

J.J. de Boer *Novomoskovsk Carton Packing Line Speed Increase*
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The Russian detergent powder market grows 20% per annum. To be able to meet the increasing demand, the capacity of the Novomoskovsk plant has to grow. This report describes the process of a 20% capacity increase on three of the carton packing lines. In August 2004 the speed of the three lines was increased from 250 cartons per minute to 280 cartons per minute. In September 2004 this speed was further increased to 300 cartons per minute. The stepwise plan to analyse this speed increase is presented in figure 1 and discussed below.

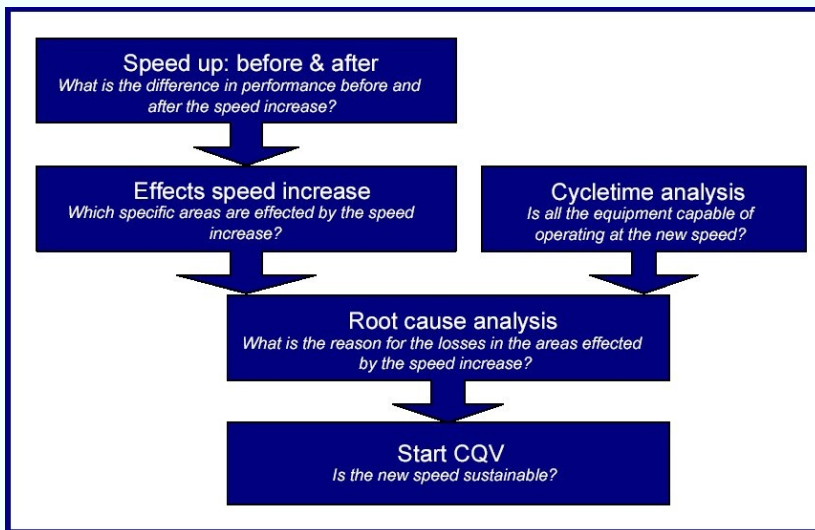


Figure 1, Stepwise action plan

The first step, *Speed increase: before & after*, shows that the speed increase has had a significant effect on the process reliability.

In the second step, *Effects speed increase*, four areas of the carton packing line are identified as being affected by the speed increase. This means that on these areas process reliability losses increased after the speed increase. These four areas are the carton opener, quality of materials, the case packer and the filler head.

The next step, *Cycletime analysis*, is done before the root cause analysis in order to check if all pieces of equipment can operate sustainably at the new speed of 300 cartons per minute. The conclusion of the cycletime analysis is that none of the currently installed pieces of equipment will cause problems at a speed of 300 cartons per minute, except the stretch wrappers. The report recommends investing in extra stretch wrapper capacity on a short term.

In the fourth step, *Root cause analysis*, the origin of the increased losses on the four areas identified in step two is analysed. A steel guide in the filler head is identified as the root cause for the increased losses in this area. The increased losses on the case packer are the result of a varying thickness of the cartons. This variation is caused by a lack of a proper functioning mechanism to check the weight of the cartons. On the carton opener a focus improvement project in combination with the construction of a checklist should bring the process reliability back to the level before the speed increase. The increased losses on the fourth area, quality of materials, are caused by the fact that suppliers deliver cartons of insufficient quality. New measuring equipment needs to be bought in order to assess the quality these suppliers.

In the last step, *Start CQV* (Commissioning, Qualification and Verification), validating the three lines at the new speed of 300 cartons per minute is commenced. Three tests are performed: an induced failure test (passed), a binomial SPRT (Sequential Probability Test Ratio) (failed) and a sequential MTBF (Mean Time Between Failures) test (passed).

The report ends with the conclusion that the new speed leads to a sustainable capacity increase if the action plan presented in this report is implemented. A financial comparison between this project and the acquisition of a whole new line is given as well.