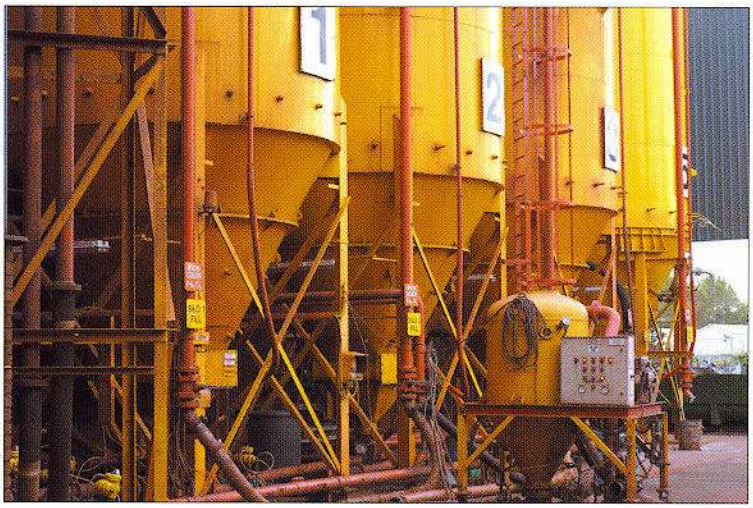
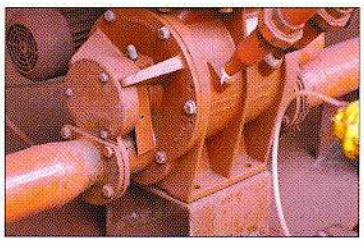
LG Philips Displays, producers of colour picture tubes for TVs and colour display tubes for computer monitors, were recently required to double their output. As a result they turned to DMN UK Ltd to combat wear problems and meet the demands







CLOCKWISE FROM TOP: The external storage silos; A DMN rotary valve under one of the external storage silos; A view of LG.Philips' factory

No wear to hide

At their Southport factory, L.G Philips Displays produce the ferrite powder from which transformer cores, for TV tube Electron Deflection Units, are made. It is the Deflection Unit that focuses the electrons onto the back of the TV screen to generate the picture. Until recently, the ferrite powder was pressed into shaped magnets at Southport. However, as part of the company's globalisation, the powder is now shipped to factories in China and Poland to be press formed.

The ferrite powder is formulated from a variety of metallic oxides, including iron oxide, plus some minor additives. Most of these constituent materials are very finely divided and extremely abrasive. They are so fine that they have surface areas ranging from $2m^2$ to $25m^2$ per gram and are so abrasive that rotary valves were being replaced at the rate of three to four times a year.

The original plant was installed in the 1970's and upgraded 15 years ago to include an automatic weigh station. It was the rotary valve (blowing seal) on the outlet of the weigh hopper that became the weak link in the chain. Wear allowed pressurisation from the pneumatic conveying system to affect the weighing accuracy and to slow the rate of discharge.

Adjustments are now made every three to four months compared to four to six weeks previously and no valves have worn to the point of replacement

To meet demand, a 500kg batch, accurate to ± 100 grams, is prepared in the weigh station, discharged and conveyed to the mixer every 15 minutes, 24 hours a day, seven days a week. Thus the slowing down of the discharge and the downtime associated with adjusting and replacing the previous rotary valve just had to be resolved. On top of this, the factory is sited within a residential area and environment issues had to be considered. The risk was from potentially leaking blowing seals fitted to the external metal oxide storage silos - from which constituent materials are conveyed to the weigh station.

As powder process manager, Ian Jackson, confirms: "It was **DMN** who came to our rescue offering what looked to be an expensive solution until the cost/benefit exercise proved the

case to be very different."

To encourage LG.Philips Displays to try one of their ceramic lined Blowing Seals, DMN offered a deferred payment arrangement so that the customer would only have to pay if they were satisfied. Jackson continues: "I am most impressed by the way that DMN have worked with us on this project. To get the optimum configuration, DMN's engineers tried different rotor blade tip arrangements including bonded ceramic tips. These would have been fine but for the odd foreign inclusion which caused damage which we couldn't 'instantly' remedy ourselves." The final specification is ceramic linings to the valve body and end plates with hardened steel adjustable/replaceable rotor blade tips. Adjustments are now made every three to four months compared to four to six weeks previously and no valves have worn to the point of replacement, even the one which has been in service for four years.

