



KÜMAŞ IDENTIFIES OPERATIONAL EFFICIENCIES TO ACHIEVE GROWTH

DuPont Sustainable Solutions uncovers financial opportunities worth US\$57MM

In January 2012 one of Turkey's largest holding companies, Yıldız Holding, decided to acquire Kümaş Manyezit Sanayi A.Ş. – Turkey's leading producer and supplier of refractory products for steel, cement, glass, lime, non-ferrous and other industries. Operating from mines in Eskisehir, Bilecik and Kütahya, Kümaş is the largest producer of DBM, fused magnesite, refractory bricks and mortars in Turkey. It also holds the majority of national ore reserves. With revenues of US\$132MM in 2012, Kümaş is nonetheless a relatively small company operating with around 1000 employees and a few hundred contractors. Its market position is largely due to the quality of its product.



To gain a more thorough understanding of the state of affairs and any possible issues at Kümaş, Yıldız Holding invited several consulting companies to bid for assessing operations in March 2013, in the end choosing the consulting arm of DuPont, DuPont Sustainable Solutions (DSS), for its experience as an international owner operator. Although the initial focus was on evaluating Kümaş' energy efficiency, the scope of the consulting project soon widened to include operations and quality, maintenance and reliability, supply chain, capital effectiveness and safety.

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WHAT WAS AT STAKE

DSS engagement leader René Hulleman recalls what his team found during its six month diagnostic. “Kümaş was just at the point of taking the step from a smaller company to a large organisation, so it was not surprising that we found many of the issues that smaller companies face, from a lack of energy monitoring and absence of predictive maintenance to internal supply issues. This meant Kümaş had no idea what their production cost per unit was. We rapidly uncovered financial opportunities with a recurring value of US\$57MM in the areas of energy management, maintenance and reliability, operations and quality management, and capital projects management. We believed US\$26MM of this could be captured within two to three years. We also identified a further US\$8.2MM of one-off savings specific to supply chain management and warehousing.”

Capitalising on these opportunities required some changes and a roadmap to help Kümaş achieve them.

In 2012, accidents and incidents were threatening the company’s operations. As Hüseyin Gürcan, former general manager says: “The frequency of work accidents was high and that disrupted production and affected productivity.” In the melting facility, employees repeatedly lost limbs. There were also a large number of work accidents at the fused magnesia facility and even a fatality in 2012.

In addition, plant utilisation and performance was below the holding company’s expectations, and the lack of experienced personnel and a low retention rate made it difficult to maintain a capable workforce focused on continuous improvement. As there was also no viable structure or framework in place to deal with these issues, day-to-day operations in the company were dominated by a fire-fighting approach.

To show Kümaş how quality could quickly be improved, DuPont ran two so-called Value Accelerator workshops as part of its assessment. These five-day workshops took an in-depth look at two of the opportunities for improvement Kümaş had. The first focused on high quality sintering magnesia production ratio, second one reducing change press mold time during brick production. As Kümaş manufactures different sized bricks in a variety of moulds, one of the Value Accelerator workshops examined reducing the change-over of moulds.

But these Value Accelerator workshops were just the start of a much more targeted two-year programme aimed at transforming safety and operations at Kümaş.

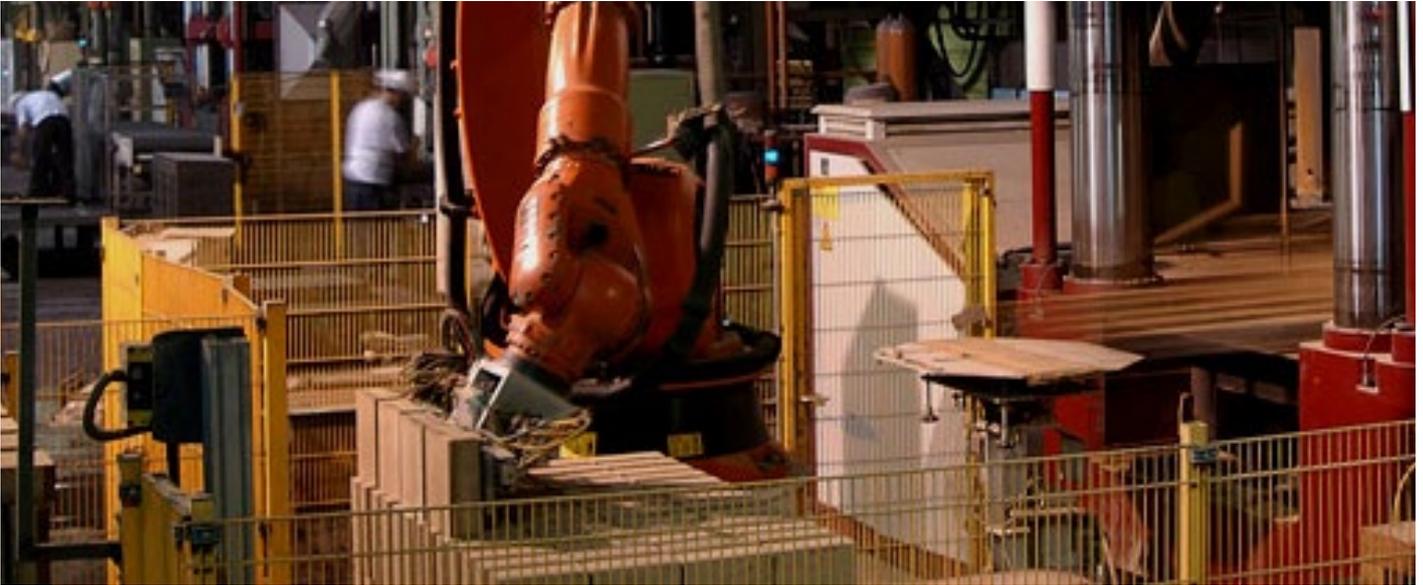
KÜMAŞ CHANGES...

