The OMNI Transmitter

INSTRUMENTATION
ELECTRICAL
CONTROLS

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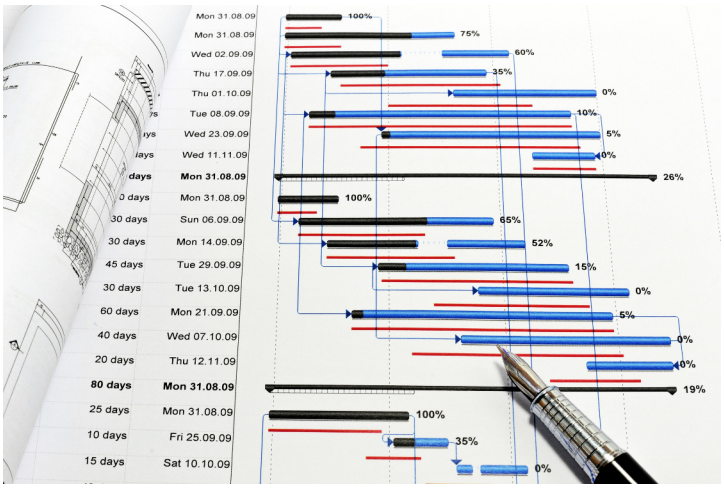
Instrumentation | calibration | loop check | startup | commissioning | electrical installation | control panel design & fabrication | project management

Milestone Schedule Can Alleviate Supply Chain Issues



Closely tracking production helps to prevent unpleasant surprises and head off pandemic-related project delays

Omni Instrumentation & Electrical Services, Inc. is currently involved in a large manufacturing plant project that has been proceeding surprisingly smoothly despite nationwide supply chain disruptions stemming from the ongoing coronavirus pandemic. Much of this favorable progress can be attributed to widespread adoption of the milestone schedule among contractors working on this project.

Milestone schedules help ensure that equipment and material production is progressing as expected and important details don't go unnoticed. Though the construction industry has fared better than many others during the pandemic, the shutdown has certainly had detrimental effects, with project start dates pushed back, schedules upended, and equipment and material delivery delayed. Requiring that manufacturers provide a milestone schedule is always well-advised on any large construction project, but the fact that many are skittish about making production and delivery commitments right now makes obtaining them important than ever.

Close tracking of production milestones from purchase order through delivery and requiring regular detailed updates from manufacturers help provide a clear picture of where a project stands and what might be expected should new supply chain disruptions arise. Typical milestones can include target dates for engineering completion, receipt of raw materials, stages of fabrication, testing, and shipment. When production problems do occur, most manufacturers give preference to contracted customers with whom they have firm milestones and open lines of communication in place.

In working closely with equipment manufacturers to track milestones on the various substations, switch gear, motor control centers, VFDs, PLCs, HMIs, and instrumentation required on our current project, Omni can definitively point to a number of instances where the milestone schedule has worked to our distinct advantage. We've been able to spot and head off potential problems and make proactive schedule adjustments when they can't be completely avoided.

Based on our positive experience, Omni strongly endorses the milestone schedule on any large project, especially during these unsettled times. It might just make the difference between a satisfactory project outcome and an unmitigated finger-pointing disaster.

Also In This Issue...

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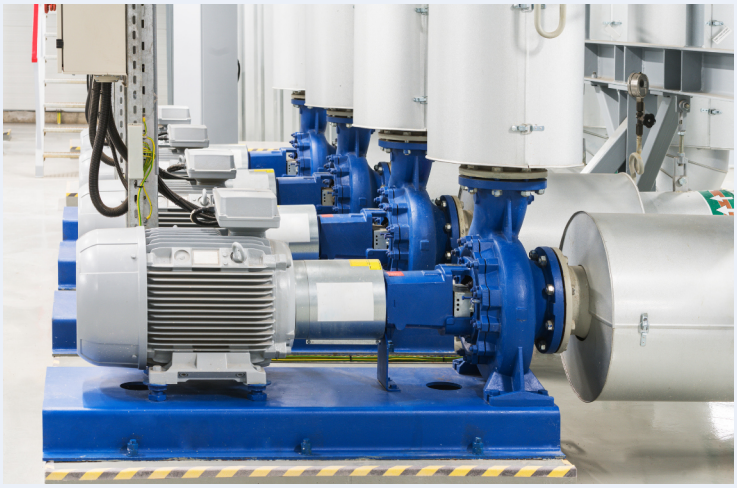
Remote Prefabrication Keeps Workers Safe From COVID-19

Prefabrication has always been a favored method of electrical construction here at Omni Instrumentation & Electrical Services, Inc., but work practice changes designed to increase safety during the pandemic are bringing even more of its many benefits to light.