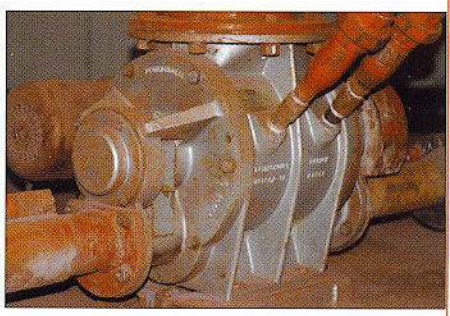
The weigh hopper valve has been installed since 1998. Three further valves have been fitted to the silos containing the most aggressive oxides and a fifth valve is kept as a stand-by to replace any valve that has to be taken out of service for rotor blade tip adjustment/replacement. So sophisticated is the control and monitoring of the plant at Southport that signs of normal wear and tear show early enough for the plant to continue to produce finished material well within tolerance whilst engineers plan to take the necessary remedial action.

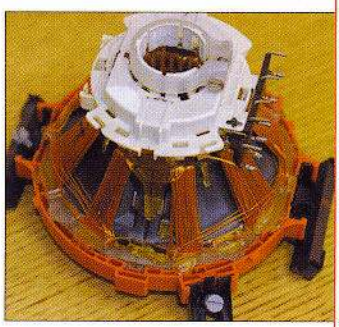
LG.Philips Displays, is the joint venture between the Cathode Ray Tube businesses of LG Electronics of Korea and Royal Philips Electronics of the Netherlands. In 2001, the company's share of the total market for both colour picture tubes and colour display tubes stood at 24 per cent. Today, one out of four television sets or computer monitors has an LG.Philips Displays tube inside. The company, with its operational headquarters in Hong Kong, employs more than 35 000 people and has 32 factories worldwide.

The DMN-Westinghouse portfolio of rotary, slide, diverter, pressure relief and gravity flap valves is one of the most extensive available. Their rotary valve range comprises airlocks, blowing seals, specialist and general purpose models. They can be constructed in a variety of materials including cast iron, aluminium, stainless steel, Hastelloy and Ni-hard. They offer a full range of surface finishes including mirror polishing for dairy, pharmaceutical and food applications. Where appropriate, as alternatives to ceramics, coatings such as hard chrome, nickel, tungsten carbide or Teflon can be applied to the contact surfaces. Rotors can be supplied with tight running clearances due to the accurate tolerances achieved on DMN's sophisticated machining centres. For those applications demanding the ultimate in hygiene and frequent cleaning, DMN offer models with quick disassembly features and slide rails to support the weight of the rotor and others that are machined from stainless steel bar stock rather than castings. Many models have combination square/round connection flanges whilst others offer the option of a round inlet and a square outlet. DMN have Rotary Valves to withstand over-pressure situations of up to 10 bar g and to arrest an explosion flamefront. A recent introduction to the range is the new DL (Dust Lock) model designed specifically for cost conscious filter applications.

DMN's range of Diverter valves includes flap, plug, tube multi-way and fill and vent types. Operation is normally by pneumatic actuator. The slide valve range comprises hand and power operated versions and includes centre opening rotary models for difficult applications. The latest addition to the diverter valve range is the new ball type diverter (BTD) valve specifically designed to converge or diverge hot, abrasive products in pneumatic conveying systems. The valve is ideally suited for applications in thermo-electric power stations (coal and fuel oil ash), incinerators, foundries and cement, glass, ceramic, limestone, gypsum and chemical factories.







For details of the range of rotary, slide and diverter valves offered by DMN UK Ltd or to discuss a specific application, contact the sales team on tel: 01249 818 400 or visit: www.dmn.info

Exhibition Information

DMN are to participate in the Hillhead 2003 Exhibition, Buxton 24th - 26th June. This will provide visitors with a first hand opportunity to inspect DMN's range of valves designed for the most arduous of duties, including the ceramic lined model supplied to LG.PHILIPS Displays. In addition, to demonstrate their repair and refurbishment capabilities, examples of 'before' and 'after' valves and components will also be on display.

ABOVE TOP: General view of the weigh station
ABOVE MIDDLE: The DMN rotary valve under the weigh station collection hopper
ABOVE: Fully assembled LG.Philips Electron Deflection Unit