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The First Robotic System for the
Functional Testing of Nanosatellites**

**“Crime Scene Investigator”
Identifies Usual Suspects of
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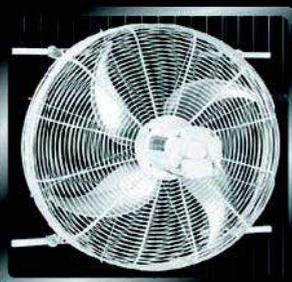
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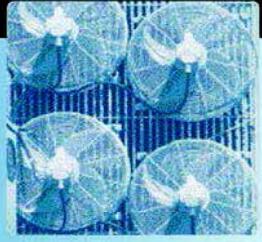
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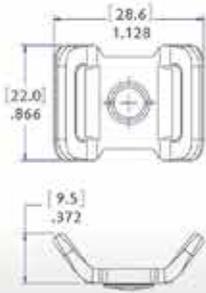


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 Package: 1000/box 20 Magazines



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 Package: 750/box bulk pack
 Part Number: 10450MAG
 Package: 1000/box 20 Magazines

Image Industries Introduces Breakthrough QuikLinx® Cable Management System

Patented system solves the challenge of cable management

Image Industries, a leading designer and manufacturer of stud welding solutions, announces the launch of its revolutionary **QuikLinx® Cable Management System**. Available in three different options depending on volume requirements, the QuikLinx system definitively solves the decades-old challenge of effectively managing cable routing in a wide range of equipment.

The foundation of the system is the QuikLinx weld mount—a one-of-a-kind, patented piece that can be welded in place in as little as 0.3 seconds. The mount allows for fast, efficient and secure routing of cable and cable bundles of almost any size, up to as much as 70mm diameter, and accommodates cable ties up to one-half inch in width. The system requires almost no training to use and the welds have proven reliable under the most rugged conditions; this means that anyone on the shop floor can install QuikLinx attachment points with consistent and dependable results.

“Cable management has been a problem for as long as there have been cables to route,” says Blake Hobson, Co-owner of Image Industries and inventor of the QuikLinx system. “Every customer has a different homegrown solution, built out of necessity by resourceful engineers because there was nothing better on the market. With the QuikLinx system, we provide an option that is faster, more cost-effective, consistent

Guard-Safe Guarding

Utilizing Laser Scanning to Design Machine Guarding



- ❖ **Identify Hazards – Access over, under, around or through to a moving or rotating part must be guarded.**
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- ❖ **Engineered Drawings – Arrangement and details are approved by client prior to fabrication.**
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- ❖ **Installation – GSG technicians assure that all guards are mounted rigid and secure.**

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and reliable. The result is something that's both one-of-a-kind and extremely simple for any company to implement. Simply put, it changes the game for cable management."

