Measuring for Sustainability

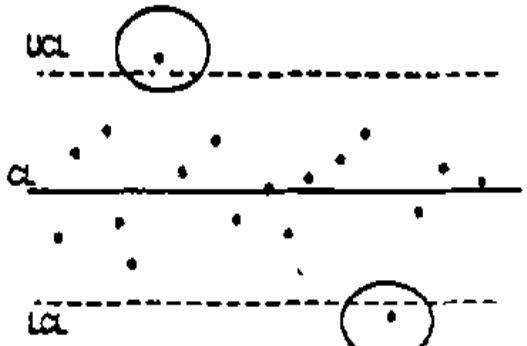
Moving towards monitoring

How do we know when we have achieved improvement?

Rules or determining a special cause

If data shows high auto correlation use only rule 1

1. A single point outside the control limits.

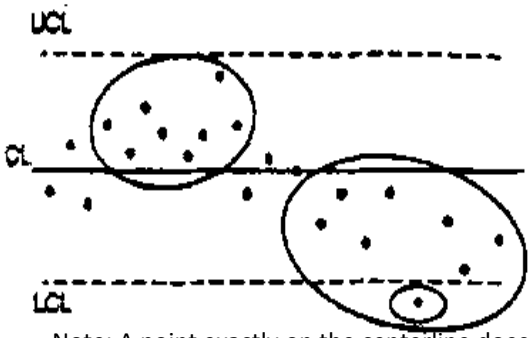


Note: A point exactly on a control limit is not considered outside the limit

When there is not a lower or upper control limit

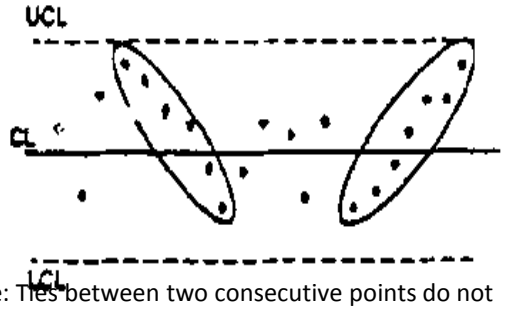
Rule 1 does not apply to the side missing limit

2. A run of eight or more points in a row above (or below) the centerline.



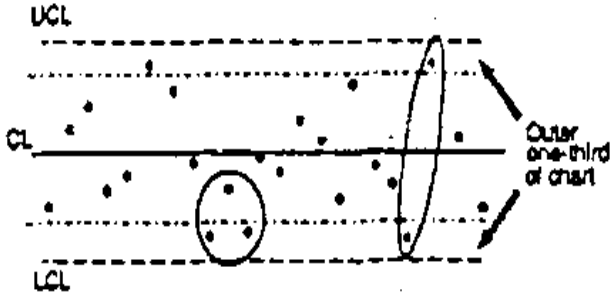
Note: A point exactly on the centerline does not cancel or count towards a shift

3. Six consecutive points increasing (trend up) or decreasing (trend down).



Note: Ties between two consecutive points do not cancel or add to a trend. When Shewhart Charts have varying limits due to varying numbers of measurements within subgroups, then rule #3 should not be applied

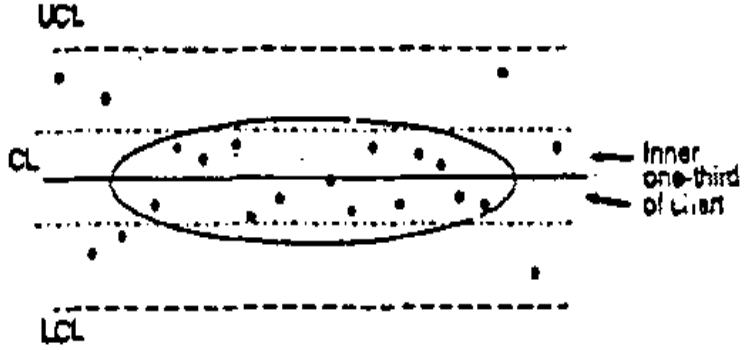
4. Two out of three consecutive points near (outer one-third) a control limit.

