



# MainTrain Ottawa 2018

Maintenance, Reliability and Asset Management

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## Isolated Phase Bus Inspection & Maintenance Best Practices

Mohsen Tarassoly

Electrical Builders, Inc. (EBI)

## Electrical Builders, Inc. (EBI)

- The nation's premier specialty electrical and welding contractor specializing in bus duct services and solutions for related components.



## IEEE C37.23-2015 for Metal Enclosed Bus

### **Purpose:**

- Establish minimum construction requirements
- Establish preferred ratings
- Establish testing and performance requirements

## Metal Enclosed Bus Duct Designs



**Isolated Phase Bus**



**Non-Segregated Phase Bus**



**Cable Bus**

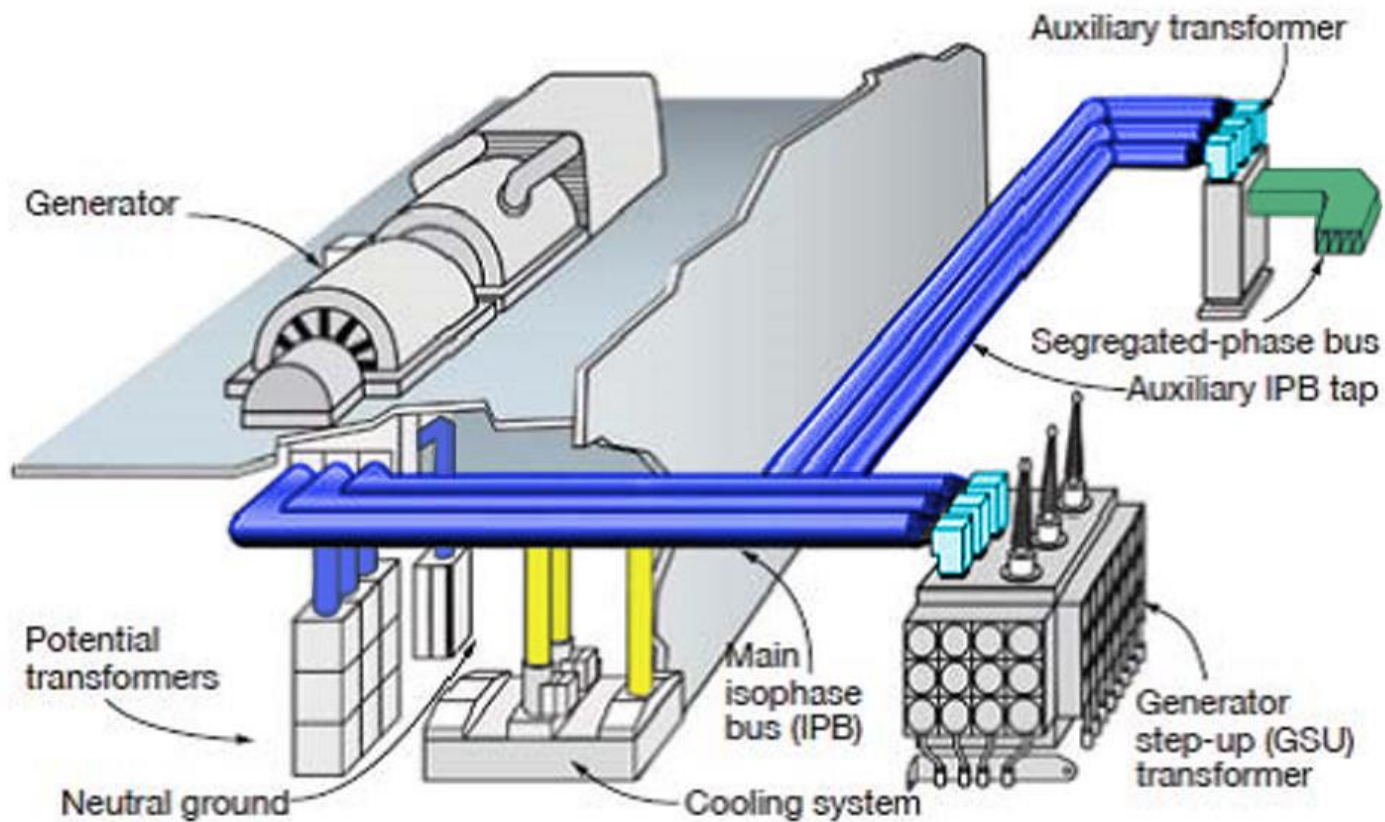


**Segregated Phase Bus**

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## Typical Plant Layout



## True or False?

**Q:** The Isolated Phase Bus (IPB) duct system is an inert system with no moving parts. So you don't need to waste time or money on it?

## Answer:

**FALSE:** Your IPB is one of the only system critical components in your plant that has **NO REDUNDANCY** or **'QUICK'** FIX if it fails.

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When It's Not PROPERLY Maintained, it Fails

**IN OTHER  
WORDS...**

It's your power  
cord, when  
it's down, you  
are offline.





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When you're offline it's costing you MONEY!



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## When you're offline it's costing you MONEY!