- *Training in operational effectiveness best practices*
- *Continuous improvement project governance system introduced*
- *Focus on leadership and culture through line walks, performance dialogues, 5S*
- *Data-driven approach to analysing problems, root causes and benefits*
- *Clear communication of well-defined KPIs*
- *Improved risk perception and safety skills*
- *Energy monitoring and management launched*
- *Predictive and preventive maintenance put in place*
- *Value Accelerator workshops focused on key quality issues*

... SHOW RESULTS

- *60% reduction in workplace safety accidents*
- *50% cut in accident frequency rate*
- *Energy savings of US\$1.8MM in 2015*
- *Continuous improvement projects save US\$1.5MM in first 9 month of 2015*
- *A further US\$6.5MM in continuous improvement savings identified*





CHANGING ATTITUDES TO SAFETY

Barkin Minez, who worked at Kümaş as engineering manager at the time of the DuPont consulting project, describes his experience. “When representatives of DuPont Turkey, and some experts from abroad first came to our factory, we saw people who tightly held onto handrails, tried to lock the wheels of the chairs in meeting rooms, and wore goggles even when they were not close to machines while walking around the plant. Now, I must admit that I thought it was all showing off for business purposes. By the end of the three year period, I have found myself advising my children and others in the apartment building to hold handrails tightly, and thus been considered a strange person by other kids’ parents. Of course, DuPont did not give us training particularly about stairways, but even if it was late in the day, I have come to understand that this [safety] is a way of life, not just an approach to work environment.”

“ *Until we visited DuPont plants in Belgium and the Netherlands, ‘Zero Work Accidents’ seemed an unachievable target... I can say that visit changed the way I look at my whole life. I saw with my own eyes that the DuPont methodologies are not just abstract theories, but can be achieved by determined work, that work accidents and other errors are not inherent to the nature of work, that they can be prevented.* ”

“They were always talking about methodology,” he continues, “saying that each work process has to have a detailed methodology. I was thinking that Kümaş was a 40 year-old successful enterprise, had always been and will always be good. However, although the company improved each passing year, it still had major deficiencies particularly in the area of occupational safety. Maybe we thought it was the inherent nature of the work. For work at height, we were not allowed to use a crane and were asked to have personnel get in digger buckets and solve the problem that way. Even though there were miles of conveyor belts at the factory, we were not allowed to build maintenance platform for newly made belts and we had to call fire department in the middle of the night in order to repair some of it. It feels strange when I think about it today, but we used to use rubber-wheeled diggers to build load bearing pillars and even the roofs of some buildings at Kümaş. In 2005, a mechanical engineer colleague had opened an order and I had approved the purchase of the first work shoes and work clothing. This request was rejected by the purchasing manager. His justification was that purchasing such items was not usual practice and that contractors should pay for them out of their own pockets. When our workers were given work shoes and work clothing no more than 50 per cent actually wore them.”

DuPont changed all that by first using structured interviews and focus groups to understand the mind-set that was driving employees’ behaviour and to measure the cultural maturity of Kümaş. This allowed the consulting company to build a profile of the workforce’s critical values and attitudes to safety and operational excellence in the company. DSS then held

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mirror workshops for all senior management to refresh and emphasise the value of safety and to highlight the key role that leaders play in moving an organisation from a culture of compliance to one of commitment out of conviction. Next, the consultants held sessions for all employees to give them an opportunity to discuss potential barriers to the envisaged future. Finally, DuPont developed an organisational blueprint to accompany Kümaş on a journey of continuous improvement in the short term and to address the more complex, longer-term business needs.

