

## PAM Analytics Projects: Manufacturing

Many manufacturing processes require key process parameters, for example temperature and pressure, to be within well defined narrow ranges for the products to meet the required specification. If a parameter strays outside its permitted range, inferior quality products will be produced some of which may have to be rejected. It is therefore very important that manufacturing processes are controlled to minimise inefficient production, wastage and unnecessary costs. These objectives can be achieved by using real-time systems that monitor and analyse the processes' signals to identify when the signals are about to go out of range so that the problem can be identified and corrected.

PAM Analytics has developed a model for analysing in real-time the cycle times of injection moulding machines for manufacturing plastic bottles to detect when the cycle times are about to go out of range so that production can be stopped and the problem corrected. The model uses smoothing and simple forecasting techniques, and decision rules that specify when the cycle times are out of range.

Figure 1 shows a sample of 100 consecutive cycle times. The red observations are out of range and the blue observations are in range. Note how the smallest and largest cycle times are out of range and how the model identifies when the cycle times are back in range.

**Figure 1**

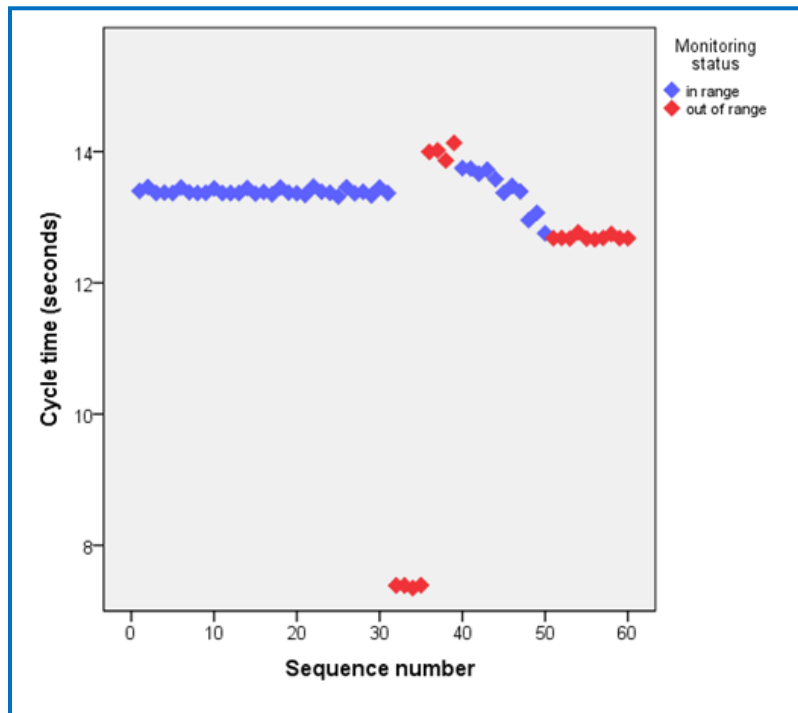


Figure 2 shows another set of 100 consecutive cycle times, all of which are in range.

**Figure 2**