**\$65M+ Lost**

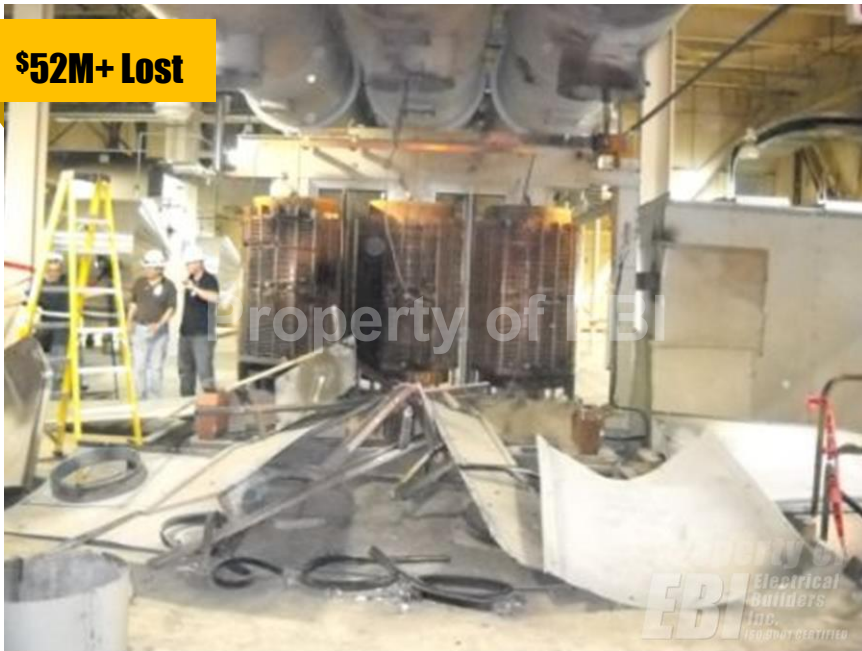


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## When you're offline it's costing you MONEY!

**\$52M+ Lost**



**Almost a Life Lost**



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When you're offline it's costing you MONEY!



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## When you're offline it's costing you MONEY!

**\$30M+ Lost**



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**HOW DOES  
THIS HAPPEN?**

## 3 Root Causes:

- Failures Due to Other Connected Equipment
- Inadequate Design
- Improper Inspection & Maintenance

## Failures Due to Other Connected Equipment

- IPB, Generator, CT/PT Cabinets, Auxiliary or Main XFMR
- Difficult to Determine a Final Root Cause





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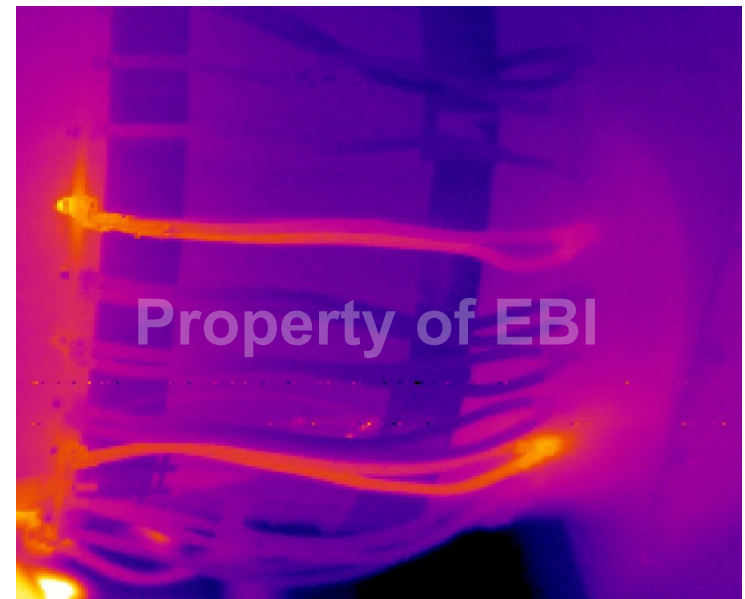
## Inadequate Design / Access



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## Enclosure Expansion Joints – Cable Jumpers



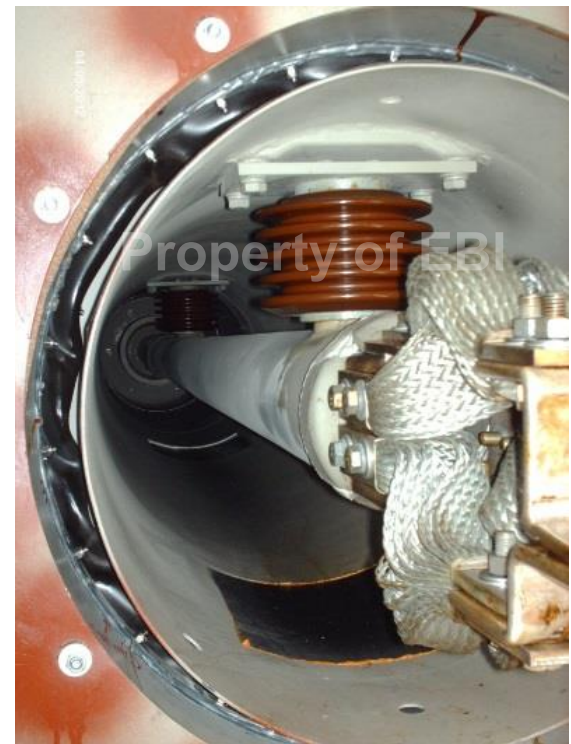
## Welded Enclosure Expansion Joints



Issue



Result



Same Bus – Different Phase

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## Single Conductor Support Insulator Under Suspension