“Until we visited DuPont plants in Belgium and the Netherlands, ‘Zero Work Accidents’ seemed an unachievable target,” Mr Minez says. “I can say that visit changed the way I look at my whole life. I saw with my own eyes that the DuPont methodologies are not just abstract theories, but can be achieved by determined work, that work accidents and other errors are not inherent to the nature of work, that they can be prevented. There were so many well thought-out practices, which are very easy to implement, that I must say that I was very impressed. All of these practices valued people, introduced quality in the plant and created commercial value for the company. It is possible to give many examples but I thought it was great that they had statistically calculated that a maintenance employee spent one fourth of his entire work period looking for tools and materials. The maintenance kits DuPont had prepared, the maintenance tool station set-up in the plant, and the material warehouse system were all brilliant.”

“Today, Kümaş is a plant where you see the work accident evaluation panel even at the main entrance, and you cannot see a single person, including the general manager, without protective equipment.”

This was not just achieved through a visit by senior safety staff and engineers to DuPont sites in Belgium and the Netherlands, but by tackling the issues Kümaş had head on. At the time of the initial operations assessment in 2012, safety was not seen as a leadership responsibility, nor were safety systems such as incident report and investigation used effectively. DuPont set out to change the reactive safety

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management approach to a more proactive one by focusing on improving visible management, line accountability, improved incident investigation, progressive motivation, a more integrated organisation and a behaviour-based safety model. This was achieved amongst others by field coaching management and getting senior leaders more involved in safety initiatives such as safety tours, safety meetings and risk assessments. DuPont also put in place and tracked safety KPIs, defined and implemented safety rules, standards and procedures and set up an integrated safety organisation with a central safety committee, sub-committees and task team. As Mustafa Çavaç, manager of continuous improvement projects and quality says, “DuPont has proved that the consulting service was based on actual experience and not just on books. Safety has become a priority. Employees accept the fact that the potential for accidents decreases if the correct measures are taken. The old ‘fate-based’ approach no longer exists. Employees now volunteer and want to take part as they see the personal benefits.”

OPERATIONS IMPROVEMENTS

Kümaş underwent similar changes in operations after DuPont identified sources of inefficiencies and developed systems to anticipate or counteract these. Together with DuPont, Kümaş set up 24 continuous improvement projects (CIPs) to address operations and quality concerns. DSS project manager Jan Teuwen explains: “CIPs are not capital intensive, but they are resource heavy. However, they are very useful for addressing key areas, setting milestones, keeping an eye on completion dates and tracking expected savings.”

He also points to other changes. “Many processes have been improved,” he says. The supply chain organisation underwent an overhaul, which saw the implementation of best practices and processes, the introduction of a new supply chain organisation, a new inventory control procedure and the launch of a capacity and uptime model for presses.

Mr Çavaç again: “The value accelerator related to reducing downtime in presses was successful. The support provided by DuPont for the supply chain was very good. I can see that now when I look at the existing applications. DuPont also implemented a changeover to a central maintenance unit, but it is still too early to say how well that will work.” In this area, DuPont introduced predictive and preventive maintenance to pre-empt the fire-fighting needs of the past.

Other improvements were made in energy consumption. Mr Çavaç says, “Together with DuPont we identified high energy consumption measurement areas and assembled tools according to a plan. We have achieved much better efficiency in energy

management by monitoring energy use in the rotary kiln, the pilot area for this project. And we have initiated central energy management activities as a model for the entire plant.”

All in all, Kümaş initiated a total of 24 continuous improvement projects with the help of DuPont. These have already achieved an energy saving of US\$2MM in 2015. In the first nine months of 2015, completed continuous improvement projects saved a further US\$1.5MM with a total savings potential of US\$8MM predicted once all 34 continuous improvement projects are completed.

The current general manager, Mehmet Şevket Erol, sums the site’s new understanding up as follows: “We believe that a continuous improvement culture is essential for any manufacturing plant. We know that we can only reach this common objective if all employees are engaged and we have a strong team culture. With a safety and efficiency-focused structure of continuous improvement project teams consisting of people from different disciplines, our entire work performance culture has changed. With this structure, we believe Kümaş is in a position to continue its transformation journey and will reach its objective.”



ABOUT DUPONT

DuPont Sustainable Solutions (DSS) is one of 8 DuPont businesses. Bringing customers the benefits of an integrated global consulting services and process technology enterprise, DSS applies DuPont’s real-world experience, history of innovation, problem-solving success, and strong brands to help organisations transform their workplaces and work cultures to become safer, more operationally efficient and more environmentally sustainable. For more information, visit our website at: www.sustainablesolutions.dupont.co.uk

DuPont (NYSE: DD) has been bringing world-class science and engineering to the global marketplace in the form of innovative products, materials, and services since 1802. The company believes that by collaborating with customers, governments, NGOs, and thought leaders we can help find solutions to such global challenges as providing enough healthy food for people everywhere, decreasing dependence on fossil fuels, and protecting life and the environment. For more information about DuPont, visit: www.dupont.co.uk

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