



DEMAGNETIZING SOLUTIONS

Demagnetizing Equipment & Services

MAGNETISM: GENERAL FUNDAMENTALS, CAUSES, COMMON PROBLEMS AND SOLUTIONS

Presented by:
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TESTIMONIAL

“... you can use us anytime as referrals on the Demag Equipment! That has been one of the best investments on equipment that we have ever made... we haven’t met a weld that we couldn’t make over the past 4 years.”

Kevin L. Carman

*Manager of Regional Projects
Boardwalk Pipeline Partners
Northern Division - Texas Gas*

AGENDA

- Magnetism Fundamentals
- Common problems
- Solutions
- Tips for the field



EVER SEE THIS?

16-pound sledgehammer & other tools hanging off of the cut



HOW MUCH MAGNETISM?

- If no meter available, what can hang off of the cut?

MINIMAL MAGNETISM	MODERATE MAGNETISM	HIGH MAGNETISM
Welding Rod	Wrench	Sledgehammer

- With Gaussmeter:

MINIMAL MAGNETISM	MODERATE MAGNETISM	HIGH MAGNETISM
< 15 Gauss	15 to 100 Gauss	> 100 Gauss

- If extremely high magnetism (>500 Gauss):
 - Use the DEMAG Expansion Box or 2 DEMAG Systems



ISSUES RELATED TO MAGNETISM

- ARC BLOW
- POROSITY
- DELAYS



COMMON CAUSES OF MAGNETISM

- Increased use of MFL PIGs
- Use of lower grades of steel
- Lifting pipes by electro-magnetic crane
- Proximity to overhead wires
- Cathodic protection
- Lightning strikes
- Quenching

The challenge: to balance cost saving measures, operational procedures and regulatory requirements.