## Recommended Maintenance Intervals

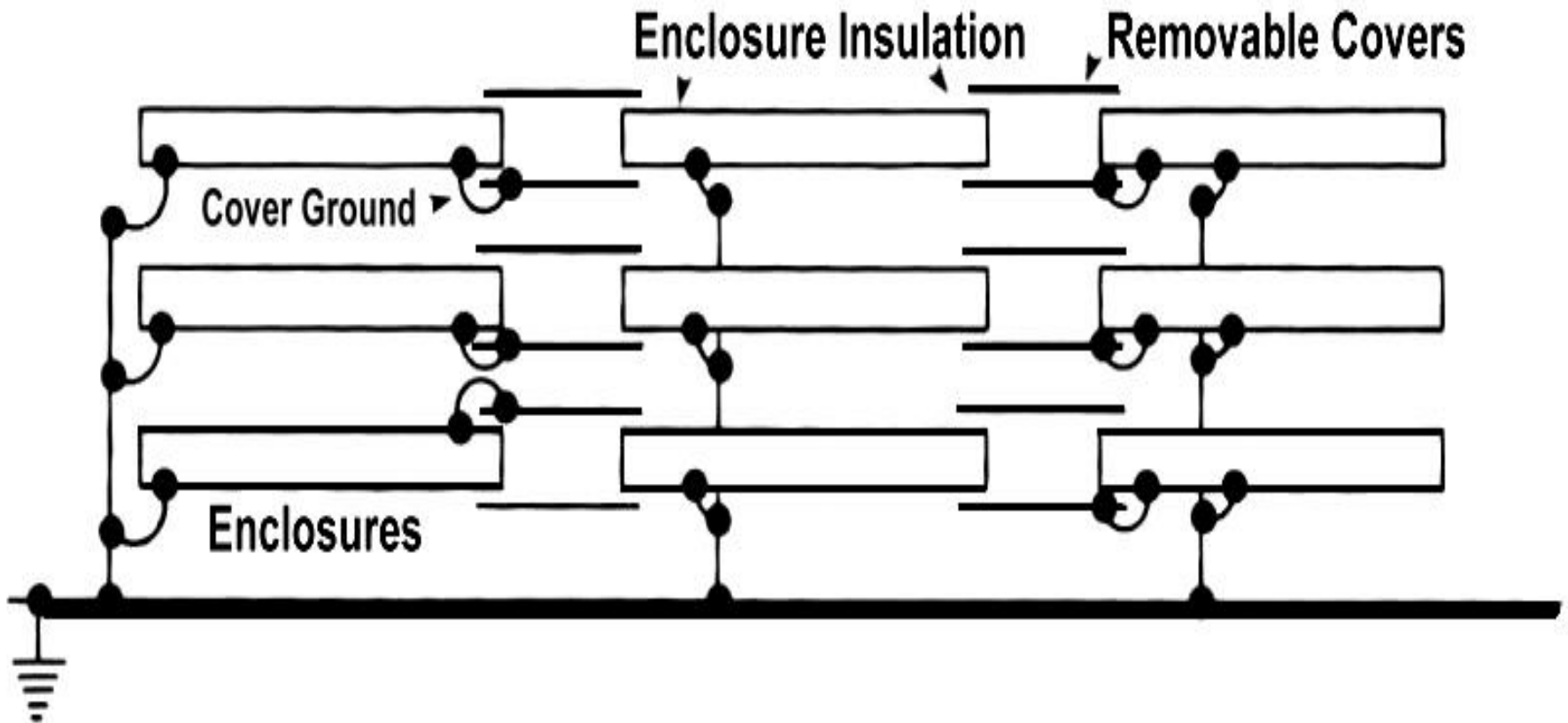
Most OEMs recommend maintenance yearly, at every scheduled shut-down, or at a **minimum of every 18 months**

## Improper Inspection & Maintenance

Are you performing proper inspection  
and maintenance?

