

asking for someone in the congregation to donate the services to the church as a tax deduction. If the project is new construction, ask the general contractor to run it through the architectural firm. Or if you just don't want to deal with it, make sure to cite the requirement and then exclude the structural engineering in the bid proposal. It doesn't matter how it gets done—as long as it gets done.

But it is not enough to have a professional engineer verify that the structure will support the actual load. The engineer also needs to consider a design factor for the installation. The entertainment industry uses a minimum design factor of 5:1 for all overhead applications. That is very different from the traditional 1.5:1 design factors found in most building codes. A design factor is a ratio between the ultimate strength of a component and the load rating of that same component. The load rating is called a *working load limit* (WLL). To figure out the WLL of a component that breaks at 1,000 pounds, the following formula would be used:

$$\text{WLL} = \frac{1,000}{5} \\ \text{WLL} = 200 \text{ pounds}$$

One consideration is an attachment to a building with an appropriate method that will be strong enough to support the load and inconspicuous enough to generally please the client. That can be a difficult task if the venue is a museum-quality piece of architecture. Regardless of the aesthetic constraints, many pieces of hardware will do the job well. Look around at reliable rigging sources: you are bound to find the right fit for the project. However, use only product-traceable hardware that is rated for overhead suspension. Hardware that is not product traceable and not specifically rated for overhead suspension will not limit your liability exposure. If the hardware fails for any reason, you will be held liable. If that statement is unsettling, it's because it's a very real danger.

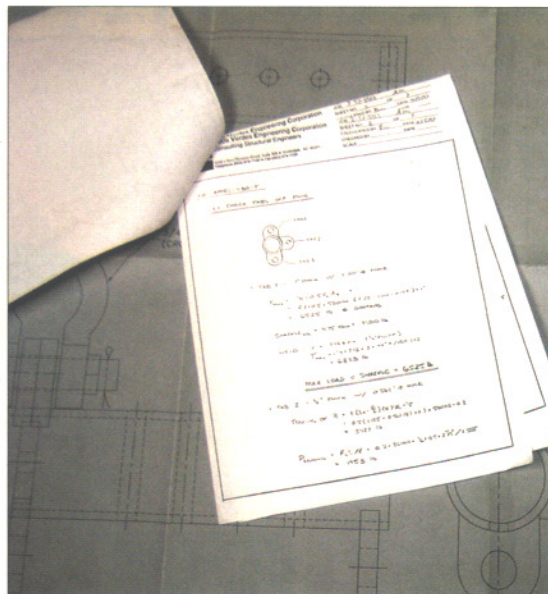
THREE STEPS TO SAFETY

It's simple to mitigate your liability to almost zero. All that's

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necessary to manage your risk is three simple steps: use only product-traceable hardware that is specifically rated for overhead suspension, employ hardware in strict accordance with the manufacturer's instructions, and maintain the hardware in strict accordance with the manufacturer's instructions or be sure to contractually forward the maintenance obligation to the purchaser.

At this point, with a mere three best practices, the vast majority of potential accidents with the rigging installation have been eliminated. All that remains is the functional particulars of actually performing the installation in such a way that everything will be secure. The key to providing just such an installation is to keep a simple and direct approach to the rigging system. The more complicated the contraption, the more opportunity there is for error and for failure. If the installation



Set of certification documents with the professional engineer's wet stamp.



Loudspeaker cluster suspended from a wood beam using offset swivel ring fasteners on both sides.

requires a complicated approach, then extra care needs to be taken in execution. However, if the installation is not a complicated one, keep the rigging system appropriate for the job.

When you are shopping for rigging systems, look at the various manufacturers throughout the world. Purchase a system rather than fabricating your own, and use only product-traceable hardware that is rated for overhead suspension. It is too important to leave the fabrication of a life-endangering device to anyone other than a rigging fabrication expert. Know your