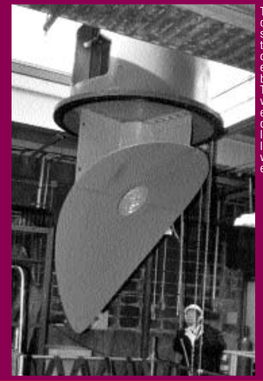
CASE LONGO HISTORY

Barnacles, clams and an assortment of sea life had made a home on all the submerged components.

Corrosion on the diverter was substantial, eating completely through the column support areas of the diverter. New sections were welded into place, welds cleaned and smoothed before the unit received its bright protective coating.

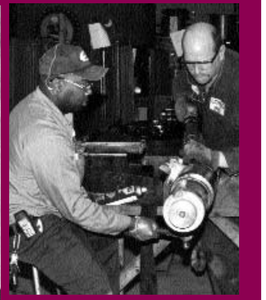
Divers were critical for the extraction, positioning and aligning the jack beneath the pump, adding the needed pressure to break the pump loose from the encrusted casing.

With each part cleaned, repaired, or replaced the reassembly was relatively trouble free. There is always the concern that even these massive elements could go out of round or distort after years of confinement, but that was not the case. Outstanding crane work and a delicate touch had parts easing into place on the first try.



The huge diverter, or shovel, in its two-tone blue color scheme easily slipped back into place. The blue color was a two part epoxy coating designed for a long protective life in the salt water environment.

Crouched in the pit, guiding the components together, our Longo team members know exactly when to stop, backup or keep going. The wrong call can have tons of pressure turning seals and bearings into salvage stock!



The main shaft of the pump was examined, worn protective sleeves removed and the shaft was checked for balance and straightness.

When it's time to kick it up a notch...

We were recently awarded the contract to refurbish one of three cooling pumps for a New Haven, CT generating facility. The pump alone was 34 feet in length, weighed 16,000 lbs, and delivered 95,000 gpm of cooling water from the Long Island Sound to the generating plant.. The pump had not been serviced for years, so the combination of the long exposure to the salt water, sheer size and coordination of several mechanical services meant organization was as important as our pump expertise. While the project was fairly straight forward– dismantling of the pump housing and motor, the extraction of the pump, rebuilding the pump and reinstallation...*the devil was in the details.*

The scope of the job was something new for us and we looked at it as a chance to showcase our mechanical and organizational capabilities. Although we have handled large pump projects before, this one was not only large but had details that were a bit different. The lower portion had been submerged in the Long Island Sound for years and the condition of the pump and its casing was really an unknown.

One of the reasons for our optimism is our obsession with the "what ifs..."- looking at all the things that should not go wrong and plan for them as if they were going to go wrong. This is a constant for us, across the board, whether tackling a motor or switchgear job. The ability of our field service teams to make things look easy is in part due to considering all the "what if's" and having answers at hand.

Removal of the motor and the huge diverter through the roof of the building went according to schedule through the use of a 20 ton on-site crane. Removing the actual pump was more of a concern since it and its casing had obviously become home to an assortment of sea life. The accumulation of this material basically eliminated any free space between the pump and the casing. The 20 ton crane alone was simply not enough to ensure the pump would move. With this in mind, a dive team was on hand to add jack pressure to the bottom of the submersed pump. Working in murky water with about one foot visibility, the dive team and crane operator were choreographed by our Longo crew to dislodge the pump from the grip of the assorted tiny crustations that had been cemented to the pump and the walls of the casing. With the crane operator calling out readings as he approached the limit of his machine and crackling speaker voice of the diver as he described reaching the limit of his jack, nothing was moving! Then slowly, and literally an inch at a time, the pump shaft began to rise up.

The pump paused a few times as crew members had to resort to shovels to break off the barnacles and shells that held up the pump every few feet. Once clear of the casing, the pump was lifted up through the roof placed on Longo's flat bed which was there, ready, and in a matter of minutes the pump was strapped down and on its way back to our Wharton, NJ facility.

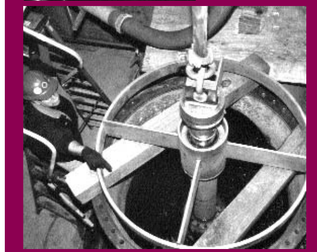
One day in the shop and the pump was apart and work underway to repair it. New components had been ordered and were already in house. Most of the damaged areas were expected, but, as always, there were a few surprises and we consulted with our customer to decide what to repair and what to replace. With Longo's extensive in house mechanical capabilities, (machining, welding, balancing super-sized components) we are often able to salvage components rather than just order new. Even when "money is no object" it is often time that becomes the critical factor and Longo is uniquely geared to cheat the clock. The main shaft was cleaned and when checked against the specs found to have a slight bend. A plating contractor on stand-by was notified and the shaft built up, turned, and, ground to bring it back in line with the specifications. Longo's resources both inhouse and outside came into play to resolve this one problem.

The reinstallation of the motor/pump unit was the reverse of the extraction, step by step with proper caution. Even though all the components were either new or resurfaced one can never assume anything when dealing with tons of weight and tight tolerances. The Longo crew paid specific attention when lining up couplings and seals. Even a slight misalignment under these forces could result in a pile of useless scrap metal. With everything back in place the unit was started up and, to no surprise for us, it purred!

