

Case Study

Hanson Desford lays foundation for consistently high quality brick production

A new vacuum pump installation improves product quality and saves £8,000 pa



Situation: Quality producers of building products and construction materials

Challenge: To produce quality, durable products

Requirement: A system that ensures consistency in manufacturing

Solution: A custom designed vacuum pump

Benefits: High quality brick produced

Hanson Desford is a leading supplier of heavy building materials to the construction industry in the UK. The company is part of the Heidelberg Cement Group. It produces aggregates (crushed rock, sand, and gravel), ready-mixed and precast concrete, asphalt and cement-related materials and a range of building products including clay bricks and roof tiles, concrete blocks and pavers.

These construction activities are operated over 350 manufacturing sites and employ more than 6,000 people. In the production of building products, which is one of its 3 business lines, Hanson uses abstracted ground and surface water and mains water for its construction activities. The water is recycled within the process and a high percentage is often returned to the natural system. In the production of bricks a vacuum is required when extruding the clay mix in order to remove all of the air cavities. If air pockets are present in the clay they tend to get squeezed out flat and lead to a fault known as "laminations" which will cause cracks in the following processes of drying and then firing.

Situation: Problems with the performance and wear rate of a vital vacuum pump

Hanson uses abstracted ground and surface water and mains water for its construction activities. The water is recycled within the process and a high percentage is often returned to the natural system. In the production process, a vacuum is required when extruding the clay mix to remove all

"Bennett is a well-known supplier, with a good reputation for quality, who we have used before on similar jobs"

**Steve Godfrey, Works Manager,
Hanson Desford**

Case Study

of the air cavities. If air pockets are present in the clay they tend to get squeezed out flat which leads to a fault known as "lamination". This can result in cracks in the drying and firing process, and even failure in situ due to frost damage. Hanson Desford engaged Bennett Engineering Design Solutions Limited to design and project-manage a solution to resolve the problem of intermittent breakdown of vacuum pump.

Challenge: Efficient vacuum pump needed to ensure uninterrupted production

Hanson Desford operates a vacuum pump that uses cold water to form a seal between the fixed and rotating parts of the pump. To get the best quality the water has to be clean and cold to prevent wear and destruction of the vacuum. A small quantity of water is needed to feed the vacuum pump, and this water is discharged along with the air drawn from the clay.

However, an existing vacuum pump used water constantly pumped from a quarry, and impurities in this water caused:

- > **A premature failure of the pumps, lasting only 3 to 6 months**
- > **Loss of vacuum in hot weather due to system overheating**
- > **Poor use of energy to pump water for cooling from the recycled water tank**
- > **Reduction in water usage**
- > **An estimated replacement cost of £6,000**

Requirement: A system to improve quality of water supplied to the vacuum pump

A system to improve quality of water supplied to the vacuum pump. A clean and cold water is required from the vacuum pump to ensure the production of quality bricks. The quality of water prevents air cavities that can cause bricks to crack during drying and/or firing. Hanson Desford required a system that would improve the quality of the water supplied to the vacuum pump to an acceptable level, and at an economic cost.

Solution: A closed loop thermostically controlled cooling system

Bennett Engineering investigated the existing vacuum pump and identified that the pump could not tolerate impurities or warm water. Bennett designed a closed system, with a separate thermostically controlled cooling system to stop the water temperature building up. In collaboration with equipment suppliers, Bennett Engineering designed and installed a new water tank, which allowed the use of clean mains water.

"From experience I knew that filtering water and removing impurities can be difficult and expensive. I worked with equipment suppliers to specify the correct size of cooling plant necessary and designed the new water tank"

John Bennett, Founder/Principal
Bennett Engineering Design Solutions Limited

Benefits: Correct Designed vacuum pump prevents brick defects

Bennett Engineering asserts that the new system has comparatively proved reliable. For Hanson Desford, the project has generated a number of benefits;

- > **An estimated savings of £16,000 (£8,000 annually) after 2 years when the project is expected to be repaired**
- > **Greater water availability for the rest of their plant**
- > **Saving on energy on water pumping**
- > **Better quality bricks being produced**
- > **Vacuum pump now working constantly**

"The system was installed and has proved very reliable and cost effective and Hanson intend to carry out a similar modification on their second production line"

John Bennett, Founder/Principal
Bennett Engineering Design Solutions Limited

"A well managed project that does exactly what we requested for the cost we expected; we will be fitting a second system in 2010"

Steve Godfrey, Works Manager
Hanson Desford

About Bennett Engineering Design Solutions Limited

Bennett Engineering is a privately owned limited liability company based in Loughborough, UK. The company specialises in providing a comprehensive package from research through to design, development and delivery of unique products. Bennett Engineering works within a network of trusted partners to ensure that their designs can incorporate an impressive range of materials, and an equally wide range of manufacturing processes.

A Business Community project providing practical training and insights for local university students



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November 2009