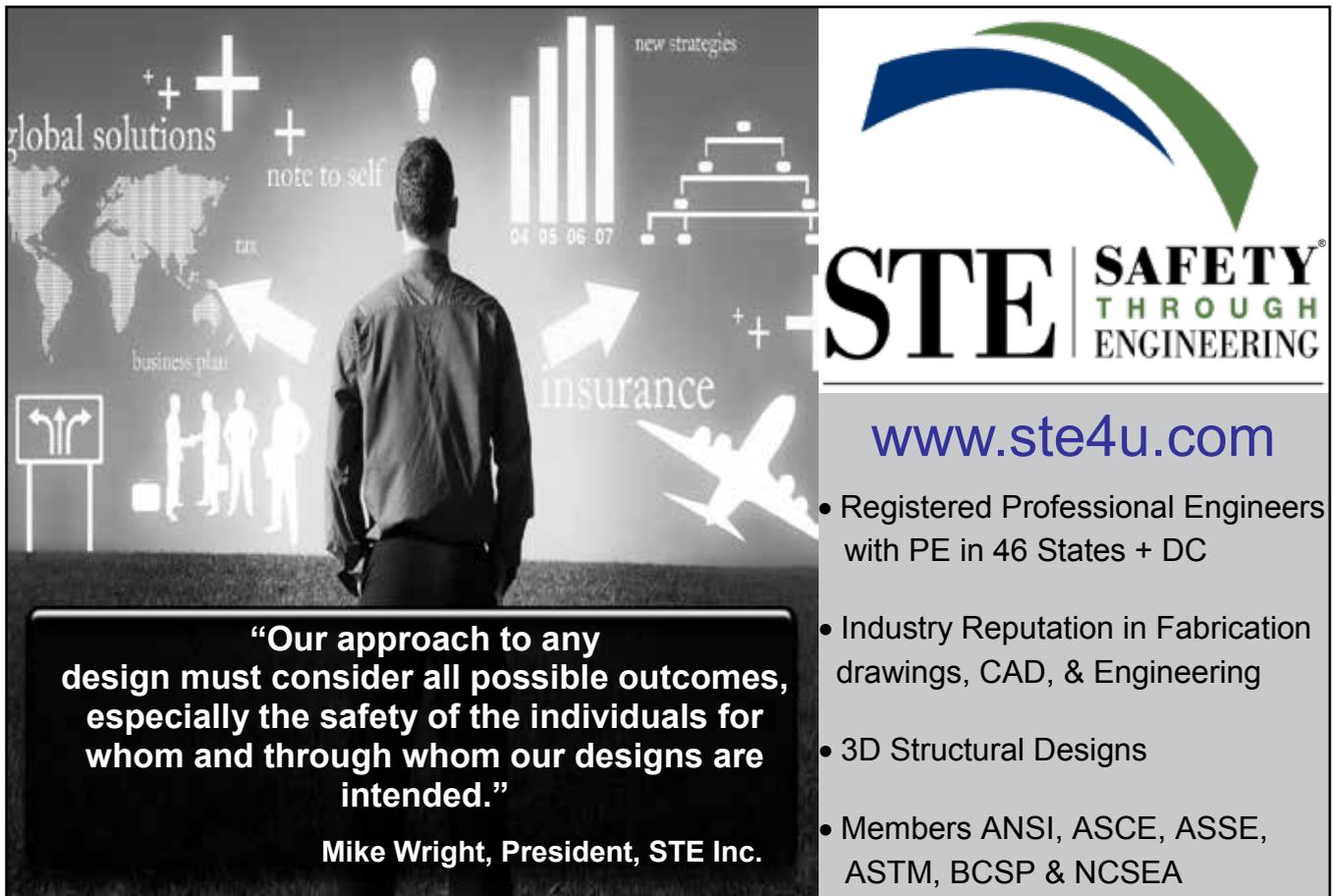
QuikLinX is ideal for any equipment in which cable management is required, and has been proven especially well-suited for agriculture equipment, trailers, construction equipment, power distribution equipment and other equipment that's often used in unforgiving environments. Customers can choose from three configurations based on their needs:

- **MIG Linx:** Ideal for low-volume needs, these QuikLinX mounts are made for use with standard MIG welding equipment—just position the mount and weld it in place.
- **Single Shot Stud Weld:** Compatible with most brands of stud welding equipment, an adapter allows a QuikLinX weld mount to be loaded one at a time, and each takes just a fraction of a second to weld. Ideal for moderate volumes.
- **QuikLinX Autofeed System:** For high-volume needs, Image Industries offers an Autofeed tool with magazines of QuikLinX weld mounts. With less than 10 minutes of training, an operator can load 50 mounts at a time in about 15 seconds, and can weld up to 16 mounts per minute.

To see how the QuikLinX system revolutionizes cable management for all equipment types, visit www.quiklinx.com •

About Image Industries

Image Industries is a U.S.-based designer and manufacturer of studs, stud welding equipment, hydraulic ports and cable management solutions. The company provides a full breadth of standard and customized product and service solutions to meet the specialized needs of many different industries. This includes precisely engineered and unique answers to the challenges customers face in their production systems. The first U.S. manufacturer to introduce digital stud welding equipment for quick, easy stud welding with greater productivity, Image Industries is also the inventor of the patented QuikLinX® system, which revolutionizes the cable management process for manufacturers of construction, agriculture, transportation and fixed equipment, among others. Learn more at imageindustries.com.



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Guard-Safe Guarding

Five Easy Steps to Successful Machine Guarding!



Identify the Hazards

Not all hazards are created equal. Nor are the solutions for guarding them. Keep in mind the basic principle: Over, Under, Around or Through. If any body part is capable of reaching a moving component by those means, it must be guarded. The example to the left shows an exposed rotating shaft and a fan that present a hazard to employees.



Scanning & Measurements

Set up an appointment with Guard-Safe Guarding to visit your facility and review your goals and primary objectives regarding your hazards. GSG will perform their own safety assessment to assist you in this process. GSG will photograph and measure the application. Some applications may require Laser Scanning to capture interferences and assist us in the design stage. The shaft/fan hazard from above was scanned by GSG, as shown here.

