Rubber Seals Manufacturer solves quality issues with effective rubber compound mixing procedures

The Client Situation
Our client, a major rubber products manufacturer, had recently been acquired by a large multinational group. A number of new strategic partnerships were generating a sharp increase in demand for the company’s industrial seals.

Business Challenges
The seals production unit was not coping with the surge in demand. A significant increase in labour hours had generated only a marginal increase in output volume. The order backlog and delays were increasing alarmingly, as were customer complaints for delivery-on-time and quality.

An already compromising situation for the company was becoming a major embarrassment for its new owners, as influential group-level customers were becoming increasingly unhappy and vocal about the situation. Our group level client, the European Manufacturing Director was under immense pressure to address the situation quickly.

The Issues
Our operational assessment in the seals production area found that impurities in rubber compounds were one of the main causes of seal production inefficiencies and quality problems.

Although not part of our initial programme scope, the significance of the rubber quality problems meant that a separate implementation was necessary in the rubber mixing department. This was immediately authorised by our client.

The rubber mixing plant supplied a number of internal production units and external customers all of whom had very different rubber compound specifications and purity requirements. At that time, there were 5 rubber compound families, 271 different rubber compounds, over 200 ingredients.

The high purity requirements of the seals production unit were not being met and this manifested itself as:
- A large amount of process scrap and running problems at injection moulding and compression moulding machines.
- Product contamination which could only be identified after the final tube cutting process. Orders failing inspection at this stage were placed into quarantine.
- A growing number of quarantined orders requiring 100% inspection and sorting. The failure of the MRP system to track works orders through the production process meant that the quarantined order backlog was not managed; in fact it was called the “black hole” by production staff. Sorting was very labour intensive and resulted in further delays in deliveries. After sorting, component rejections often meant that customer order quantities could not be met fully.

To avoid contamination, the rubber mixing plant had very specific cleaning requirements, which were dictated by the rubber compounds that the mixer was being changed from-to. However, only very general cleaning rules were applied consistently and any additional cleaning was left to the discretion of an expert operator on each shift. Production plans did not consider the optimisation of cleaning requirements when sequencing rubber production.

There was no supervision of cleaning activities and no traceability or individual accountability within the mixing department for quality failures.

Solutions Implemented
By physically observing the rubber mixing machines during compound changes, our consultants were able to define all possible contamination points.

Working with the company materials technicians, the consultants developed procedures for each type of compound change, detailing the precise machine areas to be cleaned and the standard of cleaning necessary.

A Cleaning Requirements Matrix was also developed which indicated the cleaning procedure that should be applied for every possible rubber compound change combination.

The new production planning system utilised the Cleaning Requirements Matrix to sequence rubber compound production in a way that minimised the amount of cleaning necessary and reduced the risk of contamination. New production schedules provided a clear indication of the specific cleaning procedure applicable for each rubber compound change.

Extensive training in the new procedures was provided to mixing operators and staff. In addition, Active Process Supervision™ was implemented so that supervisors continuously followed-up the mixing activities, making sure that cleaning and other procedures were being fully adhered to.

Finally, batch traceability was extended to include the supervisor and shift which carried out the rubber compound change, thus introducing accountability for quality performance.

Results Delivered
The improvement in rubber compound quality was evident everywhere; running problems at moulding machines were dramatically reduced as was the number of tubes scrapped. Post-implementation and over the whole follow-up period, no seals orders were quarantined at final inspection.

The rubber quality improvement was widely acknowledged as being one of the main contributing factors to the output and quality excellence levels achieved in the seals production unit.

Combined with improvements in seals production efficiency and production planning, seals output had increased by more than 60% (with the same number of employees) and was continuing to rise.

See the Operational Performance Improvement graph overleaf.
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About Action Management Consulting
Action Management Consulting is an international consultancy firm focused exclusively in the manufacturing sector. Combining unparalleled operational improvement skills and experience from all process types, Action supports clients to realise the immediate opportunities in their manufacturing operations.

We deliver unprecedented performance improvements and financial results in all operational areas of the production, maintenance, procurement, engineering and supply chain functions.

Our second key focus area is to increase growth and profitability through excellence in commercial activities. We also provide expert support in special client situations such M&A activities, failed improvement programmes, underperforming capital investments and ERP implementations.