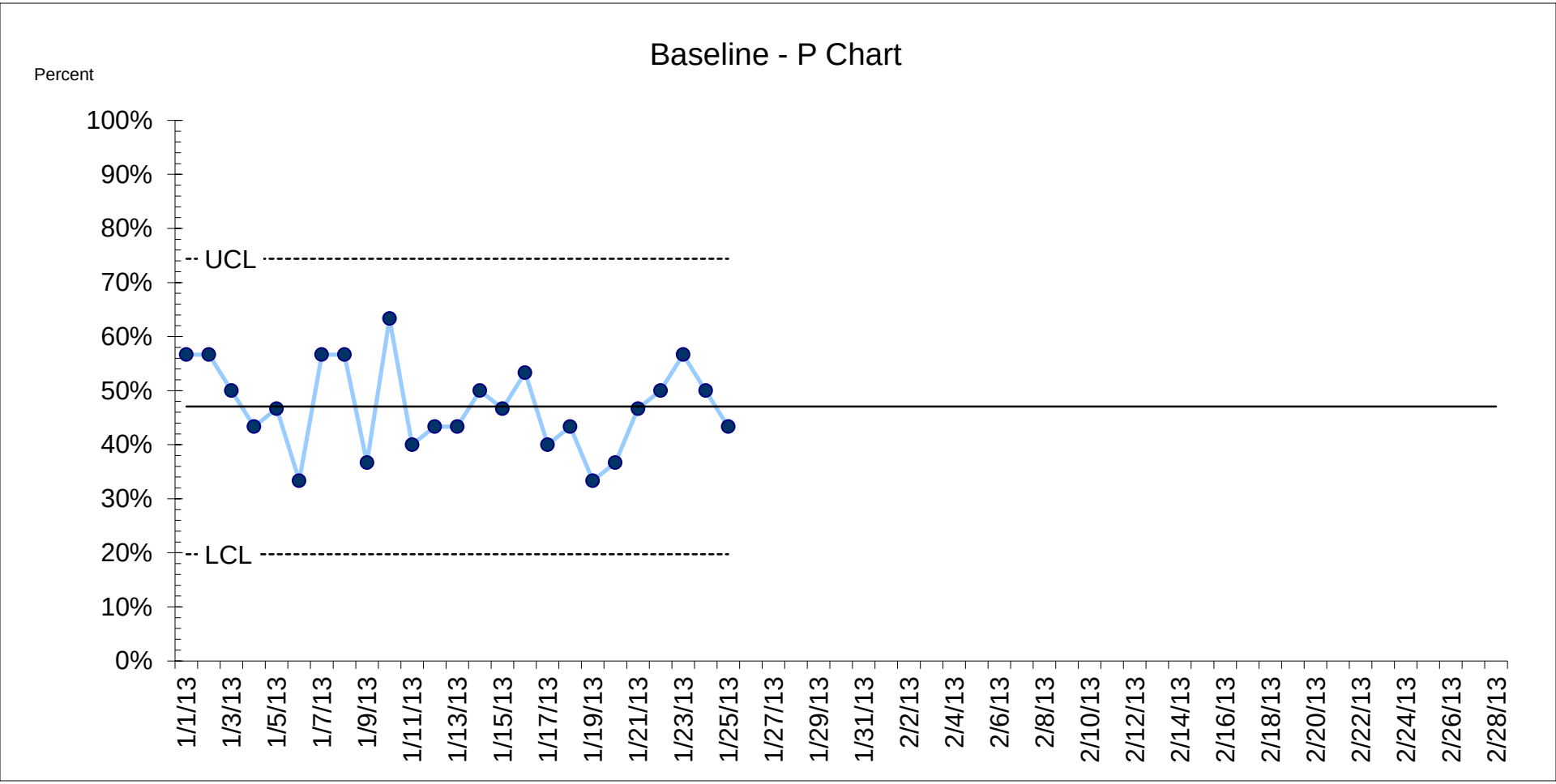


When there is not a lower or upper control limit

Rule 4 does not apply to the side missing limit

5. Fifteen consecutive points close (inner one-third of the chart) to the centerline.




Baseline - P Chart
Percent
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
UCL
LCL
1/1/13
1/3/13
1/5/13