***Do you know what design style  
your IPB is built to?***

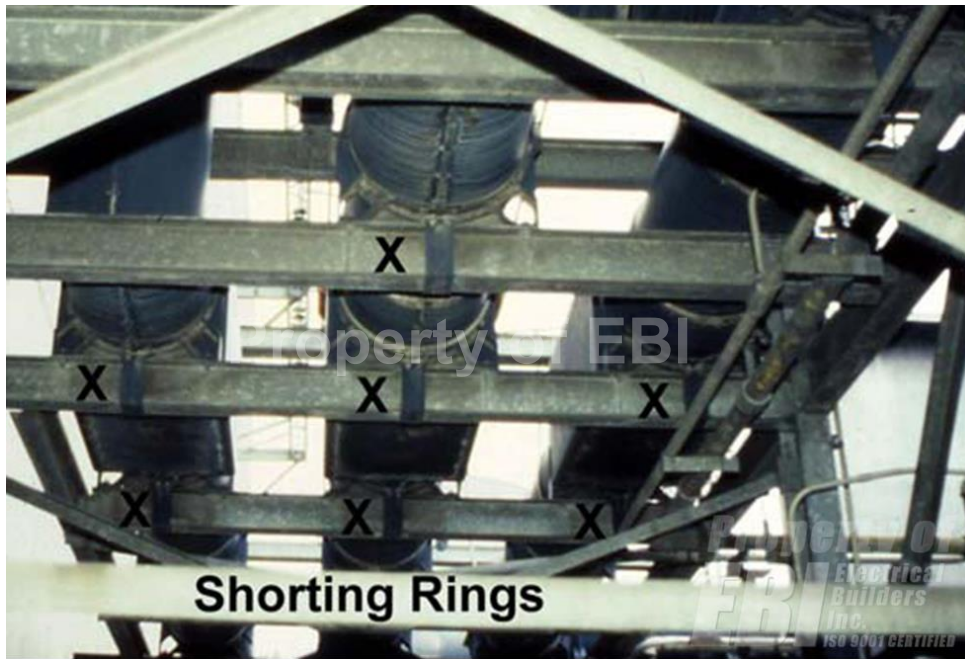
## Design Style – Non-Continuous IPB Design Style



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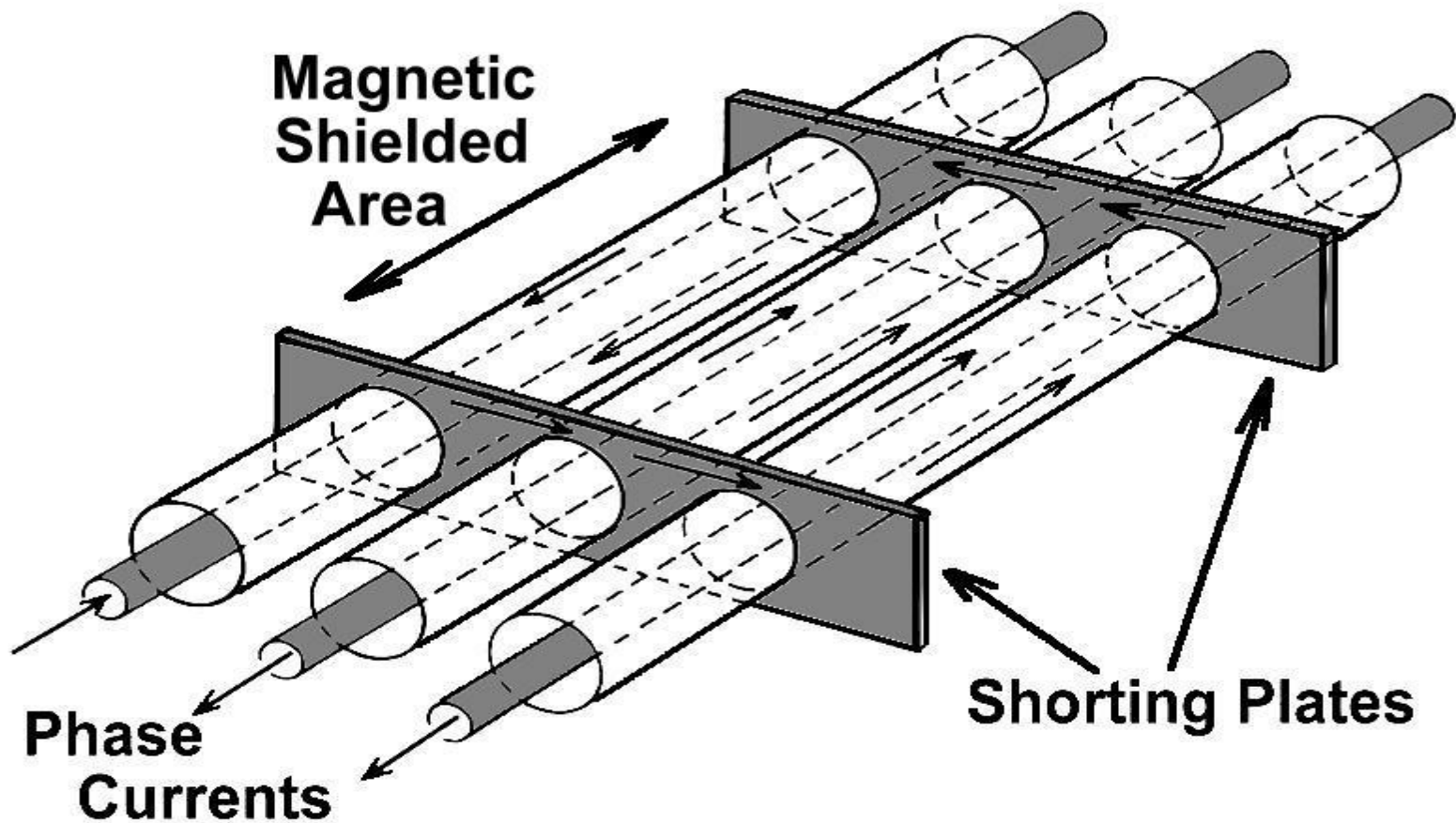
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## Design Style – Non-Continuous IPB Design Style





