

Care and feeding of truss and hoists

BY ELMER VEITH

BY THE TIME this article gets to your mailbox—virtual or physical—we will all be looking back over the hardest 12 months that our industry has encountered in living memory. For far too many of us, this time has meant our equipment has had more downtime than ever. The good news is things are starting to come back and more of our people and our gear have work to do. As much as we all need to get back on the job, we must not do so at the expense of doing it safely and carefully.

As shows cancelled and our industry saw events go on hiatus, many companies were also forced to put their maintenance on hold until they knew when things would get back to “normal.” This situation may have left some gear not checked in from the last show or left equipment in need of maintenance and repair before going to the next job. As we get back to work, we need to make sure all the deferred maintenance is completed, and that equipment inspections are up to date. This might also be an opportunity for companies to establish or review inspection routines for their hoists and truss.

As the owner of this equipment, you have a responsibility to your clients as well as to yourself to make sure your gear is being serviced and is ready to be used on shows. Opinions will differ about how much needs to be done, or what needs to be inspected. The good news is we have a road map that gives us a minimum criterion from which we can work. These road maps can be found within a few documents produced by ESTA’s Technical Standards Program and adopted as ANSI standards documents.

For truss and tower products there is one main document—*ANSI E1.2-2012* (by the time this journal hits your desk, or very soon after, a new version of this document should be available). For chain hoists, look no further than *ANSI E1.6-2-2020, Design, Inspection, and Maintenance of Electric Chain Hoists for the Entertainment Industry*.

I think a lot of our industry considers truss to be a class of equipment that is just there and doesn’t need maintenance or intense scrutiny. After all, it is built from a bunch of tubes welded together and doesn’t have any moving parts—what can go wrong? In general, the issues that do happen with truss are tied directly to how it is used

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Figure 1 – Typical damage caused on a truss chord from the use of a standard lighting clamp without any protection installed on truss. Most manufacturers recommend against using lighting clamps on truss, or only using when a protector is placed on truss.



Figure 2 – Damage to truss diagonal caused by a forklift while truss was being unloaded from a truck. It isn’t uncommon to see diagonals broken out of the module due to operator error.

and abused on shows. Items like lighting C-clamps having their steel bolt tightened into the aluminum chords is a prime cause of truss damage and requiring removal from service. Other common causes of truss damage occur during handling. Moving it with a forklift? One guy trying to move sticks around by himself? Straps not being set correctly in the truck? All of these are reliable methods of turning a perfectly good piece of truss into a credit from your local scrap yard.

Beyond these common issues are problems that come from environmental conditions or problems caused by inattentive or untrained staff. Truss that is used outdoors and is exposed to rain runs the risk of having water being captured inside the tubes, especially at the ends of the truss. While the aluminum isn't going to be adversely affected by this exposure, you now have the risk of that water freezing inside these members if the truss is exposed to below-freezing temperatures. With the water turning to ice and expanding in volume, the ice can exert enough force on those tubes to cause them to split or separate from their



Figure 3 – Ruptured tube in truss end ring is typical of damage caused when water enters a tube and is then exposed to freezing temperatures. This can happen on jobsites or while the equipment is being transported or stored.

adjacent tube.

Electric chain hoists are typically better inspected and maintained than truss because of their mechanical nature. It is obvious that their moving parts and load-holding role mean they need to be checked regularly to keep them working properly. But are there things to be worried about if your hoists have just been sitting around since last spring? Many people seem to think that hoists don't just "go bad" from sitting. As any moving light tech will tell you, there is a miraculous occurrence where a fully tested fixture will go from the shop to the show site in a road case and somehow develop issues. Chain hoists aren't immune from this phenomenon either.

For some brands of chain hoists there is a requirement to load the hoists so the slip clutch engages to make sure it is working properly and not sticking. Lack of use can also contribute to the brake assembly in a hoist sticking and not fully releasing. Many times, this is caused by condensation collecting in the hoists due to temperature variations. If your shop has been sitting with the heat turned way down, or you are



Figure 4 – An example of a worst case scenario—chain hoist that is used solely for outdoor events and is stored in a trailer between events, without preventative maintenance being completed between shows at a company shop.

in an area where temperature and humidity swing back and forth wildly, you should be checking for this. These conditions can have other effects on the hoist as well. Are your load chains getting wet from condensation?

Coupled with insufficient chain lube, this condition can quickly create chains with excessive surface corrosion requiring cleaning. Electrical contacts can become corroded, transformers can have their wrapping material degraded, and surface rust can develop on steel components when water collects in the hoist.

... ask your supplier for copies of the current inspection reports.

The ANSI standards listed earlier in this article give guidance to the equipment owner on how often the equipment needs to be inspected, what needs to be done during the inspection, and what qualifies someone to perform the work. On top of the information in the standards, the manufacturer of the equipment should also be able to provide inspection guidance, usually with much more detail and specific items to check than the standards documents.