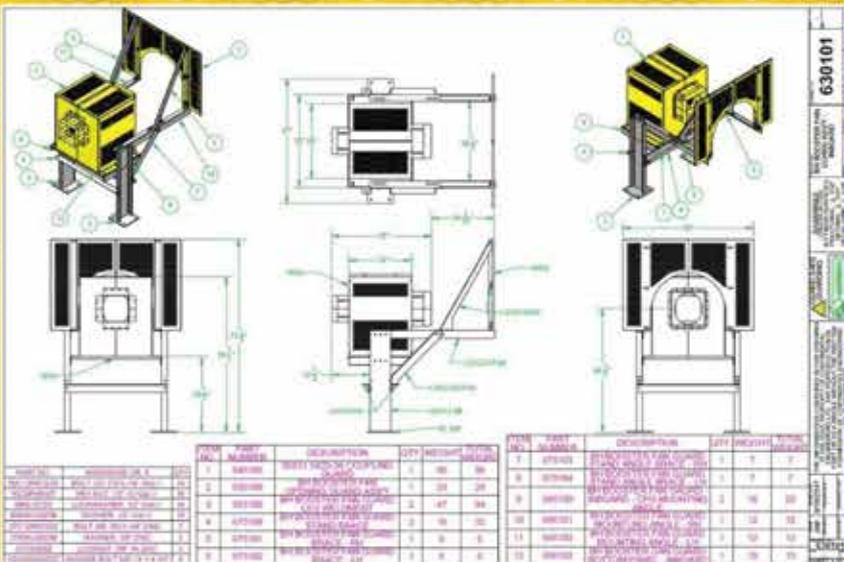


Designing your Guards

Upon processing the Laser Scan, GSG utilizes 3D CAD software to model the new guards and supporting structures. For simpler applications, the model is created based upon site measurements. A 3D CAD image is created and shared with our clients. The client is then able to visualize the final product, ask questions, and provide feedback regarding accessibility, or other concerns.

Engineering Drawings

Upon approval from the client of the initial concept model from above, GSG proceeds to create complete fabrication, arrangement and installation drawings. The drawings are once again submitted to the client for final approval prior to fabrication and shipment. O&M Manuals & drawings are provided for the client in electronic pdf format and paper format.