1/7/13
1/9/13
1/11/13
1/13/13
1/15/13
1/17/13
1/19/13
1/21/13
1/23/13
1/25/13
1/27/13
1/29/13
1/31/13
2/2/13
2/4/13
2/6/13
2/8/13
2/10/13
2/12/13
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2/18/13
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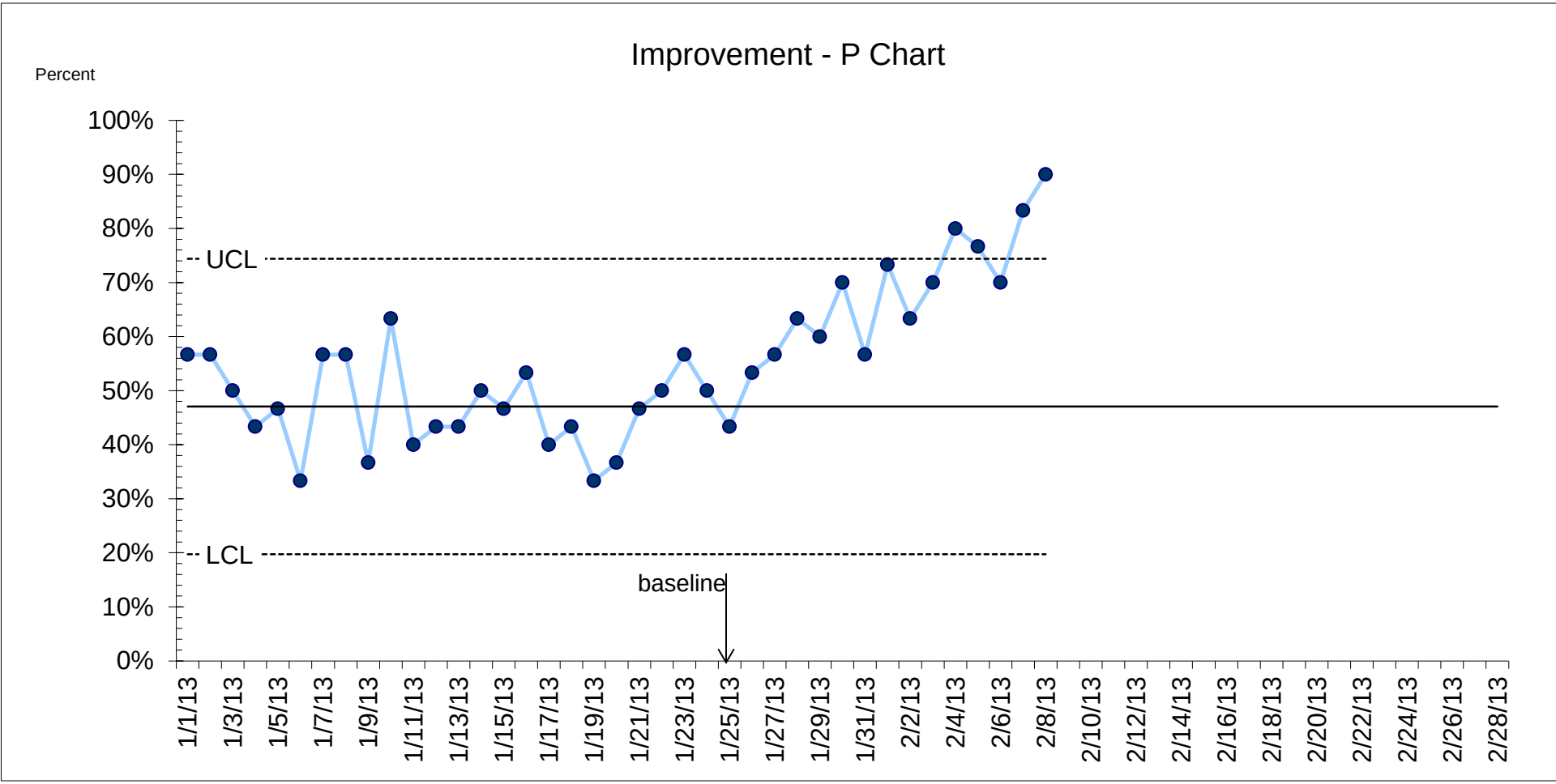
2/22/13
2/24/13
2/26/13
2/28/13