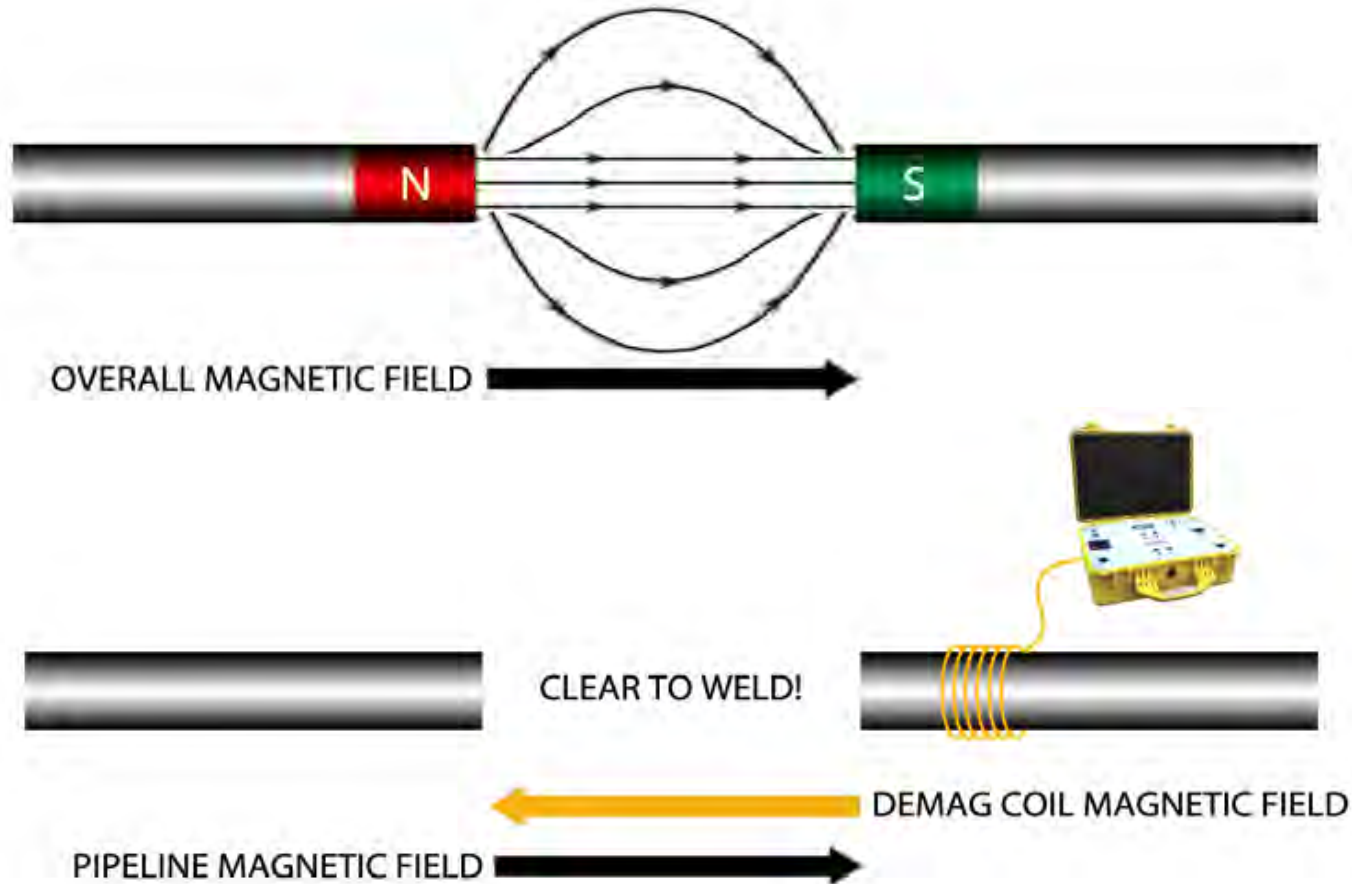
OTHER CAUSES OF MAGNETISM

- Machining – can remove domains that were cancelling out other domains
- Impact – unlikely but can re-orient domains and has a chance to become magnetic.
- Transporting pipes around the Equator

TWO TYPES OF DEMAGNETIZING

- Nullify
- Eliminate

DEMAG – NULLIFY = CANCEL OUT



**THE MAGNETISM IS EFFECTIVELY “ZERO’D OUT” BY THE DEMAG CONTROLLER
AND THE ROOT PASS CAN BE MADE IN MINUTES.**

DEMAG - ELIMINATE

Reversing and decreasing the magnetic field

- 100% - Left
- 90% - Right
- 80% - Left
- etc.
- Also known as “Manual Downcycling” or “DC Stepdown Method”



STANDARD PRACTICES NO LONGER WORKING

- Second welding machine – wrap lead
 - 50/50 chance of wrapping in wrong direction
 - 2nd truck in the field
- Trial and error
- Damaged equipment

DEMAG ADVANTAGES

- ONE BUTTON OPERATION!!
 - Only Demag on market with that feature!
- 100' Demag cable with 25 individual conductors inside
 - Equivalent to 2500 feet of cable!
- Portable
 - Job-to-job
 - Easy to move to other sites
 - No Extra Truck
 - FedEx/UPS or luggage on an aircraft



WHAT'S IN THE DEMAG BOX?

- Transit Case with wheels
- Power Controller (aka “Brain”)
- 100’ Demag Cable
- Gaussmeter
- In-line GFCI



DEMAGNETIZING SOLUTIONS

Demagnetizing Equipment & Services

www.demagnetizingsolutions.com • 908.444.MAG1

Using the extremely portable **Pipeline Demagnetizing System**, a high quality weld can be made quickly and efficiently. Tough inspections will be easier to pass. The system has the ability to reverse current through the Demagnetizing Cable without having to re-wrap the cable around the pipe.

The Pipeline Demagnetizing System weighs less than 100 lbs., operates from 110V – 220V and includes the following: Power Controller, Demagnetizing Cable, Gaussmeter, In-line GFCI and Transit Case.



Power Controller	Demagnetizing Cable	Gaussmeter	In-line GFCI	Transit Case
Mode of Operation	Cable Length	Model	Rating	Material
Manual DC 0 – 100%	100 feet	Alpha Labs GM1-ST	Up to 30 AMPS	TTX01 High-Strength Resin
Power Input	Characteristics	Operation	Reset Type	Features
<ul style="list-style-type: none"> • 110V AC – 220V AC • 30 AMPS Max • Single Phase - 50/60 HZ 	<ul style="list-style-type: none"> • Heavy Duty PVC • Built-in Dust Caps • Flexible • UV, Water, Weather & Oil Resistant 	Handheld with Probe	Manual Reset	<ul style="list-style-type: none"> • Retractable Handle • Built-in Wheels
Operating Temp.	Operating Temp.	Battery	Operating Temp.	Dimensions
-10° – +120° F	-10° – 200° F	9 V Alkaline	-31° – +151° CF	<ul style="list-style-type: none"> • Length – 28 inches • Width – 22 inches • Height – 15 inches
Weight	Weight	Weight	Weight	Weight
10 pounds	50 pounds	1.5 pounds	2.5 pounds	25 pounds
Power Output				
Full Wave DC				

