The OMNI Transmitter

INSTRUMENTATION
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Instrumentation | calibration | loop check | startup | commissioning | electrical installation | control panel design & fabrication | project management

NAVIGATING THE SUPPLY CHAIN: How Omni Minimizes Long Leads & Shortages

In the November 2021 issue of *The Omni Transmitter*, we reported that widespread supply chain problems affecting our trade weren't expected to ease "until at least mid-2022". Now that we've entered the year's second half, these industry predictions appear to have been fairly accurate in that we've observed steady improvement in certain areas. **That's not to say, however, that significant shortages don't still exist**. Some materials remain very difficult to acquire and have been the cause of countless frustrations on projects all across our industry.

Fortunately, there are things that can be done to help alleviate these problems. Because of a combination of factors working in our favor, Omni has been able to spare many of our clients from a lot of the pain commonly experienced on other projects. Yes, these are uncharted waters and they've been hard to navigate, but that doesn't mean we all have to be in the same boat.

It has long been common practice at Omni Instrumentation & Electrical Services to identify and source better alternatives to specified equipment in order to improve overall performance, lower material costs, and save project schedules, and this longtime approach has worked strongly to our advantage in the pandemic supply chain fallout. With office locations in New Jersey and Maryland and projects spanning the Mid-Atlantic, Northeast, and southern New England regions, Omni already had firmly-established supplier relationships in place over a large portion of the eastern seaboard when the pandemic began, giving us more resources and a greater reach than most of our competitors. These factors don't solve every supply chain problem, of course, but we can confidently say that Omni clients are in the best position possible on all fronts in comparison to what's happening elsewhere in construction.

There is some positive supply chain news to report. Our buyers and project managers are experiencing shorter wait times on some previously long-lead components and equipment, fewer unexpected delays, and in some cases, lower prices. Other item shortages seem to be "holding steady" and are showing signs of improvement.

On hard-hit power distribution items like motor control centers, substations, transformers, distribution panels, and breakers, we're calling the glass half-full. Though they're still in short supply, with estimated lead times continuing to hover at 9-12 months, these delays appear to have leveled off, as well. Unfortunately, however, microchip shortages affecting the process equipment market are likely to persist for at least another year.

Also In This Issue...

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Mushrooms May Use Electrical Impulses to Communicate in 50-Word "Language"

The mushrooms you see sprouting on a residential lawn or trailside in a forest may appear to be inanimate, self-contained life forms but looks can be deceiving. Mushrooms are the spore-bearing fruit of fungi, and a new study suggests that these organisms may have a "language" of their own that is far more sophisticated than previously known.

As many of us learned from the popular documentary *Fantastic Fungi* currently airing on Netflix, fungi transmit electrical impulses through long, threadlike structures called hyphae, similar to how nerve cells transmit information in multi-cellular organisms. In a study published in *Royal Society Open Science* and reported by Smithsonian, Guardian, and NPR, scientists analyzed electrical spikes generated by four species of fungi. These impulses were found to vary by amplitude, frequency, and duration, creating intricate patterns that are typically associated with words in human speech.

The researchers believe these patterns may represent a vocabulary of up to 50 words organized into sentences and that fungi use this electrical language to maintain system integrity and share information about nutrients, damage, or dangers to their hyphae-connected network. The scientific community is intrigued by these findings, but more evidence is needed to prove the language theory.

RSI Prevention: Construction Trades at Risk for Repetitive Strain Injuries

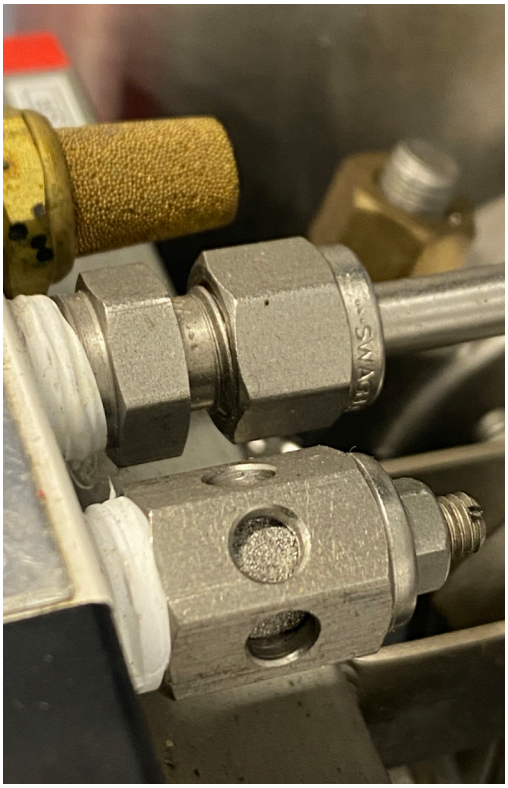
Repetitive strain injuries (RSI) are activity-related injuries to the musculoskeletal system that are often caused by cumulative trauma due to commonly performed workplace tasks. Also known as repetitive stress injuries, they are the leading cause of occupational disease in the U.S., costing billions of dollars in workers' compensation each year. Repetitive strain injuries are more prevalent in construction trades than in any other industry.