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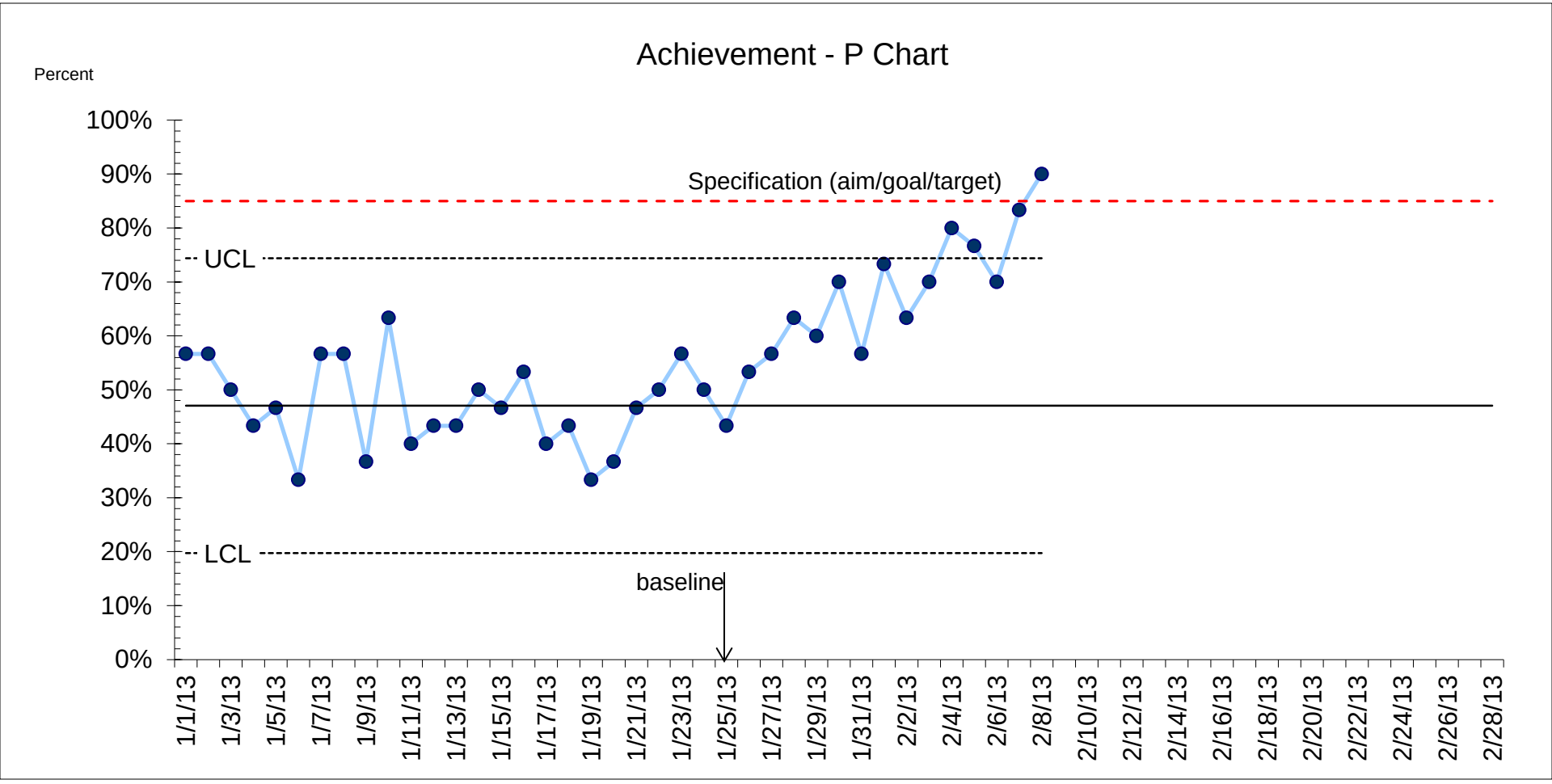

