

# ZEROMAG News



## INTRODUCTION

**D**iverse have been manufacturing Zeromag, the world's first, and only, dynamic demagnetiser for nearly 10 years. Zeromag solves the magnetism and arc welding problem. See the article about arc blow for more information about the symptoms and causes of the problem. Zeromag measures and neutralizes magnetic fields which may be present in the weld preparation region of mating steel components. Zeromag has been supplied to the world's welding professionals and has always been successful in solving this difficult problem.

In operation, the demagnetisation process can be performed manually or automatically and Zeromag is suitable for manual or automated welding processes. Zeromag demagnetisers are compact, ruggedly constructed units for use in typical welding site environments. Simple and rapid to deploy, Zeromag will greatly assist productivity, reducing welding times while minimising weld repairs and downtime associated with magnetic arc blow.

## CASE STUDY 1: Degaussing

**D**IVERSE has been supplying consulting services for magnetic problems for many years to leading welding companies all over the world.

Early in 2005, Diverse was invited to help (with Zeromag) to degauss pipes that had become magnetised in a Dutch shipyard. The reality of this exotic visit was measurement of magnetism in the shipyard in driving snow. Why do these problems not happen in Jamaica!

The project was for a huge lay barge that was scheduled to lay a 20km pipeline. Weld verification tests had shown that there was arc blow due to magnetism on a proportion of the pipe stock. The

stock was a complex clad variety used in undersea applications.

The customer, realising the high cost of encountering this problem at sea, decided to invest in Zeromag and some of Diverse's complementary instruments.

Trials carried out at the yard showed that Zeromag was the ideal tool to control magnetism, and allow production of the pipe to continue with minimal delay.

A new version of Zeromag was evaluated on site. This product is able to prepare pipes (magnetically) for welding before the weld process rather than during it. Using a novel technique, the pipe magnetism can be reduced to acceptably low levels before welding, without having to use standard degauss techniques which are slow and power hungry. The advantage to the welder is that



welding can be done at full speed and double headed.

Generally, Diverse are pleased to provide assistance to overcome magnetic problems encountered in arc welding. Our unique Zeromag demagnetiser is used by welding engineers around the world. With the high cost of down times on a lay barges, Zeromag is the most effective insurance.



## CASE STUDY 2: Tunnel vision

**Z**eromag is a specialist product that has saved the bacon of many welding engineers faced with arc blow. This strange condition caused by magnetism in the steel stops arc welding from proceeding, or can cause instability in the weld arc leading to faulty welds.

Consider for a moment the importance of welding to almost every aspect of our lives. From the cars we drive to the oil pipe lines that transport the life-blood of modern living - all must be welded.

Welding technology is so dependable and sophisticated that there is rarely a problem - until an



### New options

**Z**eromag is available with a variety of new options. These include new heavy duty probes both standard and air cooled, super thin probes to get right into small weld preps (c. 3mm) again standard or air cooled, and our new powerful option for degaussing.

The degauss option allows the end of pipes in particular to have their field removed before attempting to weld. The key advantage is that the degaussed pipe can be welded at multiple weld stations, keeping production rates at a maximum. The degauss effect is temporary, and depending upon the material and geometry, the magnetism will return after a few hours.

unwanted magnetic field is introduced. This can be due to pick up from the earth's magnetic field, or as a result of specific handling problems. Whatever the cause, the interference of a magnetic field can stop a successful weld from happening.

An example project was sited under a Norwegian fiord, with winter fast approaching and a pipeline is being laid in a tunnel that joins a small docking island to the mainland.

Everything is going well and then all of the pipe sections are found to be magnetised. They were all right when they left the factory; they were fine when they reached the site. But by the time they were placed in the tunnel they held such a strong magnetic field that they were impossible to weld.

Everything was tried - wacking them with lump hammers, trying to use weld power supplies, even



blasting them with direct heat. As usual the old wives remedies were as effective as plucking daisy petals to find true love.

Fortunately the chief welding engineer understood the problem and found the solution with a phone call. Before too many days of down time had changed the profit margin of the contract into a loss, DIVERSE had supplied a Zeromag and normal welding resumed.

You will generally find a Zeromag wherever there is a major pipeline construction. It saves so much money to have one on site. Down time is too expensive.

### Arc Blow - overview

**A**rc blow occurs when welding is attempted in the presence of a magnetic field. Some processes are more prone to arc blow than others, but TIG welding is particularly sensitive.

Disruption of the welding arc generally occurs in a magnetic field of 20 gauss. Arc blow can be expected with magnetic fields of 40 gauss.

Some welding processes are more sensitive to arc blow than others. The effects of arc blow are reduced by welding at higher currents which produces a stiffer arc. Welding carried out in hyperbaric conditions is more prone to arc blow because the electrons in the arc are slowed down and scattered by the extra gas molecules in the high pressure atmosphere, allowing them to turn more in the magnetic field. TIG welding tends to be more sensitive than MIG or MMA because of the lower arc voltages used. Additional difficulty is sometimes found when two or more welding heads are used at the same time on the same joint because the magnetic field produced by the weld current at one head can interfere with the arc at another head.

For more information see:

<http://diverse-technologies/layer2/zeropr.htm>

<http://diverse-technologies/gateway/arcblow.htm>

#### DIVERSE

Kingfisher House, High Green, Gt. Shelford, Cambridge CB2 5EG

Tel: +44 (0)1223 84 44 44

<http://www.diverse-technologies.net>