

limitations and know when to say no. That wisdom could save a life.

Enough of the broad strokes: important as they are, the hardware is still in the box, and it needs to be put together in a safe way that will produce the results stipulated in the design of the rigging system. By now you should have had a professional engineer analyze the building for strength and safety, applied at minimum 5:1 design factor, obtained product-traceable and overhead suspension rated hardware, and designed a system that is as simple as possible. You should also be confident that you can perform this installation without sacrificing safety.



ASTM C3X5 Channel reinforcement attached to a ceiling joist.

### RIGGING COMPONENTS

The time has come to assemble the hardware in strict accordance with the manufacturer's instructions and with the best rigging practices available. The best way to communicate some of the best rigging practices is to separate the hardware components of a typical rigging installation.

Strut systems must be installed per the manufacturer's instructional guidelines, usually creating a strut assembly footprint four to five times larger than the suspended load and intersecting at least four separate structural attachments on the building.

into the design. Stainless-steel lag bolts are available for applications that demand a blind fastener.

Anchors are different from fasteners. Only anchors are to be used for structural applications in which calculations must be performed. A variety of anchors

## It is too important to leave the fabrication of a life-endangering device to anyone other than a rigging fabrication expert.

**Structural reinforcements.** Steel must be of a structural grade such as ASTM A36, A500B, or C1018, because those materials have minimum ultimate strengths that can be used by a professional engineer to determine an accurate design factor for the installation. Steel is excellent in tension and shear, and some shapes are excellent in torsion, as well. Steel is the material of choice for structural reinforcement applications.

Wood structures must always be calculated by a professional engineer because wood is good, but not excellent, in torsion, tension, shear, and compression. Wood is also an organic product and cannot be calculated with precise results.

Concrete, brick, and block are excellent in compression but poor in tension, torsion, and shear. Additional reinforcement can be added to concrete to build an efficient structure.

**Fasteners, anchors, and rods.** Bolt fasteners must be rated in order to accurately calculate the strength of the rigging system. SAE Grades 5 and 8 are generally the best choices for high-strength applications in shear, double shear, and tension. Alloy fastener strength varies with the manufacturer and alloy type, so one must investigate the fastener before incorporating it

are available for use with various concrete mixtures, brick, mortar, and hollow walls. Additionally, there are different anchors for load directions in shear versus tension.

Only strength-rated threaded rods and rod shafts must be used. Rods are graded for strength such as AISI 300 A193 Grade B7 or SAE Grade 8. Most threaded rod available at local hardware stores or electrical supply houses are not of a structural grade.

**Wallmounts and brackets.** If the load is going to be over people, the wallmount or bracket must be rated for overhead suspension. Attaching a wallmounted system overhead requires the same principles as a suspended system. Once final focus is achieved, adjustment of the wallmounted hardware should become fixed.

**Wire rope, chain, and rigging accessories.** All rigging

## Know the Standards

Before tackling your next A/V rigging project, be sure you're familiar with the following safety standards.

- > OSHA worker's safety standards
- > OSHA equipment standards 1910.184 and 1926.251
- > ANSI overhead suspension equipment standards E1.2-2000
- > ASME overhead suspension equipment standards B30.20
- > Uniform Building Code structural standards section 1600
- > UL equipment standards 1480.31.3