EXCESSIVE MAGNETISM SITUATIONS

Defined as **Greater than 500 Gauss**
and/or **Larger than 32" pipes**

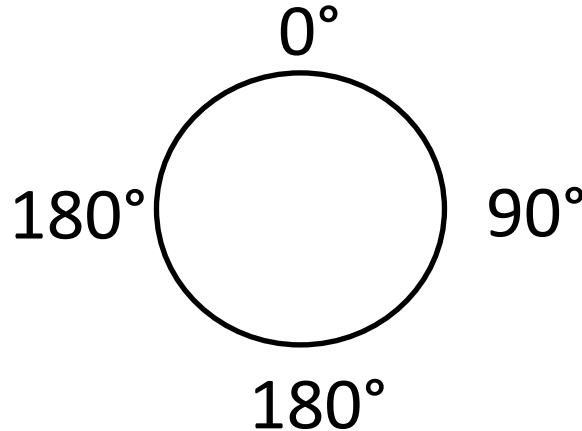
2nd DEMAG System or an Expansion Box



2 Demags that can be used independently vs one Demag
where the “Brain” controls 2 cables

MEASURING THE MAGNETISM

- Measure the magnetism with the gaussmeter
 - Place the probe tip around the perimeter along the beveled edge
 - Record readings at 0° , 90° , 180° & 270°