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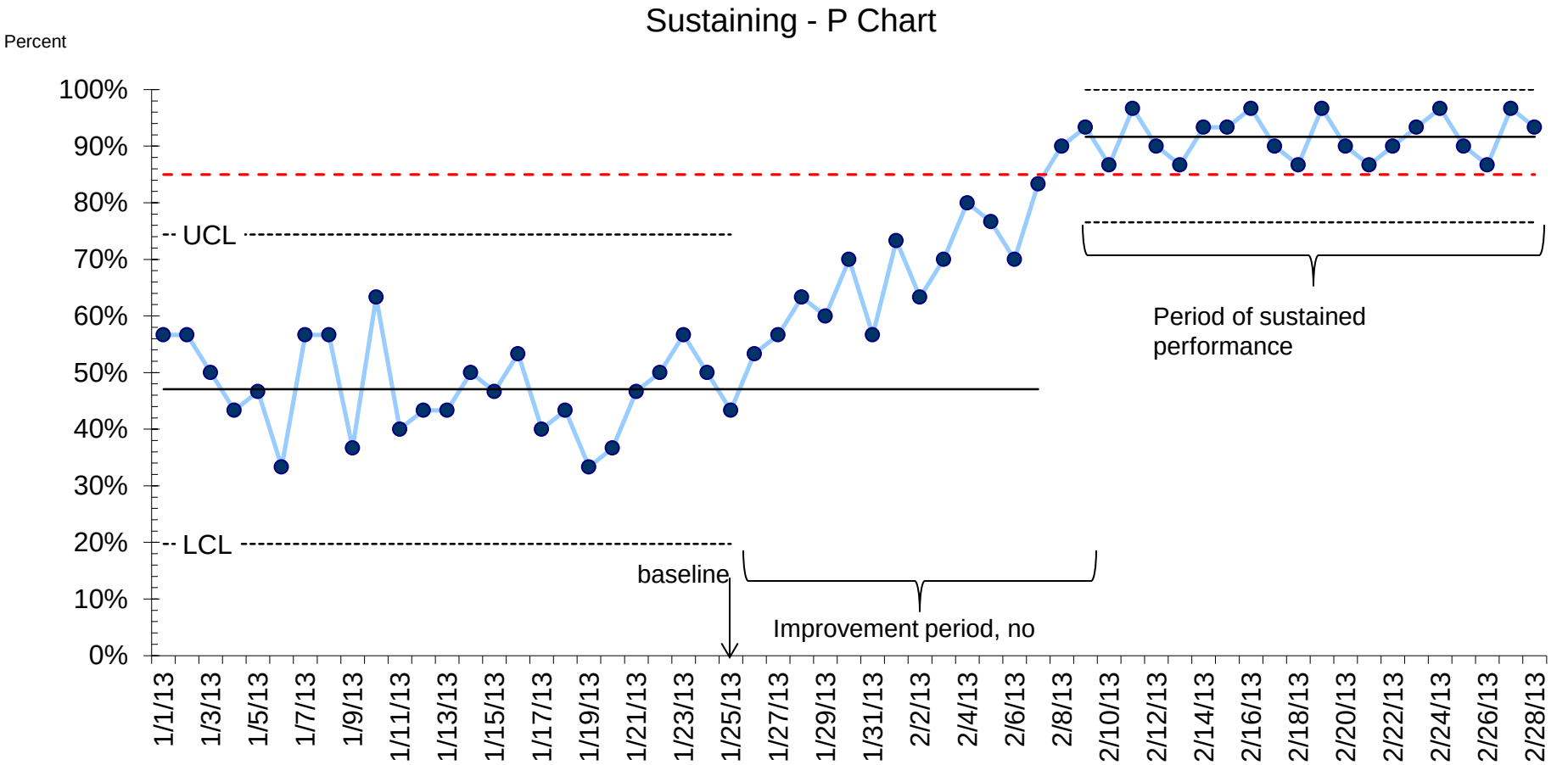
Sustaining - P Chart
Percent
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
UCL
LCL
baseline
Improvement period, no
Period of sustained performance
1/1/13
1/3/13
1/5/13
1/7/13