In general, there are two categories of inspections that can be performed—frequent and periodic. Frequent inspections are those checks that are performed whenever the gear is being prepped, checked in or out, being set up, et cetera. These kinds of checks are normally integrated into a company's procedures for getting equipment ready for a job or checking it back into inventory after use at an event. Frequent inspections don't have written records requirements and are the kinds of reviews that catch possible issues that need further investigation. In general, frequent inspections can be carried out by personnel who meet the criteria of "competent person."

Periodic inspections are the deep dive

on the gear. These inspections are required to be performed at least once a year and may be needed more often with equipment that is used with greater frequency or in more harsh conditions. These inspections also require that written records be kept on file. For chain hoists a periodic inspection requires load testing of the hoist if you are going to stay in compliance with *ANSI E1.6-2*. The manufacturer of the hoist may also have specific requirements for this type of inspection such as scrutiny of chain, visual inspection of gears, et cetera. Manufacturer requirements are usually found in the product manual. Periodic inspections of truss go beyond a visual review for bent and damaged members, and typically require measuring the component to make sure it isn't twisted, racked, or bent. Technicians conducting a periodic inspection must meet the criteria of a "qualified person" as defined in the ANSI standards and the manufacturers.

So, who can perform these inspections? I've introduced the terms Competent and Qualified but haven't identified where these people are to be found. Do they already work for your company, or do you have to have the inspections performed by a third party? Is there a certification process for these technicians? Well, let's turn to the standards for some clarity. Both *ANSI E1.2* and *E1.6-2* define "Competent person" as "a person who is capable of identifying existing and predictable hazards in the workplace and who is authorized to take prompt corrective measures to eliminate them." The "Qualified person" is defined as "a person who, by possession of a recognized degree or certificate of professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated the ability to solve problems relating to the subject matter and work." In other words, the Competent person can say "we shouldn't use this one" and ask for someone else to dig into what happened. The Qualified person is who looks at that issue, determines what happened, and can make the call on how to fix it or decide to scrap it, and has a degree

or training and experience that says this person knows what to do. When you look at both of these terms, you will see there is no mandate that these people not work for the company that owns the gear. If they have sufficient training and experience, then they can do the work in house. There will be some specialized equipment needed but for the most it isn't anything too crazy.

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If your company is in the position where no one on staff currently fits into these definitions, you still have options. One option is to hire out the inspection work. There are companies that perform inspections and service on all kinds of equipment, from dedicated service shops, to the manufacturers themselves. You can also get the necessary training for your people to meet the criteria outlined for the work to be done. Even if sending them off for training isn't an option right now, there are a number of companies providing virtual training sessions, many of them complete with ETCP renewal credits for technicians who are working towards their certification renewals.

What if you are cross renting equipment? There are a few things you should do to make sure the equipment has been gone over and is ready to go to work. The first thing you can do is ask your supplier for copies of the current inspection reports. Most companies that service hoists apply a data sticker with the date of last inspection information directly to the hoist body. This makes verifying information when on site a much simpler task. Truss inspections are usually done with a paper copy of the findings kept on file, rather than a sticker applied to the truss. Additionally, as the user of the equipment you should be following

the frequent inspection steps when you receive it and get ready to put it into use. There are two reasons for this. The first reason is the same reason you check off any shipment that comes in before the trucking company leaves your dock: You want to verify that the equipment you are receiving is in good condition and was not damaged in transit. The second reason is simply best

practice: The gear should get checked out whenever it is being handled. Just because it was okay at the warehouse doesn't mean it arrived at the job site without issue.

Here's the good news: Things are getting better for our industry, our companies, and our people. We have a long way to go if we are going to get back to where we were at the beginning of 2020, but we are heading in the right direction. As we get back to work we need to keep improving what we are doing and how we are doing it. I can look back over the last 20 years in our industry and I can see a steady improvement in how we maintain and inspect our equipment. We need to keep that trend going. We all work in show business, of one sort or another, and we all should go home at the end of the day. We can't let the desire to get back to work take precedence over doing our work well.

I have called out two specific standards in this article but there are many others that have bearing on this part of our business. The good news is that they are all available to download for free from the ESTA website. Just go to <http://estalink.us/freestandards>. You will need to provide your email address but you won't get put on any mailing lists. If your main area of focus is hoists, truss, and rigging I would recommend looking at the entire suite of *E1.6* standards, *E1.21* which applies to structures used for outdoor

event production, and *E1.39* that goes into the use of fall arrest equipment on portable structures. You should also reach out to the manufacturers of your equipment and ask them for the latest versions of the product manuals for the equipment you own. Many times these documents get updated without much fanfare and there is a lot of great information provided in those documents. And get to know who built your gear. Every company in our industry has people on staff who get paid and like to talk. Many times they are called sales people but really they are just gear geeks like the rest of us. ■



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