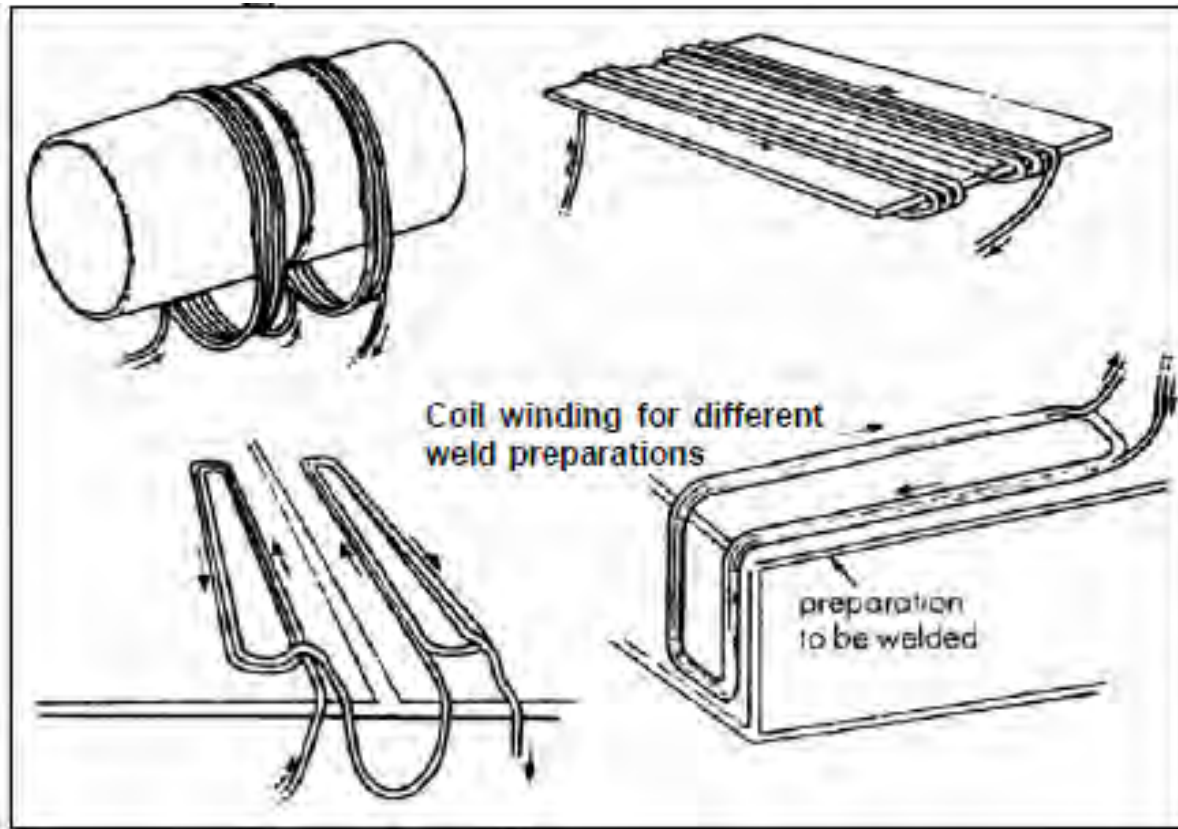


SETTING UP THE DEMAGNETIZING CABLE

- **Keep Dust Caps in place**
- Wrap cable around the pipeline
 - loose enough to slide
 - as close to the joint as possible
 - protect from weld splatter, grinding debris
 - if preheating, offset cable using heating blanket, survey stakes, 2x4s or wood scraps
- Connect both ends of the cable connector



CABLE ORIENTATIONS



- The goal is to get the measured magnetic field at the gap to be as close to Zero as possible.



Helps to have 2 team members – one to pull out the cable, the other to wrap. Start the cable wrap with dust cap ON & tape the connector to the cable to keep it out of the dirt.

SETTING UP THE POWER CONTROLLER


- Power switch off
- Start with manual power output level = 0 (black knob)
- Connect GFCI to power source (**NOT WELDER or LIGHT TOWER!**)
 - Male end to generator or power.
 - Female end/extension cord of to POWER IN
- Demag Cable Male Pigtail to POWER OUT





USER MANUAL



- 1 Take Gauss Meter (GM) readings of pipe at 12, 3, 6 & 9 o'clock.
- 2 Determine position of strongest magnetism (ex. -100 is stronger than +75).
- 3 If pre-heating pipe, use insulation blanket/stakes to protect Demagnetizing Cable (DC).
- 4 Start wrapping pipe with non-pigtail end of DC.
- 5 Wrap DC loosely around pipe as close to joint as possible.
- 6 Remove dust caps and plug & twist multi-pin connectors together.
- 7 Place pigtail from DC near Power Controller (PC).
- 8 Plug pigtail from DC into **CABLE**.
- 9 Plug GFCI into generator or wall outlet – NOT WELDING MACHINE or LIGHT TOWER!
- 10 Plug female end of GFCI into **POWER**.
- 11 Set **BLACK KNOB** to "0".
- 12 Reset GFCI.
- 13 Turn on **CONTROLLER** with power button. 
- 14 LEDs will turn on for 3 seconds.
- 15 Turn **BLACK KNOB** to "100" (yellow or green) while monitoring GM readings.
- 16 If GM readings are getting stronger, turn **BLACK KNOB** knob to "0".
- 17 Reverse current flow by turning **BLACK KNOB** in other direction.
- 18 Slowly turn **BLACK KNOB** while monitoring GM readings.
- 19 When GM shows the lowest value, commence with root pass.
- 20 Replace dust caps on DC when done.



OTHER APPLICATIONS

- Valves
- Tees
- Rotors
- Drive trains
- Pressure Vessels
- Steel Beams (Steel Structures)
- Fingernailing!

Do's AND DONT'S

DO's

SAFETY!

- DAILY SAFETY PROCEDURES
- GFCIs
- FINGERS AWAY FROM CUT WHEN
TURNING ON DEMAGNETIZER



DO's - USAGE TIPS

- Wrap the cable loosely
- Tape & zip ties
- Use fire blanket or stakes to offset the cable from the pipe.
- Always monitor the cable temperature or it can burn, especially at 220/240V



Do NOT USE WELDER AS POWER SOURCE!



CABLE ENDS CAN BE DAMAGED



USE DUST CAPS!

