320a Industrial Implementation of on-Line Multivariate Quality Control

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Dow Chemical is committed to product quality consistency. To achieve this goal, a project on implementing multivariate quality control was launched. Robust principal component analysis (PCA) was applied to a historical quality data set to remove outliers. This study shows that robust PCA is more effective in detecting outliers than standard PCA. The remaining data, representing normal process variation, were used to build a PCA model. The main advantage of multivariate analysis is that PCA can detect a change in variable correlation, which is undetectable using univariate control charts (standard industrial practice). The T^2 statistic is used for fault detection and the contribution chart is used for fault identification. The model has been implemented on-line and proven to be effective in detecting and identifying abnormal product lots. This talk discusses development and implementation issues.