## Design Style – Continuous IPB Design Style



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## Design Style – Continuous IPB Design Style



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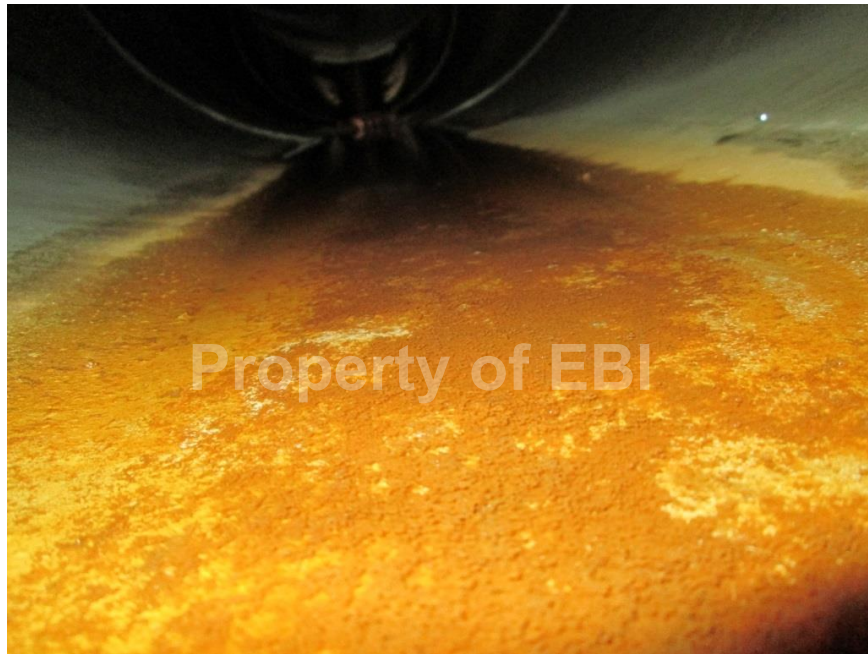
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# What to Look For

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## Water Intrusion & Condensation



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## Water Intrusion & Condensation



## Water Intrusion & Condensation



Do you have excessive ground currents and moisture?

**Excessive ground currents + moisture = MASSIVE CORROSION**



Same IPB System, Different Phase

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## Dirt & Debris Inside Bus



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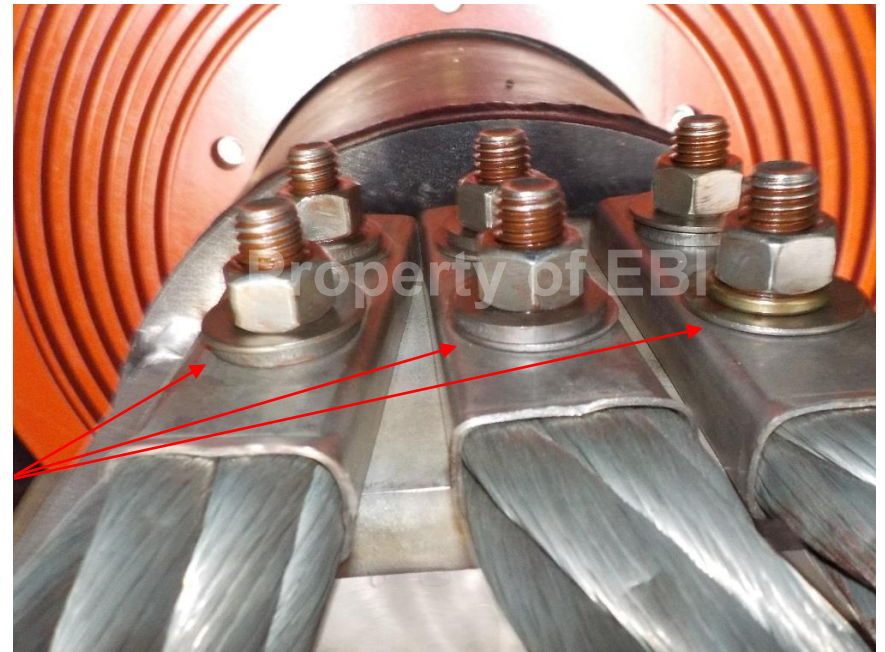
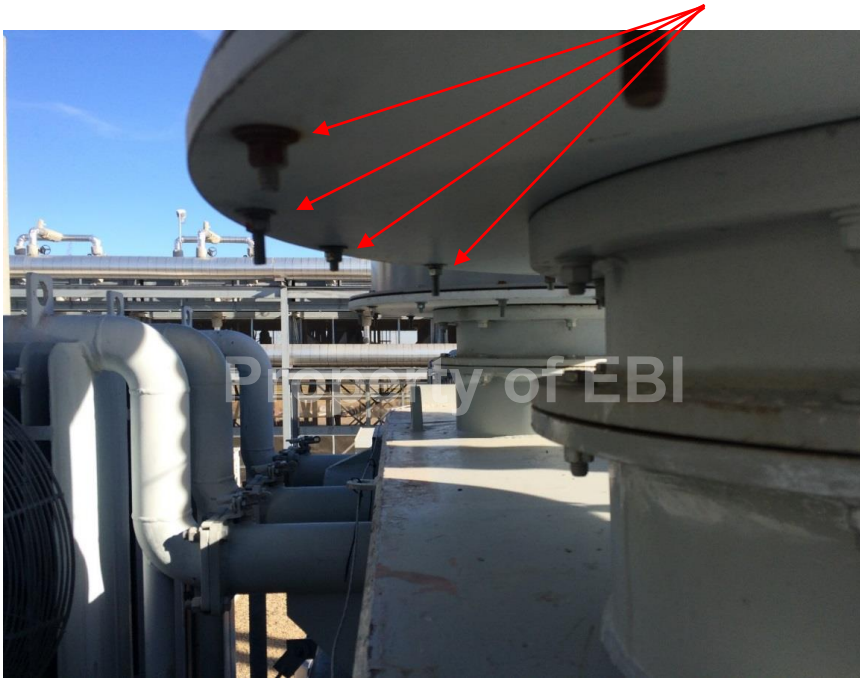
## Grounding Issues