DEMAG IN ACTION



DEMAG PICTURES – PIPELINE INTEGRITY

Nullify the field during a weld to make the Root Pass





Anomaly found by an MFL PIG



Using the DEMAG to make the root pass











No preheat so Demagnetizing cable can be wrapped directly on pipe

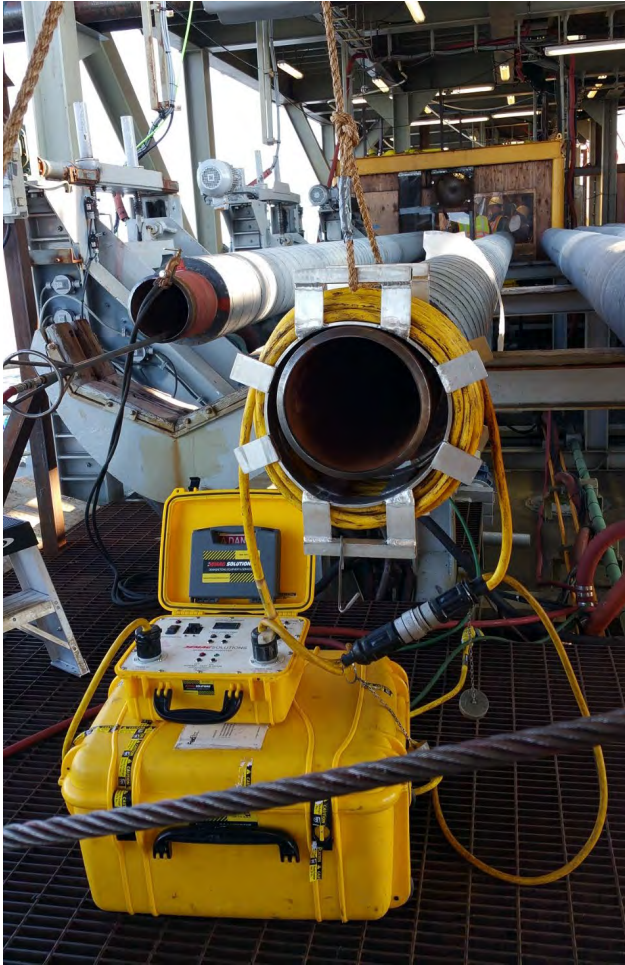


Demagnetizing cable wrapped on a fire blanket for protection from pre-heat



Cable wrapped on fire blanket

Manual downcycling to remove magnetism before laying new pipe across Alaskan Bay - overview



Manual downcycling (DC Step Down) to remove magnetism before laying new pipe across Alaskan Bay



Before Downcycling 39.7 G



After Downcycling 0.7 G



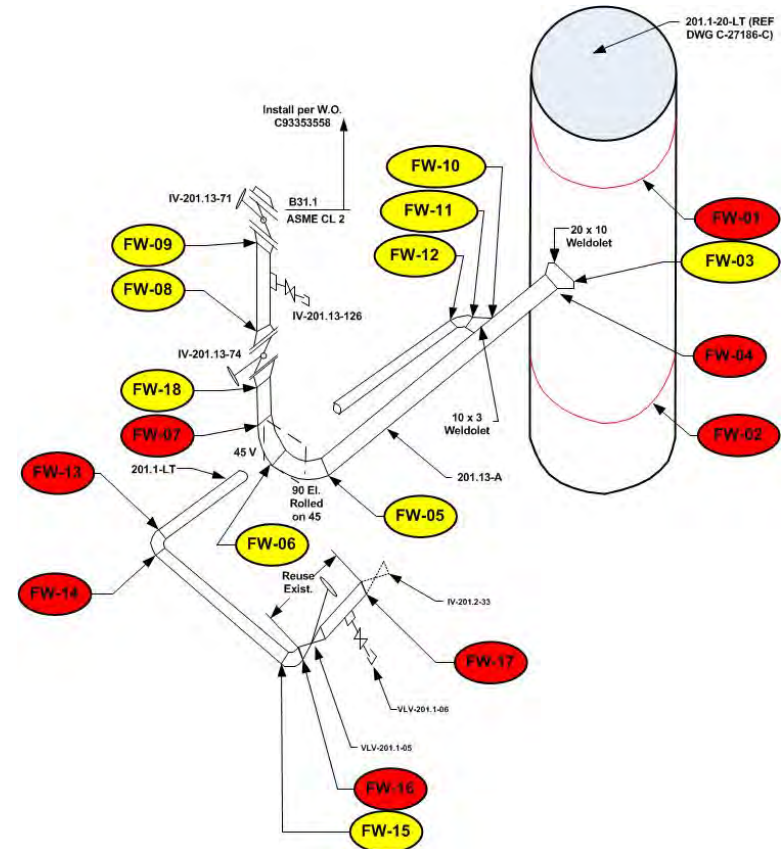






OUTAGE SCOPE – CAN YOU IDENTIFY WHERE TO DEMAG?

- Welds in Red are field welds that require RT exams during the outage
- Welds in Yellow are shop welds that require RT exams off site, pre-outage



CONCLUSION: DEMAGNETIZING SOLUTIONS PIPELINE DEMAG SYSTEM SAVES TIME AND MONEY



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