Installation

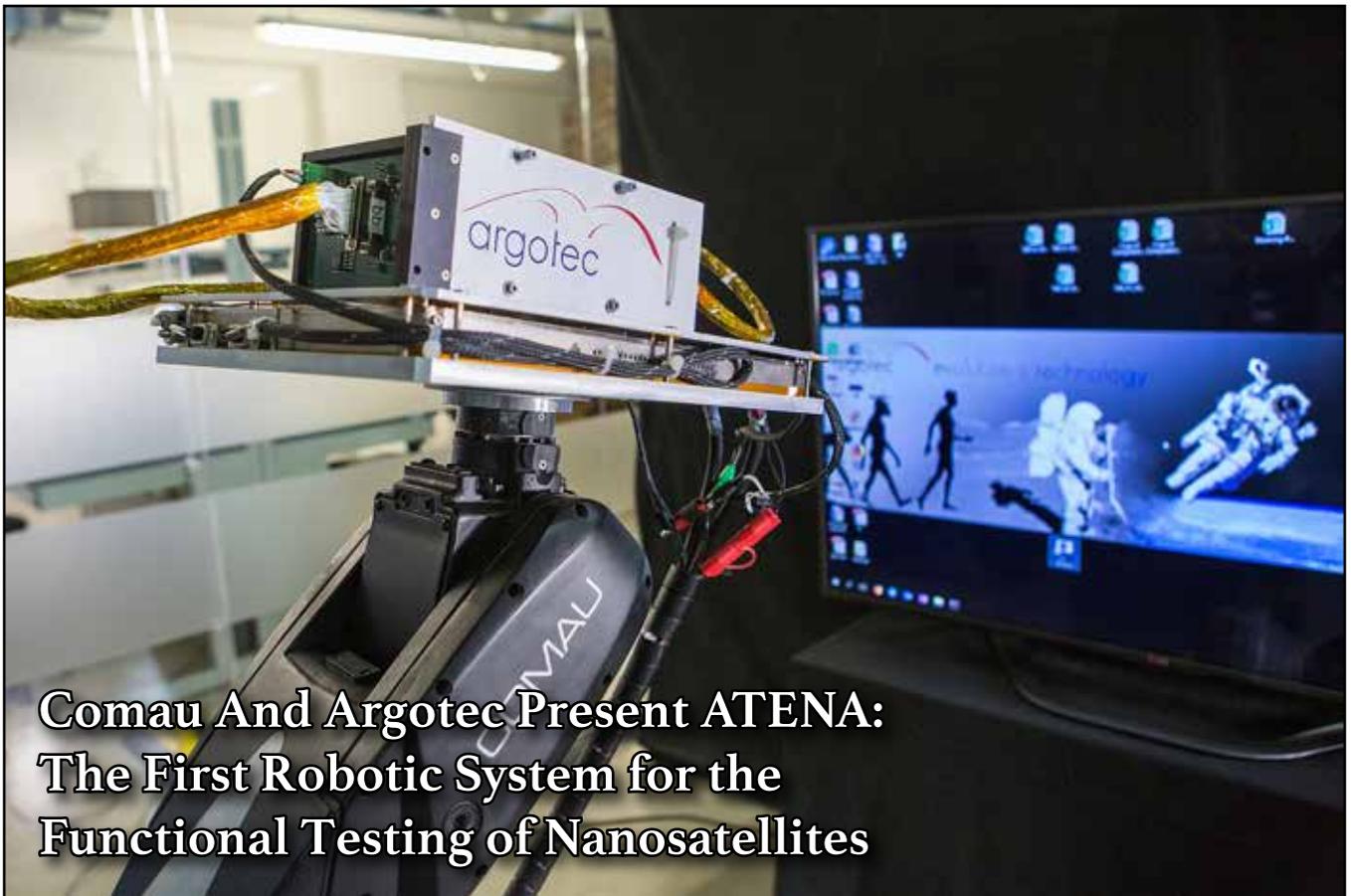
Guard-Safe Guarding powder coats all guards Safety Yellow. GSG preassembles the parts prior to shipping to ensure proper fit and delivers the guards assembled as much as possible to save time at installation. All guards are carefully packaged and shipped in a wooden box. It is recommended that a GSG technician be present during the installation process. All guards must be mounted rigid and secure.



At Guard-Safe Guarding we know that you care about your employees. We understand that guarding your equipment is not a simple or glamorous proposition. Guard-Safe Guarding is well prepared to answer your guarding questions. Typical concerns we hear are from Safety Managers looking for guidance, Maintenance personnel wanting easy access & removal of protective barriers, and from operators wanting to work safely, yet unencumbered. We have heard and addressed all of your concerns with our innovative and time saving products.

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Comau And Argotec Present ATENA: The First Robotic System for the Functional Testing of Nanosatellites

Argotec, Italian aerospace engineering company, and **Comau**, worldwide leader in delivering advanced industrial automation products and systems, present **ATENA**, an innovative system aimed at testing and validating the functionality of nanosatellites.

ATENA (Advanced Testing Emulator for Nanosatellite Arm) simplifies simulations of satellite performance, generally carried out through complex numerical analysis and tests of hardware, software, navigation and control algorithms, which usually return results difficult to interpret.

The system, **born from the intuition of Argotec (which has also registered a patent) and the collaboration with Comau**, consists of a satellite or part of it, an electronic control unit and a Comau robot. The nanosatellite, or part of it, is fastened to the wrist of the robot which, thanks to a closed loop configuration, **recreates the movement of the satellite in orbit**, during the different phases of a mission. This solution allows to **test all the communication protocols of the system**, verifying also the interaction between all the components. The robot chosen is the Racer7 1.4, the fastest in its class, which guarantees **reliability and precision in a compact mechanism**. This new approach is so realistic and versatile that it can be used from the early design stages of a satellite.

ATENA represents a real breakthrough in the aerospace

sector. Using the robot, it's possible to monitor the satellite's functionality and observe its behavior directly. This guarantees a more immediate and simple visualization of the test results, as well as **the possibility to carry out flight demos**. Moreover, two or more robots can faithfully reproduce in-orbit satellite docking.