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## Improper or Missing Hardware



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## Failed Termination



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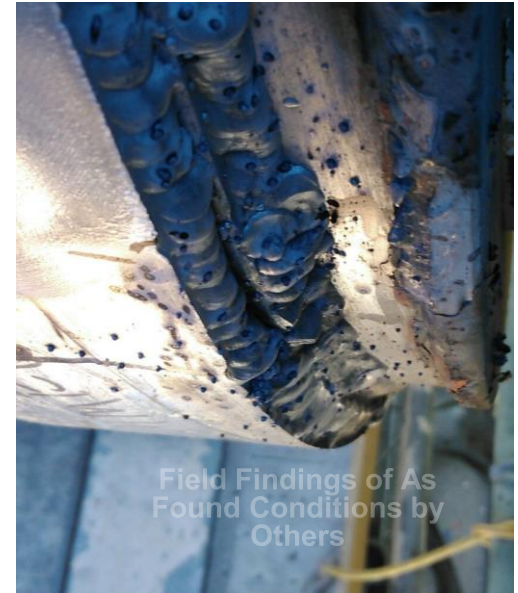
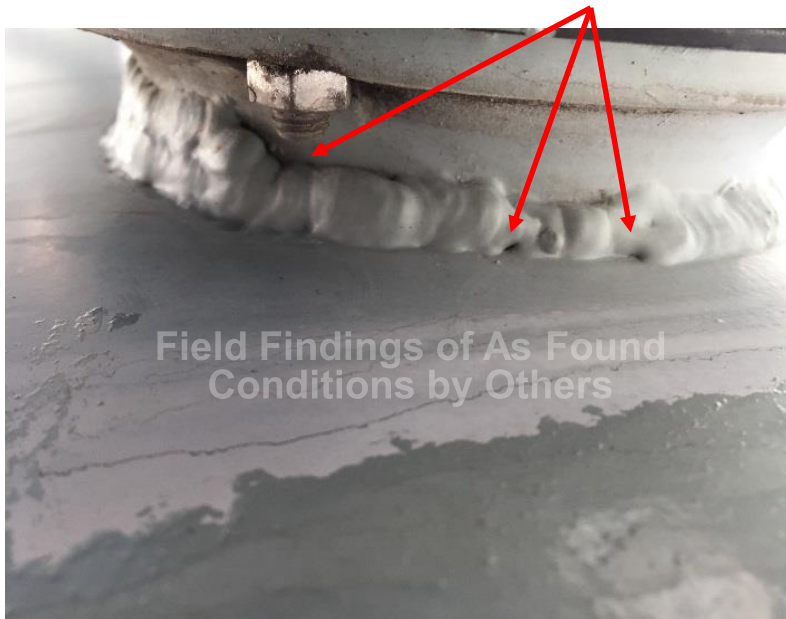
## Damaged Flexes / Laminates / Jumpers



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## Inadequate or Cracked Welds



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## Warped Surfaces or Lack of Silver Plating



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## Excessive Heating





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**WHY QUALIFIED  
BUS DUCT  
TECHNICIANS  
ARE NEEDED**

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## Why Special Training is Required



