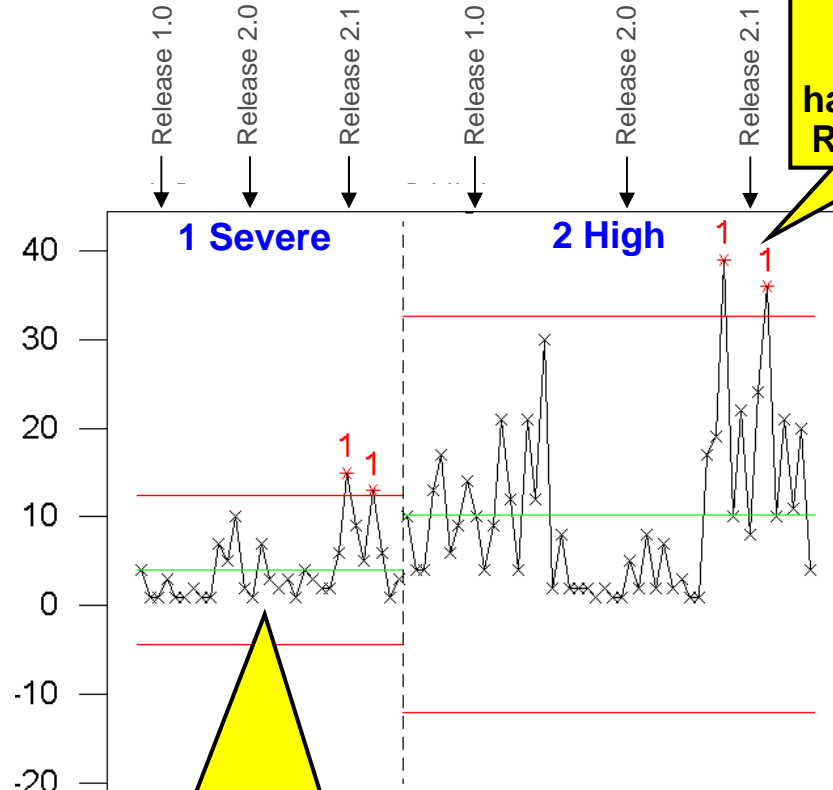


Disaggregate by Severity and Release

Severity by Release



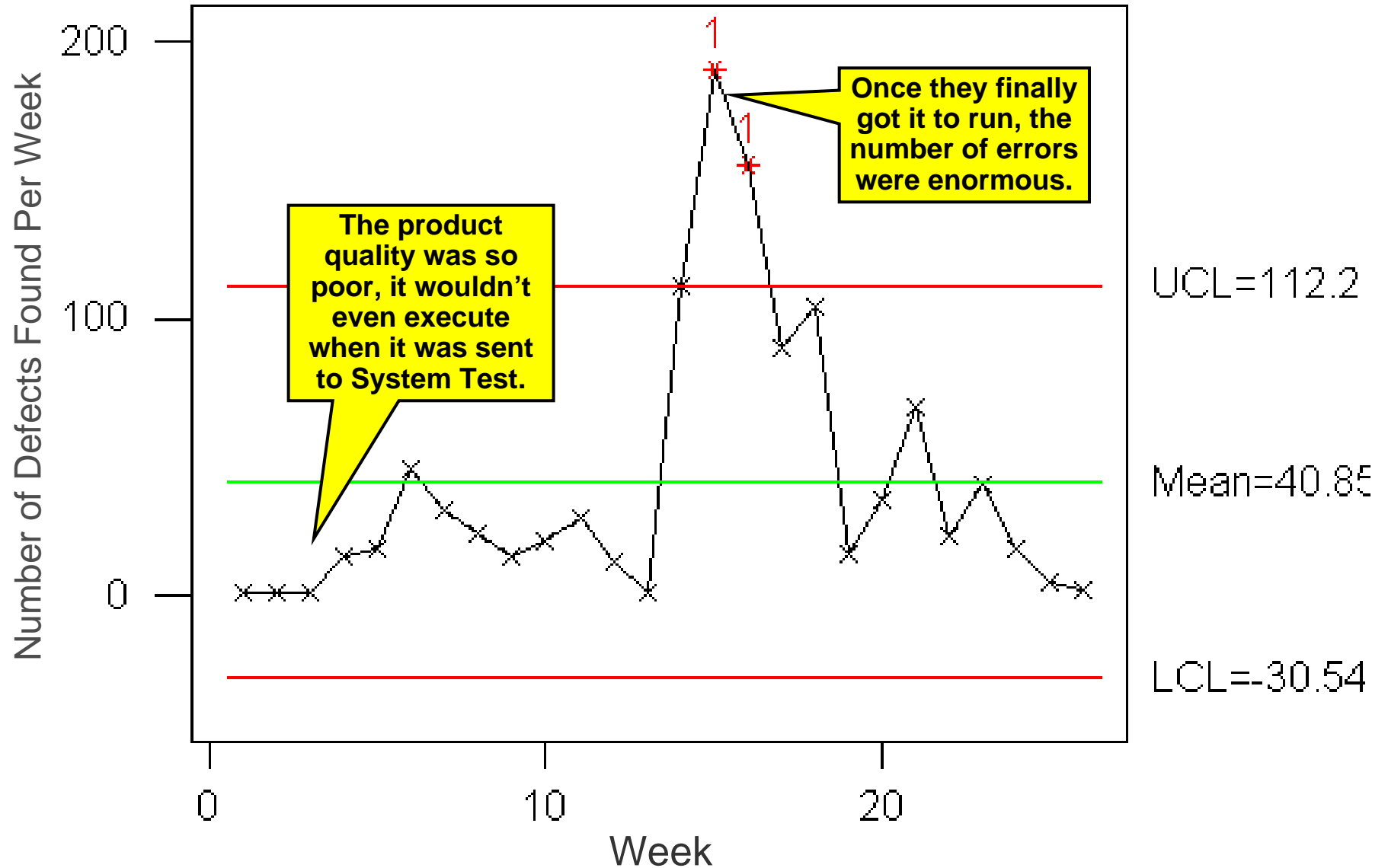