David Avino, Managing Director of Argotec, said: *"Argotec is constantly looking for reliable technological solutions which can improve the quality of space systems and also allow possible Earth-related effects. In fact, according to our company vision, everything that is designed for space activities can have an immediate return on Earth, resulting in benefits in our daily life and meeting needs which haven't been met yet. The ATENA project, for which a patent application has been filed, represents our dynamic vision, our desire to innovate and, above all, the ability to collaborate with a multinational companies like Comau, pursuing a common goal: obtaining outstanding results of international relevance by exporting the excellence of Made-in-Italy technology in the world."*

Massimo Calvetto, Sales Manager GI Italy of Comau, observed: *"We are proud to have contributed to the implementation of the innovative project developed by Argotec, in an extremely technological sector such as aerospace, where precision and reliability are essential components. Our robots have proved to be the right choice to guarantee the achievement of excellent results. Comau is renewed as a leader in*

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the automotive sector, but the company has always been ready to open up and extend its areas of application to all the other sectors as well: our advanced skills, the levels of technological excellence we achieved and our flexible, modular and high-performance solutions are now also available to the SMEs operating in the General Industry."

Argotec

Argotec is an Italian aerospace engineering company established in 2008, whose research, innovation and development activities concern the creation of products and services intended for various sectors, such as engineering, information technology, system integration, Human Space Flight and Operation, the development of solutions in the field of renewable energy and the design and manufacturing of small satellites. The Argotec unit dedicated to nanosatellites deals with all the phases that lead to the development of these systems: from design to assembly, to the integration and testing of each component. Among the company's ongoing projects in this sector, we can mention ArgoMoon, the only European satellite selected by NASA and coordinated by the Italian Space Agency to participate in the Exploration Mission-1, that will test Space Launch System (SLS), the new American launcher. Argotec's research and development activity has always been focused on the creation of innovative systems and services able to obtain applications which enhance space systems but also result in an improvement of life on Earth.

About Comau:

Comau, a member of the FCA Group, is a worldwide leader in delivering advanced industrial automation products and systems. Combining innovative engineering solutions with enabling technologies, Comau helps companies leverage the full potential of digital manufacturing.

In addition to a vast range of modular, flexible and highly-configurable products, Comau offers interconnected digital service solutions able to transmit, elaborate and analyze important machine and process data, thereby increasing efficiency for smart manufacturing. The full portfolio includes: joining, assembly and machining solutions for traditional and electric vehicles, robotized manufacturing systems, a complete family of robots with extensive range and payload configurations, autonomous logistics, and asset optimization services with real-time monitoring and control capabilities. The offering also extends to project management and consultancy, IoT services, and maintenance and training for a wide range of industrial segments.

Headquartered in Turin, Italy, Comau has over 45 years of factory-proven experience and an international network of 36 locations, 15 manufacturing plants and 5 innovation centers that span 17 countries and employ more than 9,000 people. A global network of distributors and partners allows the company to respond quickly to the needs of customers of all sizes, no matter where they are located throughout the world. Comau is also committed to improving human - machine collaboration by developing competencies through the formation of individuals and groups as part of its open automation approach. This includes hands-on training programs by Comau Academy that develop the technical and managerial competencies necessary to face the challenges and opportunities of Industry 4.0.

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“Crime Scene Investigator” Identifies Usual Suspects of Premature Transformer Failure

*Evidence reveals how to avoid transformers that wind up dying well before their time.
Spoiler alert: There’s no substitute for quality.*

When it comes to big ticket items, power transformers come near the top of the list. So, when they fail prematurely, it is a painful experience with damages that can far exceed the cost of a replacement unit. These added expenses may include the loss of priceless production time, damaged credibility, or regulatory fines and civil lawsuits.

While numerous facilities have had to endure this sting, others are learning from those mistakes thanks to failure-analysis experts who investigate transformers that die an early death. As such, the job is a lot like a detective on a CSI crime show drama. They show up at the “scene of the crime” and try to determine what went wrong and who’s at fault.

“I’ve been involved in dissecting numerous transformer failures,” says Jeff Jones, a transformer “crime scene investigator” and founder of Electrical Certification, Inc. in Cincinnati, Ohio, specializing in testing, certification, and failure analysis. “Inevitably, the first thing that comes out of the customer’s mouth is, ‘Hey, it’s just a year old! What happened?’”