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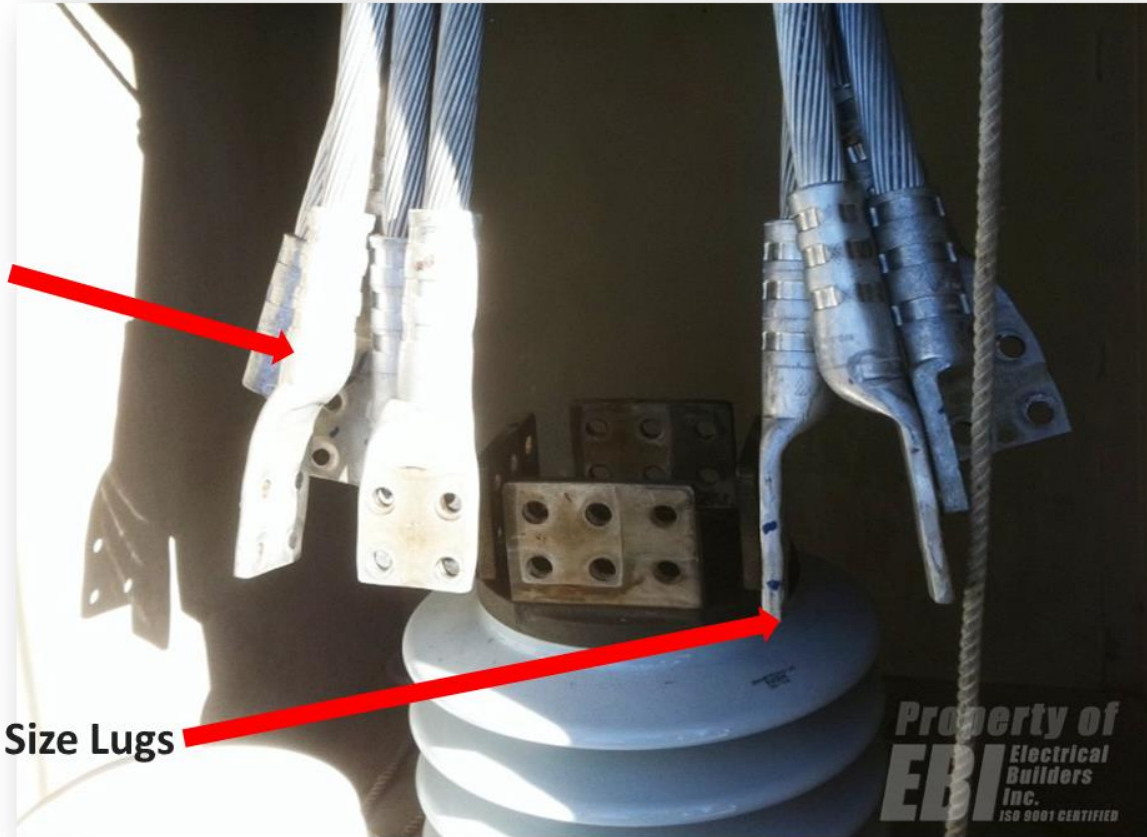


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## Why Special Training is Required

No Silver Plating



Different Size Lugs

Property of  
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Builders  
Inc.  
ISO 9001 CERTIFIED