In order to safeguard our workers from exposure to COVID-19, Omni is remotely prefabricating as many electrical components as possible rather than assembling them at the job site. Such items include temporary lighting, light fixtures, control panels, BAS and security systems, pneumatic assemblies, and even entire electrical rooms and IT/AV rooms. These substantially-completed assemblies are then transported and installed in less time than is normally required when built onsite, which drastically reduces time spent working in close proximity to other trades.

Much of the prefabrication is done in Omni's large, conditioned workshop, where technicians can perform their work safely and comfortably while maintaining proper distancing. Other project assembly takes place under large tents or in sectioned-off outdoor areas of the job site. Not only do these practice reduce potential exposure, they also save time, increase productivity, and help keep project costs low. Reaction has been overwhelmingly favorable among our workers who feel safer and, in many cases, find remote prefabrication preferable to onsite assembly. In fact, some of the new prefabrication techniques developed out of necessity have proven to be so efficient that we plan to incorporate them into our standard work procedures once the pandemic is over.

Omni Tech Talk: Inrush Current



Inrush current is the maximum instantaneous input current drawn by an electrical device when first turned on. Managing inrush current during building and process equipment startup is extremely important, particularly when power is restored after an outage.

When starting a motor, inrush current is necessary to overcome the inertia of a dead stop. Depending on the motor sizes, quantities, and load, startup of too many air handlers, pumps, fans, compressors, and other pieces of equipment at once can cause breakers to trip, fuses to blow, or generators to shut down. Many facilities are unaware of the problem until there is a loss of power and equipment is restarted on generator or restored utility power.

Inrush current can be managed by starting equipment according to a timed sequence at specific ramp speeds. This can usually be programmed through the building management system or process control system. Equipment must be started up at intervals and in the right order. For example, process water should be flowing before chillers are started. Timing and sequence should be tested to ensure that a facility won't fail to run when needed and to uncover important equipment that was mistakenly omitted from the sequence. An accurate and up-to-date electrical coordination study and ensuring that breakers are set properly also help to eliminate nuisance trips on upstream breakers.

Rugged Maine Island Declares Energy Independence with Microgrid

Isle au Haut, a tiny island off the coast of Maine, has been relying upon a 7-mile underwater cable for their electricity since 1983. But the cable's estimated lifespan at the time was 20 years, and now, 17 years beyond its expiration date, the cable could fail at any time. Fortunately, the residents of this rugged island are accustomed to relying on innovation, and five years ago they set to the task of creating a new, autonomous energy source. What they came up with may prove to be a renewable energy model for the future.

Rather than replace the cable at a cost of about $1.7 million, island residents have opted to build a microgrid. A number of renewable energy options were considered to generate electricity, but islanders settled on solar, the most economical choice by far. A 300-kilowatt solar array of 900 panels is now under construction, and supercapacitors with a capacity of 1,000 kilowatt-hours will be used for energy storage. The entire microgrid system will be controlled using algorithm-based software that will calculate the energy costs of different sources of electricity in real time, and individual users can select their preferred source from a dashboard interface.

Because the island's population of around 50-70 year-round residents swells to nearly 300 during the summer, the new system will produce more electricity in winter than is needed. The excess power can be sold to the mainland while the cable is still functioning, but will be essentially wasted once the cable fails. The solution is to install air-to-water heat pumps in town buildings to provide heat, and residents are encouraged to convert to this type of system as well. Though somewhat pricey to install, the heat pump system could cut home heating costs by half, putting payback time on upfront costs at 4-7 years.

Energy usage costs are expected to remain the same at 32 cents per kWh. The cost to switch over to the new system will sting a bit for islanders – about $6,400 per property – but most are accepting of the costs as a necessity. Residents are given the option of paying all at once or over 20 years.

Control Panel Cooling & Ventilation

Ventilation and cooling are important considerations when designing a control panel cabinet or cabinet enclosure. Because a control panel cabinet is enclosed and contains equipment that generates heat – VFDs, starters, contactors, relays, PLCs, etc. – temperatures can rise to critical levels, and a hostile external environment can further contribute to excessive heat. Overheating conditions can also develop as more equipment is added over time and panels become overcrowded. The resulting high temperatures can cause tripped overloads, damaged circuit boards, erroneous readings, component failure (PLCs and VFDs begin to fail at about 105°F), and shortened life span.

Many manufacturers have built-in cooling systems for equipment that generates heat (VFDs, etc.) but custom cabinets may need to have cooling provided, and there are several types available. DX and Venturi systems are sometimes used, but vortex cooling systems are most common. This low-cost method both purges and cools the enclosures using a vortex tube that creates cold air from ordinary compressed air. Different grades of vortex coolers are available depending on the conditions and demands of the environment.