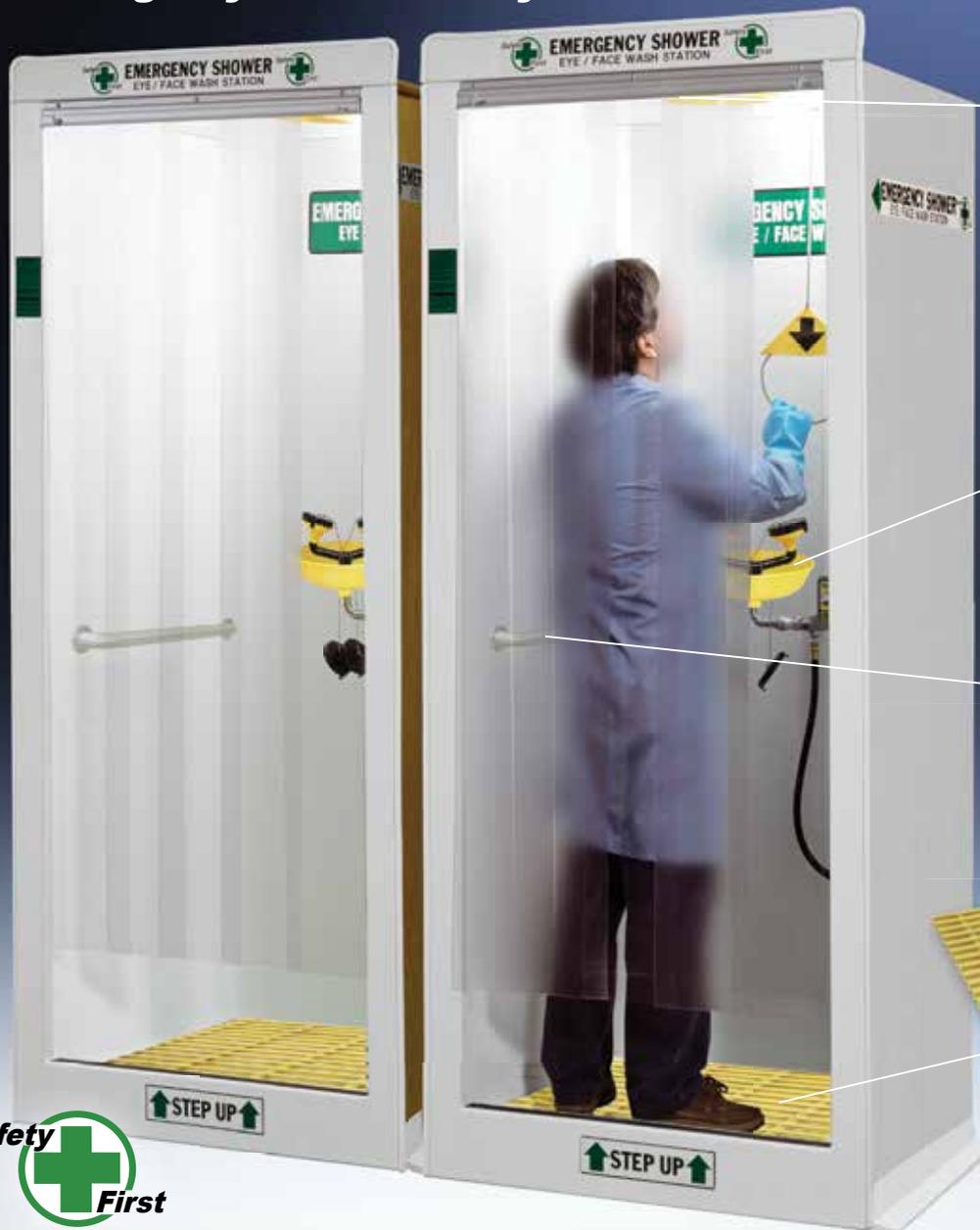
But it’s no mystery, according to Jones. Ultimately, you get what you pay for.

Plant engineers, facilities managers, general contractors and specifying electrical engineers can learn a lot from the ‘post mortem’ experiences of a CSI tech, like Jones. In most cases, the premature failure of a transformer is avoidable and the culprit is often an inadequately designed or constructed unit.

“We are in the business of ensuring that owners get what they specified and paid for,” says Jones.