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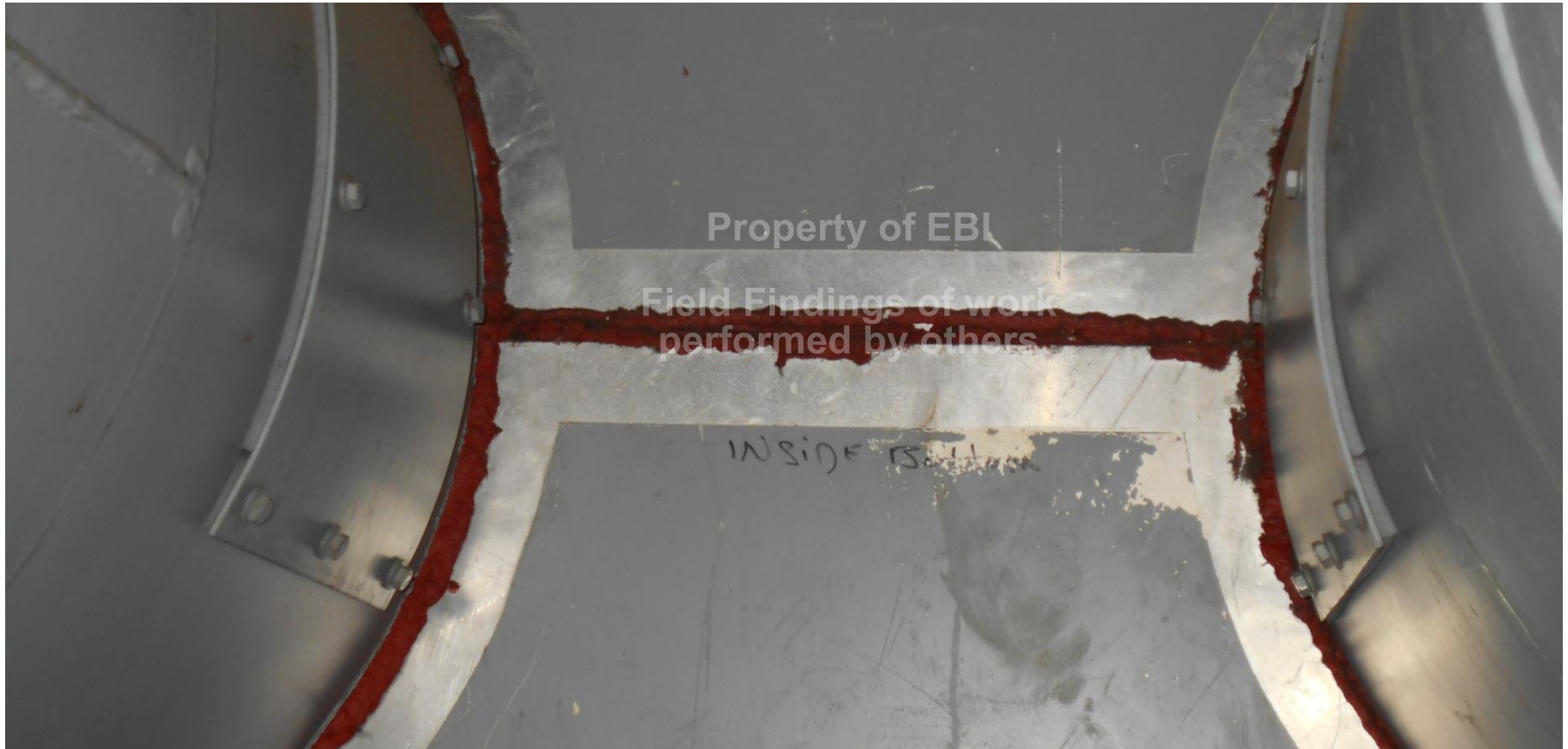
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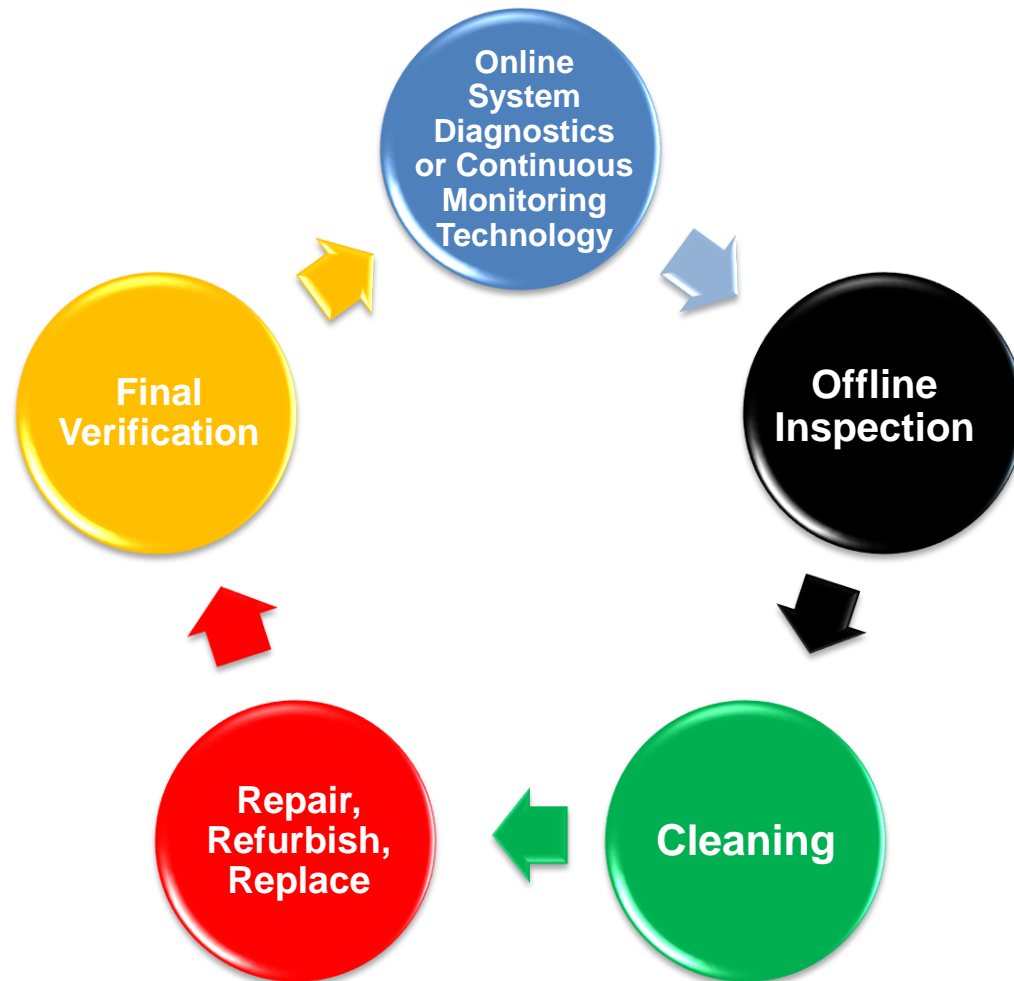
**The #1 way to extend the life of your system critical electrical assets is proper inspection and maintenance performed by a qualified bus duct technician.**



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## EBI's Full Spectrum Inspection & Maintenance Cycle



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# QUESTIONS!

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