Achieving value from process intensification through better process control

The continual economic drive to achieve improved process efficiencies has made process integration and intensification a mainstay in process industries ranging from petrochemicals to biotechnology. However, from a process control viewpoint these integrated and intensified processes are much harder to control due to complex process dynamics and/or reduced degrees of freedom. As such, in many process industries the realized efficiency gain through integration and intensification is diminished. The objective of this article is to highlight some of the lessons learnt by the authors during their involvement in controlling intensified processes in different process industries. To this end two industrial troubleshooting case studies of a side-draw distillation column and a divided wall column are presented together with actual problems the facilities faced and how the solutions developed enabled them to be remedied within industrial limitations. This is followed by an analysis of the current process integration and intensification drive of dairy and bioprocesses. Finally the lessons learnt in these diverse process industries are summarized and its implication for process control discussed.