Example of a Successful Application

Power Station Application

A profitable repair and coating contract was won by Dutch Thistlebond Distributor in the face of stiff competition. The Dutch distributor for Holland has just completed a extensive repair and coating application in a Major Coal Fired Power Station located in Holland.

Background:

Coal fired power station using coal as major fuel source shipped in by sea direct to the Power Plant.

Coal is fed into the system via hopper *(another major application is on the way in Republic Ireland on the lining of COAL CHUTES with Thistlebond TR240 - watch this space!!)*. The coal then goes into a machine called a crusher / pulverise. This crushes the coal into small particles.

The pulverised coal dust is then transported by hot air at around 900C through the pipe system. The system pressure is at around 2 bar (30 psi) The pipes are 470 mm on the I.D. and are in sections that vary from 2 – 4 meters. The wall thickness of the pipes when new is 22mm. Pipes are of steel construction. The dust then is entered through the piping system into main furnace. The fuel is 95% Coal and 5% re-cycled waste material.

Problem:

The coal dust (fuel) is very abrasive to all areas that it comes into contact with. This is especially noticeable on the elbows of the fuel feed pipes. The abrasion is made worse by the velocity of the material going through the pipes.

Cost of the Problem:

The extreme wear to the pipe work by the abrasion of the coal dust means that the pipe work has had to be replaced over a two-year working life cycle. The pipes are also “hung” on supports that hand from roof area. This makes changing the pipe work sections very costly. Whilst we cannot put an exact figure on replacement costs they do run into many thousands of euros.

Whilst there is a spare feed unit, downtime, unplanned outages / shutdowns, costs whilst non operational are all part of the equation when considering options

Possible Solutions:

Replace pipes on a frequent (two yearly in some cases – especially the elbow sections that see the most abrasion) basis. Replace pipe with a more exotic type material. This would prove to be extremely expensive. Choose a suitable repair and coating compound that would be easy to apply and cost effective over a number of years.

Why Thistlebond?

The power station management looked at various companies who produced polymer type materials for this task. Thistlebond proved to be the material of choice due to several factors:

- Track record in repair and coating of extremely aggressive applications.
- VOC (Volatile Organic Compounds) Free.
- High content of ceramic / carbide material with LARGE size particles (in excess microns).
- One of the hardest polymer/ceramic carbide materials available today.
- Extreme abrasion resistance.
- Both excellent compressive and flexural strength.
- Solvent FREE products.
- Excellent technical support facility.

The distributor in Holland – ROODHART EMISSION CONTROL, were chosen as the preferred applicator due to their extensive knowledge and expertise in both the engineering disciplines involved as well as the application know how.

Whilst cost was obviously a major factor in obtaining this contact - MANY MORE CONSIDERATIONS were discussed in the final decision making process by the Plant Engineers. Reliability - Ease Of Use - Quick Supply - Trusting Relationships with both Applicator as well as Thistlebond personnel - ROI (Return On Investment) - and many more factors!

The Solution:

The use of THISTLEBOND CERAMIC range of products (as detailed below) and as applied by ROODHART EMISSION CONTROL

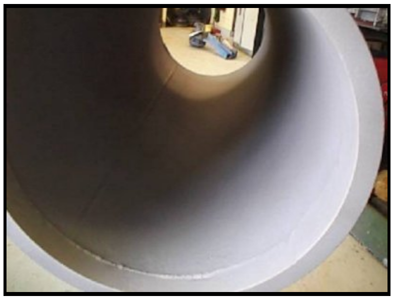
The Application:

Pipes were taken out in sections that were 2 – 4 metres in length. Pipes were grit blasted and abraded to a SA2-1/2 specification + a 75 micron surface profile (rough not smooth surface finish). The pipes were then quickly assessed for damage.

In many sections of pipe the most extreme damage was over a 40% area inside. This area was firstly treated by THISTLEBOND degreaser to make sure that no residues were left in place to affect the bonding of the polymer material. Thistlebond TR200 Ceramic Carbide Wearing Compound (paste type material) was then applied using both spatula and trowel as in some areas it was required to be in excess of 8mm thick.

In the extremely badly worn areas the use of Ceramic Tiles – held in place by Thistlebond TR200 were applied.

After waiting for the recommended period prior to further application – two coats of Thistlebond TR205 Abrasion Resistant Ceramic Carbide Fluid were applied to the inside surface. After appropriate full curing the pipe were stored prior to re-application in line.



On the majority of the pipe ELBOWS, extreme wear had taken place (in some instance had worn right through pipe?). On all these pipes, THISTLEBOND TR240 Heavy Duty Ceramic Carbide was used in conjunction with ceramic tiles.

The tiles were kept in place by “sandwiching” them between two layers of the Thistlebond TR240 Heavy Duty Ceramic Carbide. Everything was kept in place by the use of steel ties until fully cured. As the Power Station was operational at the time of the applications, temperature was most suitable for the accurate curing of the Thistlebond Polymers.

The Results:

A very comprehensive and cost effective repair was carried out in the minimum of time and least disruption to the Power Station operation.

In all 5 fuel lines were repaired and coated in the above manner with the same excellent results. Expectations are for the repair and protective coatings to give many years of service with minimum operational repair being required.

Products Used:

Thistlebond TR240 Heavy Duty Ceramic Carbide / Ceramic Tiles (Non Thistlebond Product) / TR200 Ceramic Carbide Wearing Compound / TR205 Abrasion Resistant Ceramic Carbide Fluid / TAC883 Thistlebond Thinner & Degreasers.

After Care & Maintenance Details:

One of the concerns that needed to be addressed by the Power Station in conjunction with ROODHART, was how to evaluate the performance of the repair and coating system as supplied by THISTLEBOND.

To this end an ingenious method of evaluation has been designed by ROODHART. The wall thickness of the pipe work when new is 22mm. The abrasion caused by the coal dust can and does eliminate ALL the wall thickness. It was decide that the bench mark for further repair and coating applications would be at 5mm. Roodhart have inserted a very thin copper wire on the OD of the steel pipe. It is held in place by Thistlebond Fluid Ceramic. Then the Thistlebond heavy-duty ceramic (TR240) is placed on top. Then the ceramic tiles are put in situ with a further coating of the heavy-duty ceramic.

As there is the possibility of an electrical current between the steel pipe and coal (should the wall thickness become extremely small) then a current can be measured from the copper wire. This enables not only preventative maintenance to be carried out but also is a good indicator as to the performance of the Thistlebond Ceramic Products.