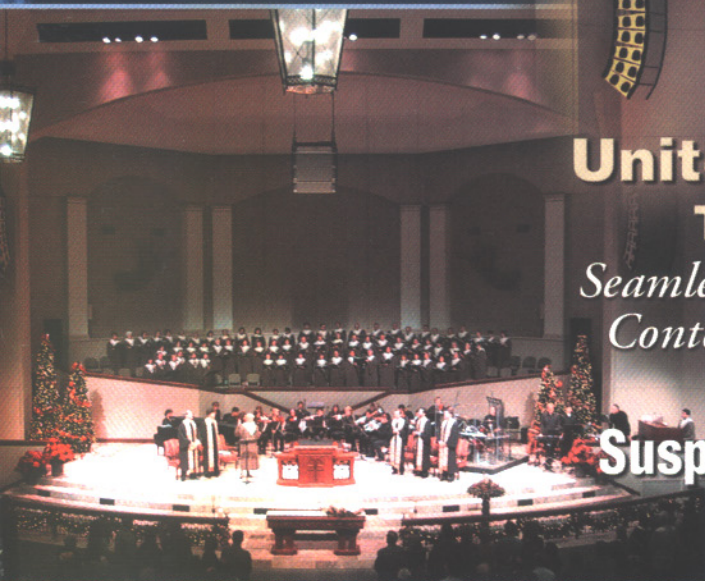


Church Production

AN EDUCATIONAL MAGAZINE FOR HOUSES OF WORSHIP COVERING AUDIO, VIDEO AND LIGHTING TECHNOLOGIES

Magazine



The Woodlands United Methodist Church, The Woodlands, Texas

*Seamless Integration of Traditional and
Contemporary Worship Technologies*

**Suspending Loudspeakers
in Houses of Worship**

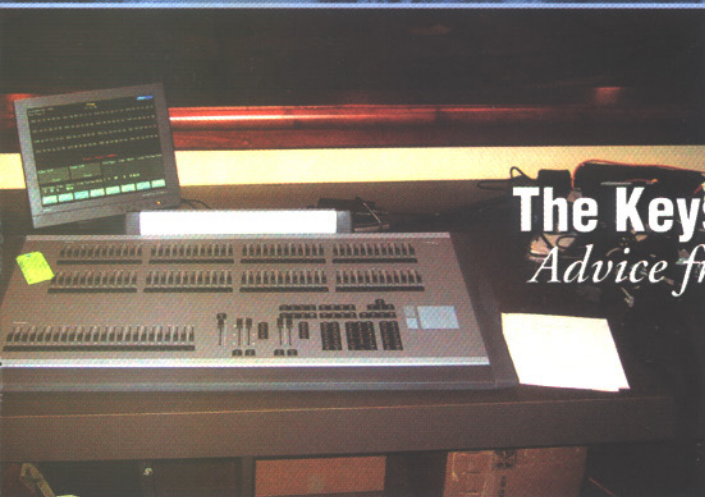
CPM Reviews:

- Canon XL1S DV Camcorder
- Grass Roots Prologue SundayPlus Software
- Midas Heritage 1000 Mixing Console
- Tannoy T300 Loudspeaker
- Telex FMR-1000 Wireless Microphone



Video Cameras:

*Production Techniques for the
Modern Worship Environment*



The Keys to Successful A/V Projects
Advice from Contractors and Consultants



Suspending Loudspeakers

by Andrew T. Martin and Karl G. Ruling

In Houses of Worship

Houses of worship get no exemption from the Law of Gravity. It would be nice if they did, but they don't, and occasionally suspended loudspeakers crash to the floor of a sanctuary or fellowship hall to remind people of this fact. Most often, the loudspeakers that have fallen were ones that were rigged as do-it-yourself projects. While do-it-yourself audio installations are not necessarily unsafe, and they can save a congregation some money and give technically handy members an opportunity to contribute their labor, these projects should be approached with caution. Suspended loudspeakers are very unforgiving; little mistakes have severe consequences.

It is certainly understandable that houses of worship want to get the most result from the least expense. The more value that can be stretched from each dollar leaves more funds for the benefit the congregation and the community. However, we've never run

across anyone who felt it was more important to save money than to suspend his or her loudspeakers safely. Nevertheless, there are a tremendous number of loudspeakers that have been suspended improperly and are in a count-down to a mechanical failure that will result in a falling loudspeaker. How can this happen?