Emergency Safety Showers

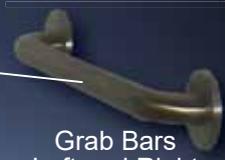
Emergency Shower and Eye / Face Wash / Decontamination Booth



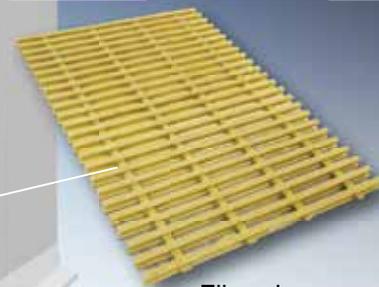
Overhead Drench shower with pull rod activation



Eye / Face Wash with stay open ball valve



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As a master electrician, test technician and member of the IBEW for 44 years, Jones possesses a wealth of knowledge and has spent endless hours combing through the evidence. For the first time he is opening his archives and revealing his list of 'usual suspects' that cause premature transformer failure.

#1 Craftsmanship

Right away, Jones exposed the bottom line up front.

"You want cost effective, not cheap," says Jones. "Cheaper transformers will often cost you more in the long run. Especially if the transformer is critical to your business process or data center, then the extra \$10,000 or \$20,000 for a better unit represents inexpensive insurance."

While he admits that it is hard to convince someone of this because of upfront cost concerns, the proof of his conviction

lies in what he has observed in the failure of countless transformers.

"Probably the most influential factor in transformer longevity is the level of craftsmanship; the attention to detail in the manufacturing process and the quality control," says Jones. "This is often overlooked in today's rush to automate every manufacturing process."

According to Jones, transformers often fail because a machine overlooked a point of weakness that an experienced craftsman, while winding a transformer by hand, would have spotted and corrected.

"Pride of work and experience went away when machines started building transformers," exclaims Jones. "That is especially the case in manufacturing outside the U.S. where they lack experience and often employ highly automated processes. A machine doesn't have the feel to detect defects."

In combing through his files, Jones came up with a classic example.

"In this case, the client had a large 10,000 kVA dry-type transformer that suffered a catastrophic failure within five



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years,” begins Jones. “Knowing that a replacement core and coil would run \$110,000—not counting the rigging and the installation which would add another \$40,000 — the owner demanded that the manufacturer allow me to witness the dissecting of the transformer.”

As Jones watched, the manufacturer cut into the insulation and epoxy with a gasoline powered concrete saw and found the fault at the crossover where the opposite-polarity windings pass through a guide tube where they should have at least 1.5” of separation. Instead, the wires were almost in contact with each other.

“A clear example of someone failing to inspect and fix that area before the resin was poured and baked in. The manufacturer had to supply a new core and coil.”

However, the client was not completely off the hook for cash outlays.

“Look where they put transformers these days, in tight spaces when the buildings are first being erected or on the roof where you’ll need a crane to replace it,” says Alan Ober, who, as the Vice President of Engineering for Electric Service Company (ELSCO), a Cincinnati, Ohio-based manufacturer of transformers, is often on scene when the transformers are installed.

“It will cost you twice as much in the long run to swap it out,” adds Ober. “When you factor in lost production while the equipment is out of service, nobody wins when a transformer dies an early death.”

#2 Material

After craftsmanship, material is the most important factor in transformer construction. According to Jones, using the right wire and insulating materials will make a huge difference in longevity.

“A well-known university hired me to investigate a pair of 2,000 and 2,660 kVA dry-type transformers that failed within a month or two of install,” recounts Jones. “I discovered the area of failure at the crossover where the winding material spools out

at a 45 degree angle across a flat area to start the next coil over. At that point this manufacturer put a *singular* wrap of Kevlar, whereas a high quality transformer from someone like ELSCO would have a double or triple layering of insulating material because it’s a high-stress area.”

The manufacturer tried to avoid the rap by explaining that their transformers needed a snubber, which is a capacitor-filter-resistor network that connects in parallel with the primary winding to absorb the high-voltage transients.

“But a snubber is a \$25,000 add-on,” explains Jones. “So if you have a cheaply manufactured transformer and you have to buy this extra equipment, where is the savings in that? The university had ten of these transformers, so they were facing a quarter-million dollar jump in costs. Now who is going to pay for that? It becomes a big fight.”

Jones also discussed the importance of iron core material. Pure original, as opposed to recycled, magnetic silicon steel is best. Also, the thinner the core steel pieces the better.

ELSCO’s Ober provides supporting evidence, explaining that commonly used M6 steel has a thickness of 0.014” per piece, whereas the M3 steel is only 0.009” thick. To cover the same volume or area, you have more pieces with M3. The more pieces, the lower the no load losses and the higher the efficiency.

“High heat aids and abets transformer failure,” explains Ober. “A 150 degree C transformer wastes a lot of energy creating heat, which shortens the life of the insulation. However, a



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beefier 80 degree C rise dry type transformer with better core steel will have a lower heat rise under the same conditions while putting out equal kVA.”