1/9/13
1/11/13
1/13/13
1/15/13
1/17/13
1/19/13
1/21/13
1/23/13
1/25/13
1/27/13
1/29/13
1/31/13
2/2/13
2/4/13
2/6/13
2/8/13
2/10/13
2/12/13
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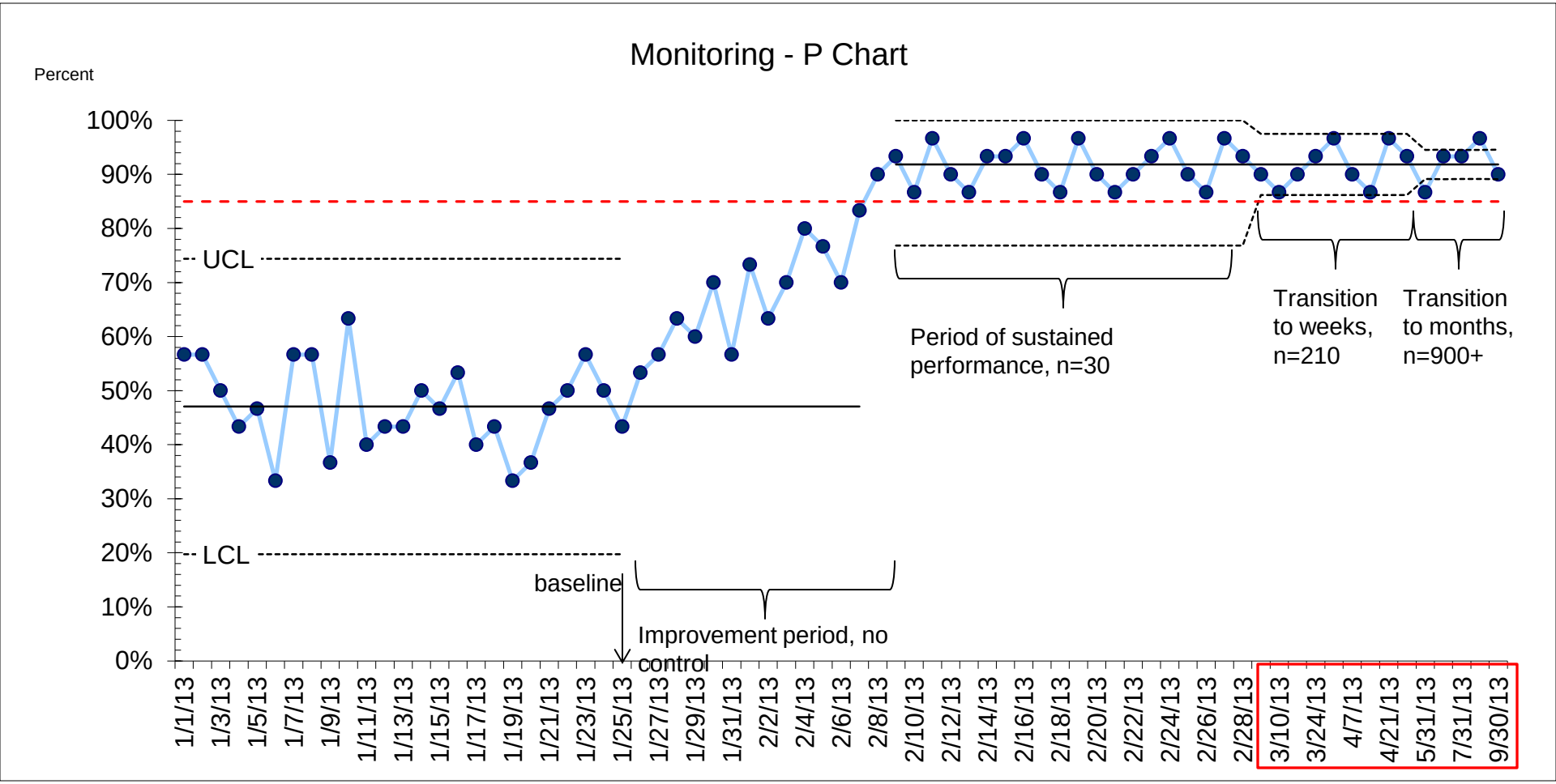
2/18/13
2/20/13
2/22/13
2/24/13
2/26/13
2/28/13