The cooperation with the plant staff was the catalyst that helped make the project run as smoothly as it did. Any question or concern was immediately addressed and problems solved. About half way into the repairs, a customer representative arrived at our shop to personally review the progress and settle any last minute questions. This cooperation was critical to keep the job moving towards its deadline and it eliminated those end of job "extras" or surprises that can turn an otherwise successful project into a sour experience. Again it goes back to our "what if" policy and trying to anticipate the needs of the project and of our customer as well.

"Give me the damn ball!" was Keyshawn Johnson's cry and like, Keyshawn, we wanted the "ball" to show what we could do. Maybe we should change that to "Give us the damn job!" As you can see, it is hard to pigeon-hole Longo when it comes to performing any mechanical, or electrical, repairs or service. Confident, competent and very competitive!

The reconditioned pump was stopped just above the casing rim. It was suspended while the special adapter was removed from the pump shaft so the main shaft from the motor to the pump could be lowered into position.



service works

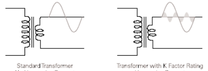
DISHARMONICS

"We are going to need more lines than that...there are the servers and the whole graphics department, all the printers, etc...

While today's office may be light years ahead of its predecessors in productivity and efficiency, it is also creating a whole new electrical environment. You might say the law of "unintended consequences" is alive and well in offices and production facilities across the country.

Millions of computers, add to that the high tech "do everything" copiers, faxes and modems, etc. and you have an electrical circus going on every day, all day. Just for fun, let's throw in some energy saving T-3 fluorescent light ballasts and we have an electrical storm brewing. An invisible, potentially dangerous, definitely debilitating "electrical tsunami." These state-of-the-art office utensils are chopping up electric waves at a fierce rate.

This equipment, and its current usage, does not fit into our traditional sinewave category. Basically the resistance is not constant and changes during each sinewave. The demand is drawn in pulses. Instead of one huge destructive wave, you now have hundreds of electrical waves. This is not your father's smooth linear circuitry, but non-linear activity on steroids and its produces some very non-conventional wave patterns.



This phenomenum is not just a computer problem. As mentioned, ballasts can have an impact, as well as VFDs and other enhancement devices.

And it all boils down to harmonics, electrical wave activity, running amok in your circuits. The non-linear activity is chopping up the current and adding multiple cycles. The impact of this effect ranges from barely registering on large ponderous production equipment to the disruption of computers, telecom activity, not to mention extremely sensitive equipment such as medical diagnosis and other sophisticated testing devices.

But there is another by-product of bad harmonics that really doesn't have anything to do with efficiency or production. It has to do with safety. These multiple cycles are most noticeable in the neutral circuitry. The size of the average office neutral, 12 AWG, is more than sufficient for linear circuits in yesterday's and even today's large office buildings. But the neutral is sort of the disposal chute for these unwanted and harmful cycles. It is also the circuit that is not protected by a breaker. These cycles come together and since they don't all cancel each other out, the harmonic currents actually add to each other. The result is a build up of heat. How much? Enough to raise the temperature of the neutral to a point where it causes insulation failure!

An example of unintended consequences.

While there are certain consistencies in the wave cycles where harmonics live, such as the 3rd, 5th and 9th multiples, each scenario is really unique. The best solution, or beginning of a solution, is to test and see if you have a problem at all, and if so, how severe it is.

Once you have the data in hand you can determine the severity of the problem and what course you want to take to reduce the harmonics.

In a stand alone facility there are various aspects of the situation that are reasonably controllable at various points. However, if you are managing an office complex, the story is now different. More than likely your major concern is the downstream effect on the neutral and preventing all your tenants from creating so much havoc within the circuitry that there is a real danger in excessive heat build up.

The question of what to do about these rogue harmonics is just as oblique as the problem itself. An overly simple solution could be to replace all your neutrals with at least 2X or 3X the carrying capacity and increase the size of the busses to remove the threat. Doing that would improve safety, but the cost would be severe. Filters can reduce and eliminate much of your harmonic problems. However, they are a case by case solution. Smaller filters at each point of nonlinear activity or larger filters to clean the harmonics before they pass on to another circuit are good solutions.

If you need help determining the severity of your harmonics problem or are looking for ways to handle it, please give us a call at ***973-537-0400 x741.***

SYMPTOMS & NEGATIVE EFFECTS ON THE SYSTEM

1. The neutral current exceeds any of the phase currents. In a 3-phase, 4-wire system, neutral conductors can be severely affected by nonlinear loads connected to 120V branch circuits.

If the loads are single-phase, certain harmonics called triplens (multiples of the third harmonic: 3rd, 9th, 15th, etc.) instead add together in the neutral conductor, causing it to overload. The neutral is not protected by a circuit breaker.

2. Circuit breakers trip even though loads do not appear to be excessive. Excessive harmonic currents reduce the amount of load a circuit breaker can support. Critical loads may trip off-line, resulting in catastrophic data and revenue loss.

3. Transformers, bus bars, wires and switchgear become hot. System components may fail due to excess heat. Waste heat will increase air conditioning cost, as well.

4. System components emit noise (a buzzing sound). System components can become magnetically resonant at harmonic frequencies. Noise is disruptive to facility personnel. Vibrations can cause mechanical damage.

5. Noise interferes with communications lines, and visible interference affects the operation of PC monitors. Magnetic fields from high 3rd harmonic currents can cause interference with end-user electronic devices.

6. Triplens in the neutral conductor cause inductive interference, which can be heard on a phone line. Telecommunications systems often give the first clue to a harmonics problem. Telecommunications cable is commonly run next to neutral conductors.