#3 Design

Whether wet or dry-type, the way the coils are wound around the core of the transformer greatly affects its robustness. Because of increased axial forces acting at the corners of *rectangular*-wound transformers, energy gets wasted and noise is created.

On the other hand, voltage stresses are less with *round*-wound designs, so they stay cooler, run quieter, present less risk of short circuit with sheet wound secondary.

Beyond the improved reliability factor, the design can further increase efficiencies and save costs in real time, as the plant consumes less electricity. Some well-designed transformers even exceed the proposed efficiency standards for Energy Star compliance, drastically lowering utility costs for a plant.

“In the old days they used to manufacture transformers that were somewhat overdesigned in terms of capacity and durability,” adds Ober. “Today, with tighter profit margins, if you want a 1500 kVA transformer, that’s exactly what you will get. So, it is critical that you don’t skimp on materials and design.”

Case closed

“Don’t be surprised if you end up doubling your costs by value engineered transformers,” Jones warns. “Otherwise, you’ll be calling me to investigate what went wrong.”



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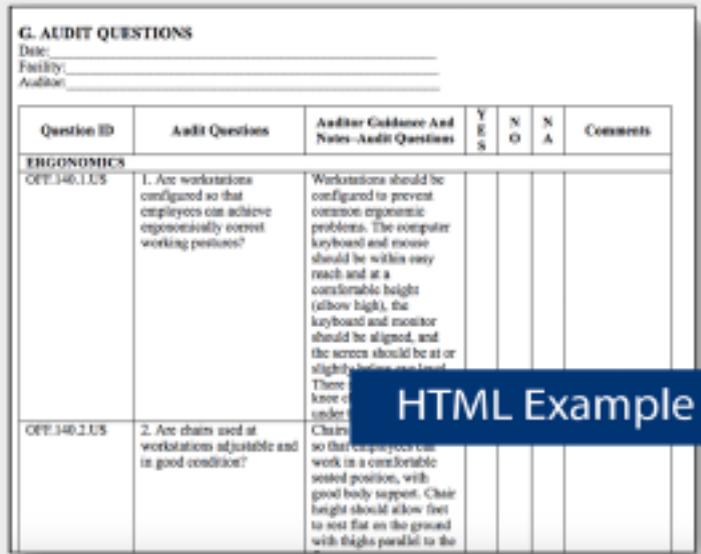
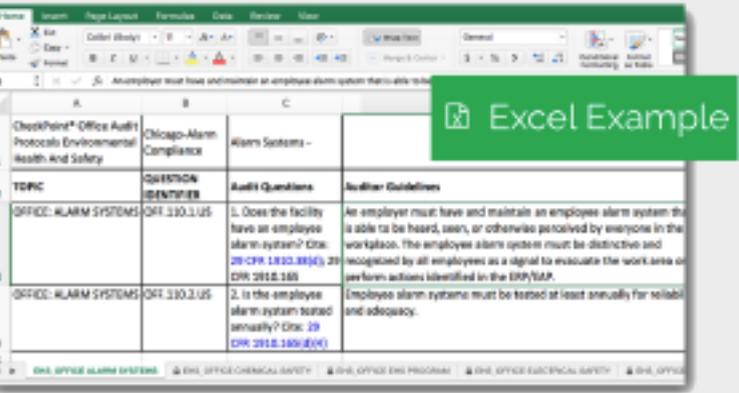
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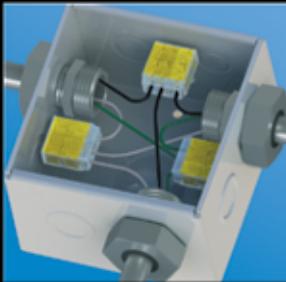
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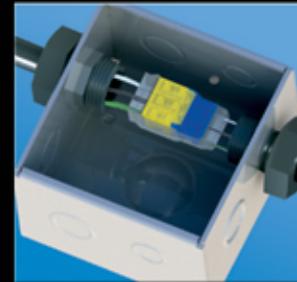
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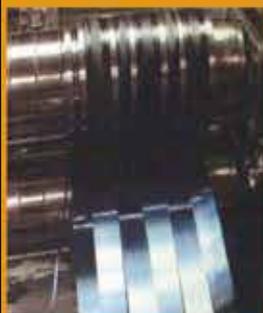
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