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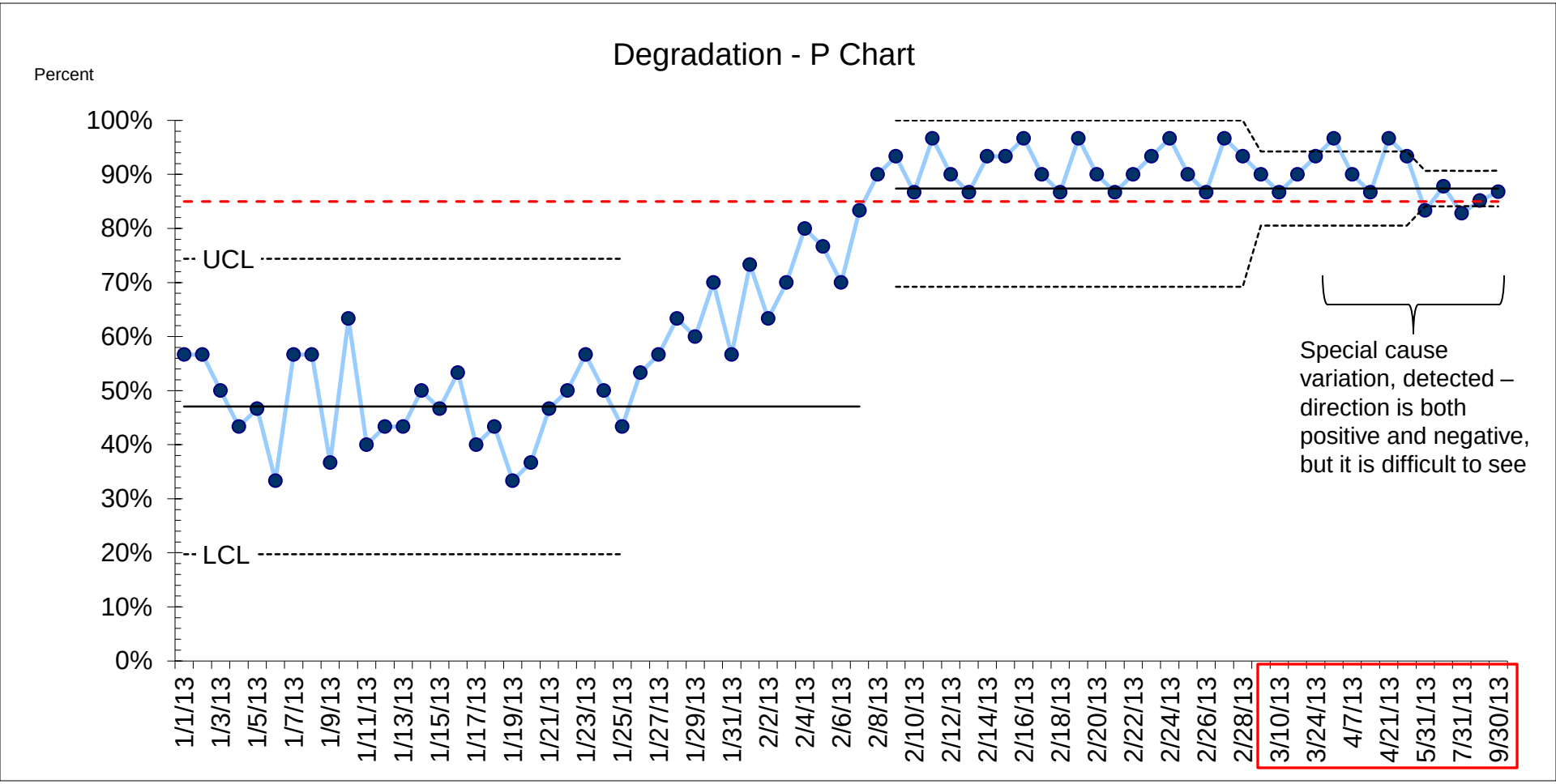
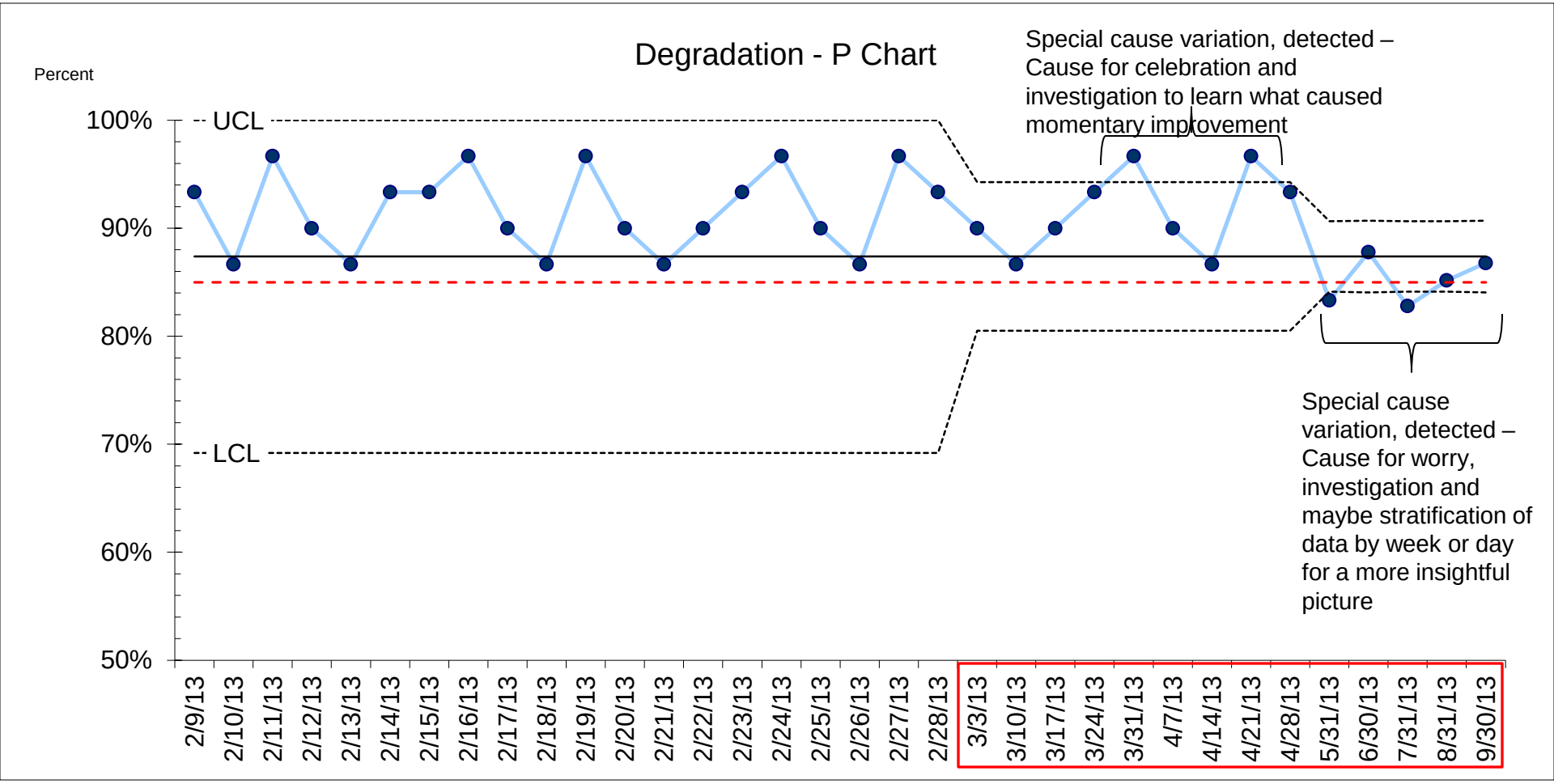

Degradation - P Chart
Percent
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
UCL
LCL
Special cause variation, detected – direction is both positive and negative, but it is difficult to see
1/1/13
1/3/13
1/5/13
1/7/13
1/9/13
1/11/13
1/13/13
1/15/13
1/17/13
1/19/13
1/21/13
1/23/13
1/25/13
1/27/13
1/29/13
1/31/13
2/2/13
2/4/13
2/6/13
2/8/13
2/10/13
2/12/13
2/14/13
2/16/13
2/18/13
2/20/13
2/22/13
2/24/13
2/26/13
2/28/13
3/10/13
3/24/13
4/7/13
4/21/13
5/31/13
7/31/13
9/30/13



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Break out

- Reflect on your measures:
- For each measure where are you in the life cycle of measuring and monitoring
- Which measures will need to be monitored long term
- How would a move to monitoring (step down approach) change your data collection strategy
- How would your data analysis and review strategies change as well