Severe and High by Release



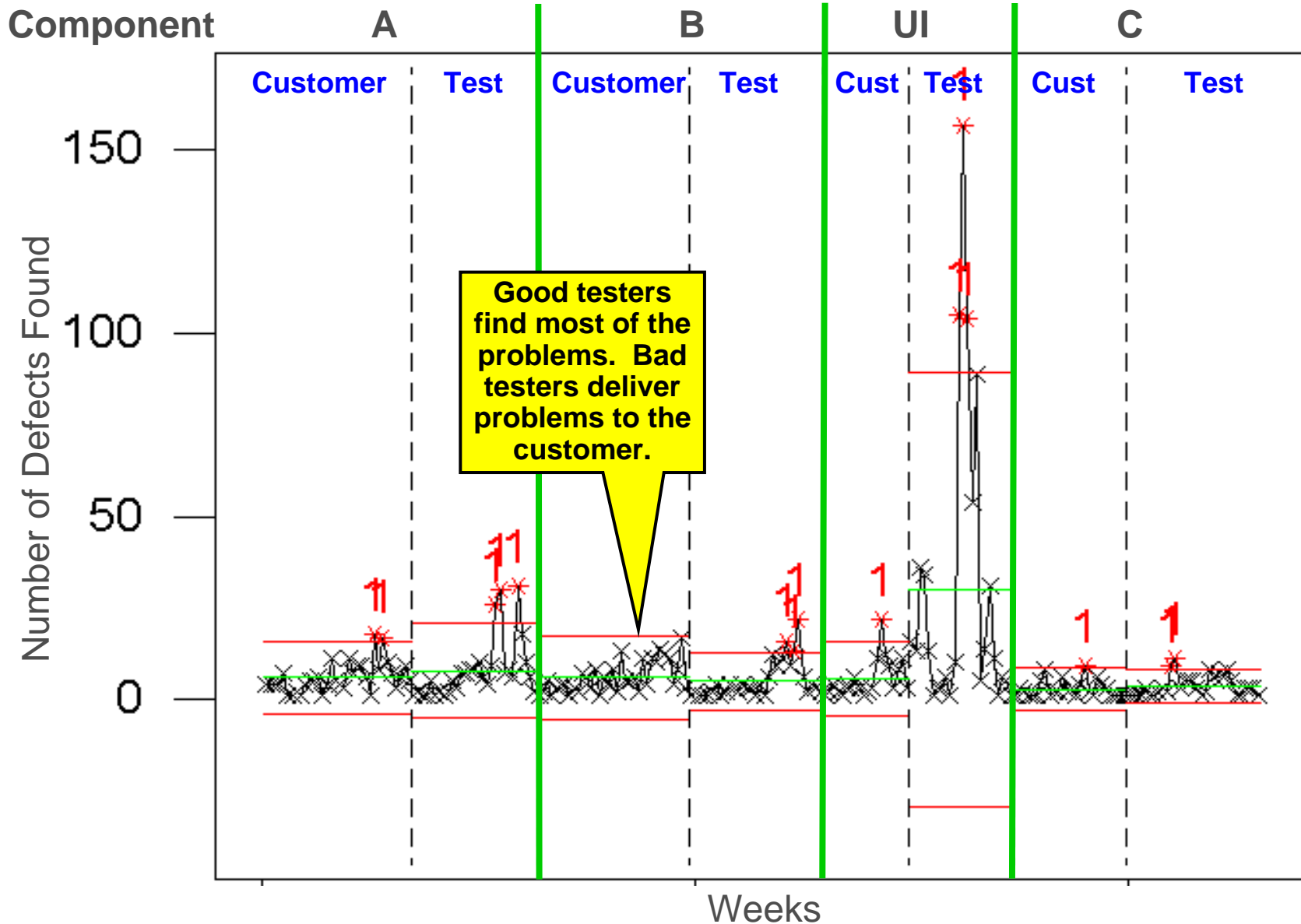
Investigate special causes. What happened on Release 2.1.