RSI can result when the body is subjected to stresses caused by repetitive tasks, forceful exertions, vibrations, mechanical compression, or sustained awkward positions. Plumbers, for example, often develop rotator cuff tendonitis from working with their arms above shoulder level, and painters frequently suffer from tennis elbow due to the repetitive motion of rolling paint. Electricians are susceptible to carpal tunnel syndrome, and other common RSIs include thoracic outlet syndrome, Raynaud's syndrome, and trigger finger, among many others.

The first step in preventing RSI is identifying hazards and taking steps to correct them. Break up prolonged repetitive movement with rest periods or by rotating tasks, and pay attention to early symptoms like pain or tingling in the neck, shoulders, arms, or hands. Stretch or move around when experiencing task-related discomfort.

Ergonomics is important when it comes to preventing RSI. Long-handled tools with smooth, rounded grips are usually preferable to those with shorter handles and hard edges, and tools that are not designed to be used for the task at hand should be avoided. Arrange tools and equipment in a layout that minimizes excessive stretching and bending, and practice proper lifting techniques. Keeps hands and extremities warm as cold temperatures can increase RSIs, especially those related to vibration. PPE such as back braces, wrist and arm supports, elbow and knee pads, and boots with good ankle support can help prevent repetitive strain injuries, as well.

Hydraulic Shock on Process Control Project Corrected with Flow Restrictors



On a recent process control project, Omni installed several hundred control valves as per design specifications. But when commissioning commenced using water batch testing and product in the lines, a severe pipe hammer problem quickly became apparent, violently shaking and moving piping on racks and risers. A solution was needed, and fast, to prevent damage and worker injury.

Omni determined that the problem stemmed from the control valves closing too abruptly, and the best solution would be to prolong their closing time from under 1 second to between 4-5 seconds to slow down air release and gently close them against the moving fluid. We located high-quality, repeatable, lockable restrictors that could be adjusted across a range on all valve exhaust ports and ordered several dozen for testing. We installed the restrictors and set each with a 5-second closing time to allow the valve to seat properly on the closed limit switch. On the process controls side, a 10-second delay was programmed to allow time for the valves to fully close and prevent alarms from triggering.

Once we'd verified that the new test restrictors were working, we placed an order for the remaining units and had them overnighted to the facility. In the meantime, we had several of our instrument technicians working ahead, installing and testing each valve on specific systems that were ready for commissioning. In the end, the new restrictors did the trick and the problem was resolved in short measure.

Contactors: How They Work and Why They Sometimes Fail

Contactors are electrically-controlled switches used to connect or disconnect power to large lighting loads and motors. A contactor consists of two basic parts: multiple normally-open power contacts and an electromagnet, or coil. When current passes through the coil, a moving contact is attracted and holds to a fixed contact. When the coil is de-energized, the contacts open, and power to the load is disconnected.

Contactors that are precisely matched and sized to their application can last for many years of continuous duty, so if a contactor fails prematurely, it is usually due to one of several common causes.

Contactor overheating, which results in severe pitting or deformation of the contact surface, can occur if too much current is transmitted, if the contactor does not close quickly and firmly, or if it opens too frequently. Once this happens, operation will become erratic and failure will be swift. Chattering, humming, and buzzing are common symptoms of contactor problems, and the stress of chattering can be a cause of failure in and of itself.

Coil overheating is another common cause of failure that can result from voltages that are too low or too high, or if contacts fail to open or close due to misalignment, dirt, oxidation, or rust. High ambient temperatures over a long period can cause contactor coils to fail, as well. If a coil problem is suspected, an ohmmeter can be used to compare resistance to a nearby matching contactor. The contactor should be replaced if the resistance is significantly higher or lower.