

# Logistics, supply chain and why backups and maintenance matter!



## Agenda

- The doom and gloom
  - What are the issues and why they present challenges
- The solutions
  - What manufacturers are doing
  - What engineers can do
  - What management needs to know



Nittobo fire June 2020 – Printed wiring board substrates

AKM fire October 2020 – plant destroyed. Supplier of vast majority of world supply of ADC/DAC chips

Renesas fire March 2021 – back to full production by late 2021, dealing with backlog





## Global Supply Chain Challenges Global Chip Shortage

- Shortage will drag on until late 2022.
- Hurting production/manufacturing of various electronics.
- Outlook for 2023 looks brighter.
- Some major manufactures have started exploring building their own semiconductors (Ford, Apple, Amazon, FB, Baidu).
- Industry will expand due to new entrants.

## Global Supply Chain Challenges • Lead-times and prices have peaked

- Demand & Supply imbalance.
- Raw materials prices have soared.
- Maximum Lead-times of most components increased to 56 weeks.
- Microchip and other manufacturers sending notification to customers to wait longer.
- High mix/low volume customers (i.e. broadcast equipment manufacturers) wait longer than high volume customers (auto and cell phone manufacturers).



## Shipping and Logistics Challenges Labor shortage in United States

- Not enough Warehouse workers and truck drivers.
- Record 4.3 million workers quit jobs in August 2021.
- Warehouse industry had record 490,000 job openings.
- Shortage of 60,000 drivers in USA.
- West coast ports congestion a major hurdle / around 80 ships waiting to dock.



#### Lead-time Overview

#### MANUFACTURER LEAD TIMES **Company Lead Time** Microchip 53+ weeks Microchip (Atmel) 53+ weeks Micron 16-18 weeks now 52+ weeks, as of Jan. NXP (Freescale) 546/202eeks ON semiconductor 24-52 weeks Renesas 30+ weeks (recovering from fire early in 2021 – back to 100%, dealing with backlog) STMicroelectronics 46+ weeks Vishay 60+ Weeks Xilinx 40+ weeks

Manufacturers average L/T increased above 50 weeks.
Over 50 different L/T increases and EOL issues dealt by Nautel SC in the past year.

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### What this means for the engineer...



- Replacements, even for off air situations, may not always be possible right away.
- Spares for normal consumables (fans, fuses, tubes, blower belts, filters, etc.) are becoming (more) important.



## What this means for the engineer...



- More emphasis needs to be put on maintenance.
- Backup systems need to be in place and tested.
- Testing of backups needs to be a regular event.



## First things first... DOCUMENT!!!

- Site diagram
- Equipment list
- photos







## **Checklists**





Rate this book

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The Checklist Manifesto: How to Get Things Right

by Atul Gawande

★★★★★ 4.04 · F Rating details · 51,357 ratings · 4,480 reviews

The New York Times bestselling author of Better and Complications reveals the surprising power of the ordinary checklist

We live in a world of great and increasing complexity, where even the most expert professionals struggle to master the tasks they face. Longer training, ever more advanced technologies, neither seems to prevent grievous errors. But in a hopeful turn, accl

https://www.goodreads.com/book/show/6667514-the-checklist-manifesto

 $\Box$  Make a checklist of things to do

□ Like checking the generator

□ Changing air filters o On both the transmitter • And the air handling system

Or testing the backup STL

□Tick off items as they're done to minimize surprises



## What this means for the engineer...



Planning is key – start planning scheduled replacements a full year in advance.

Ordering equipment a month before the CP expires is likely not going to be an option for awhile.



## **Check Grounding**



The best building grounding in the world doesn't help much if it doesn't go anywhere when it reaches the outside world!



#### Maintenance

- Grounding is important
  - Not just the installation, but the actual type of connection.
  - If you do it right, you won't have to redo it at night!





# Housekeeping



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# Ground Loops

#### Clean up excess wiring

- previous installs
- broken connections that were replaced

#### Keep ground connections to a minimum

• one per piece of equipment





## **Good Engineering Practices**



Photo credits: Rod Thannum, Northwestern Media



## Good Engineering Practices







**Cable Management** 





# **Cable Management**





## Groundskeeping?

- Some sites resist being visited.
- No Admittance? No problem!





## **Airflow Considerations**

- Airflow is also important
  - As much air as possible should flow through equipment
  - Don't defeat the purpose by reversing direction



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## **Physical Inspection**

- Do it regularly
  - Transmitters
  - Towers
  - Site in general



Photo credit, ERI

Photo credit, ERI



# Housekeeping





## Maintenance

- Air Filters / Air Conditioning Systems
- Hardware power supplies
- Air Handling belts and blowers
- Ground System integrity
- Housekeeping clean up!
- Older gear (GlassFETs!)
- Air Conditioners
- Generators







## **Air Filters**

Air Filters should be changed on a schedule, based on site conditions.

Metal mesh filters can be washed – make sure they are dry before reinstalling!





# Housekeeping







#### **Check Connections**













## Air Conditioners/Heat Exchangers



- Compressor coils need cleaning
- Check condensate lines for blockages
- Belts and filters
- Fluids/lubricants/antioxidants as required



#### Maintenance

- Fluid levels and changes
- Belts and filters
- Check for leaks
- Fuel conditioning/treatment
- Battery check



Photo credit: www.cat.com



### What this means for the manager...



https://www.ford.com/support/how-tos/oil-change/oil-change-information/oil-change-advice/

- Most manufacturers are experiencing shortages of parts and materials.
- Costs are increasing significantly, as are lead times.
- If something fails, getting a replacement overnight may not be an option. There is a need to invest in maintenance, spares and backup systems.



## In Summary...

• The challenges are real and will be here for awhile, but they're not insurmountable.

 Planning and communications are key between all components of the supply chain, from the parts suppliers to the end users.

• Maintenance and backup systems will keep things on air.



# **Questions?**

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# **Thank You**