All releases had a similar number of Severe problems, i.e., no shift is observed; therefore Release 2.0's quality was just as poor, and was probably a smaller release.

Dig Deeper for Release 2.1

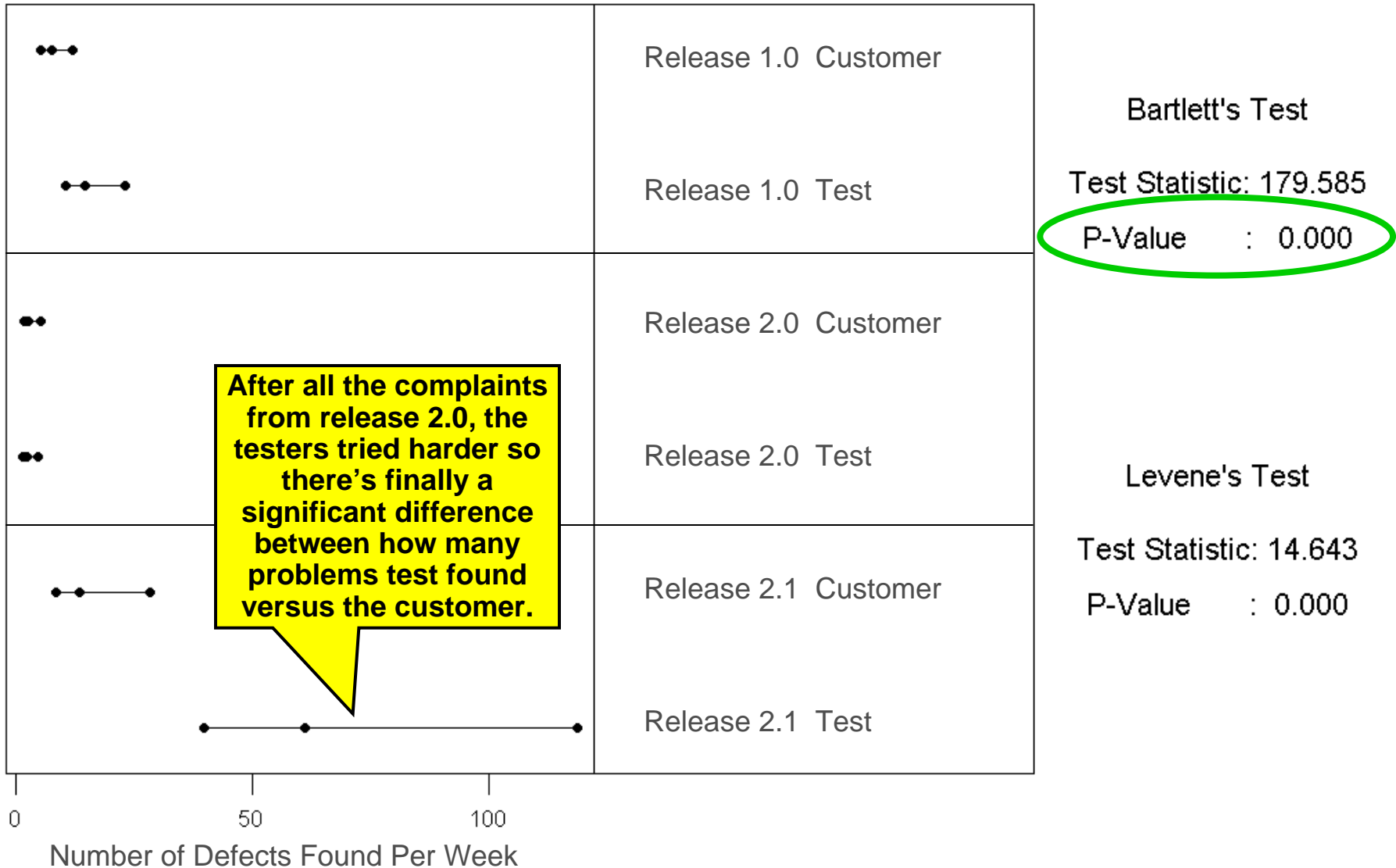


Disaggregate by Customer vs Test

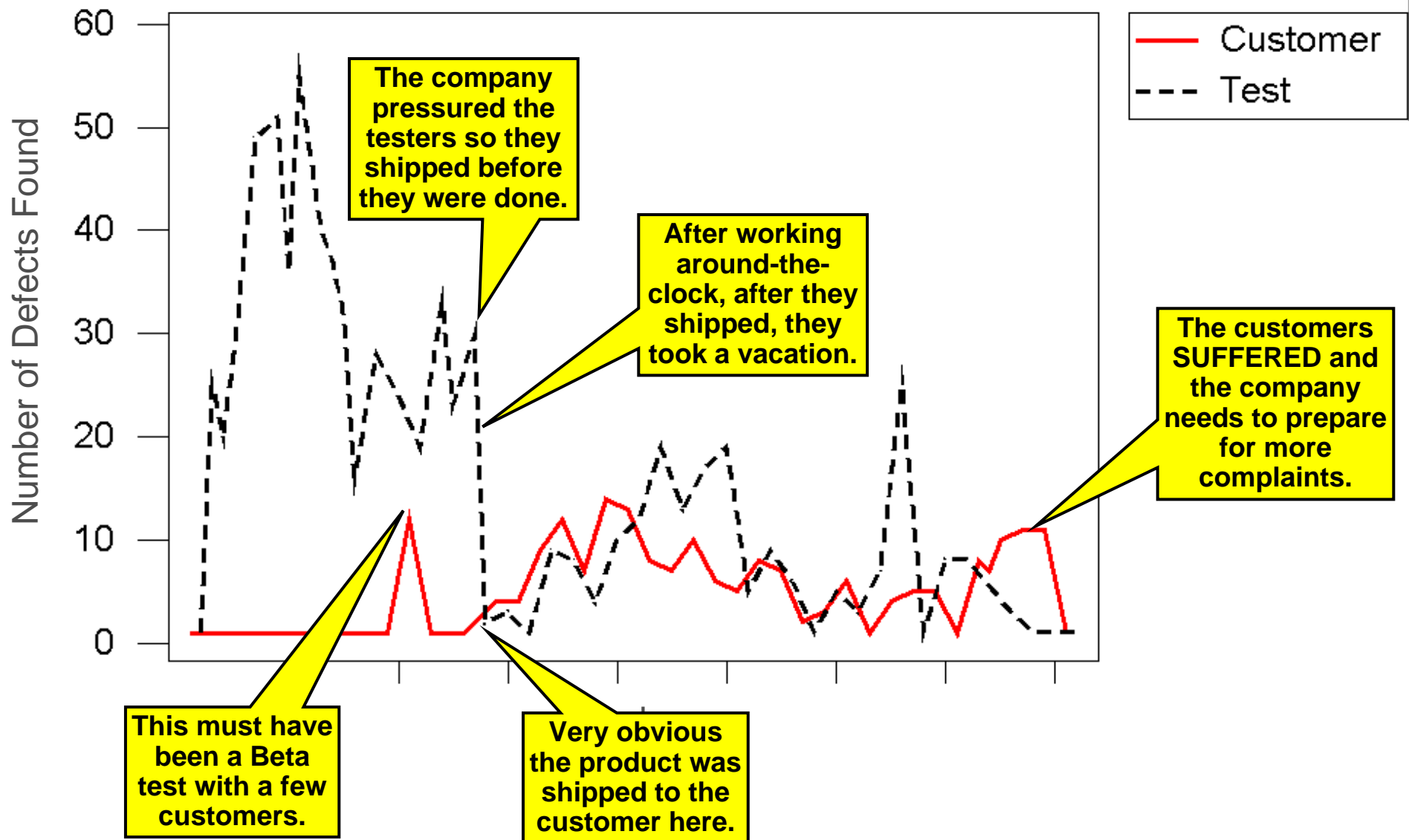


Who Finds Defects? Customer or Test?

Test for Equal Variance to check if variation differs between groups



Customer vs Test Release 2.1



The Story (1 of 2)

1 The company is a CMMI Level -5 company.

-5
CMMI Level

2 I would never buy their poor quality product



3 There are no processes, poor processes, or engineers ignore processes



The Story (2 of 2)

4 Engineers are pressured to deliver before the product is ready



5 Test may not be at fault; developers deliver poor products to test

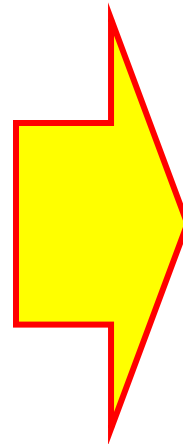


6 Customer complaints will continue until they see **CHANGE** and quality products



Summary

**No matter what
your opinions
are, always
analyze defects.**



**You'll be surprised how
much you can find.**

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