Let's start by outlining a few salient points:

- 1) Loudspeakers can be heavy, with some weighing as much as 250 pounds. However, even if a loudspeaker weighs only 10 pounds and it falls just eight feet, it will be traveling faster than 15 miles per hour when it hits. It will pack enough energy to fracture a skull or break a limb.
- 2) Some loudspeakers are intended for overhead suspension, but some are not.

- 3) The reasons most loudspeakers fall is that the attachment to the building or the attachment to the loudspeaker was not done properly. In either case, the failure could have been avoided if the installer was educated about how to go about the installation.

Not all loudspeakers are suitable for rigging overhead. Those that are intended for overhead suspension come with structural attachment points that are installed by the loudspeaker manufacturer in an enclosure constructed for the considerable stresses encountered when a loudspeaker is suspended. The average loudspeaker is made to sit on the floor or on a stand, and is not built to be suspended. These loudspeakers cannot be suspended safely without major modifications to the loudspeaker enclosures or the construction of an elaborate external structure to hold them. Most of the time it is more economical to purchase loudspeakers intended for

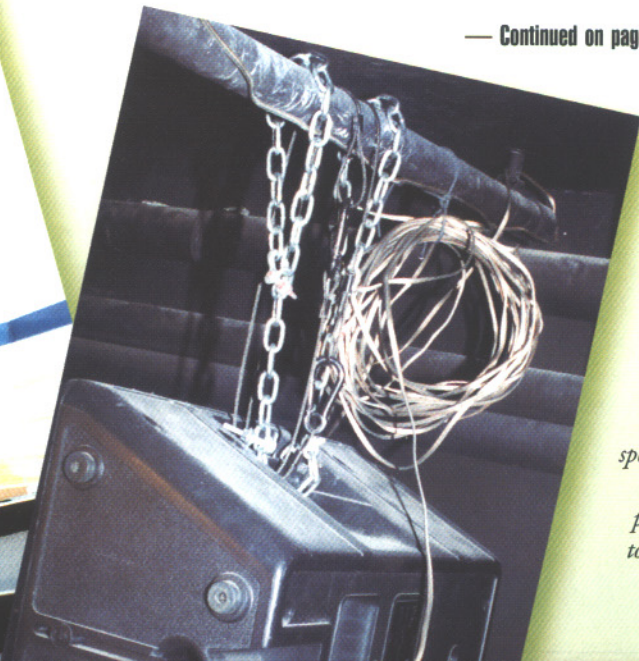
— Continued on page 26.

CPM

This is an example of a properly suspended loudspeaker using rated compression sleeves and forged wire rope clips.



This loudspeaker is improperly suspended by the carrying handle despite the numerous specially designed rigging points provided on the top and bottom.



Loudspeaker Suspension in Houses of Worship

overhead suspension than to retrofit loudspeakers not intended for this use.

You may be asking yourself, "What's wrong with suspending by the handles? Isn't that what they are made for?" After all, it seems reasonable that handles are designed to support the weight of the loudspeaker. They are, but only intermittently and only a few feet above the floor. The low height doesn't

change the forces on the handles, but it does change the level of risk. A handle failure while a speaker is being carried down a hall may result in only a dented or scraped speaker enclosure, but a handle failure while a loudspeaker is hanging over a pulpit has unacceptable consequences.

Most loudspeaker manufacturers would never approve of a handle being used as a

suspension device. Handles are usually installed with a few wood screws and, over time, the screws will loosen or strip out of the wood. They also know that handles are often made as cheaply as possible, and without strict quality controls. A handle is simply not a viable permanent suspension point.

Some people will install eyebolts on a speaker cabinet to create suspension points. Eyebolts can work very well for suspending a loudspeaker, but only if the eyebolts are the appropriate type and are installed properly. Loudspeakers are often suspended from formed-wire eyebolts from the local hardware store installed in the sides of loudspeakers by drilling a hole through the enclosure and putting a washer and nut on the inside of the box. Unfortunately, these loudspeakers are often seen on the floor after they have fallen from their perch. Usually the formed eyebolt — which is really nothing more than thick bent wire — is to blame; it has peeled open or snapped off at the base. On occasion, the fastening from the suspension chain to the eyebolt is done with an s-hook that has been squeezed shut with a big pair of pliers, or a link of the chain has been bent open and then re-closed. Either way, this bending and rebending is likely to cause a fracture in the cheap metal alloy. Sometimes the eyebolt is omitted and the chain is bolted directly to the loudspeaker, bending the links and creating a weak, as well as unsightly, fastening in the process.

So how does one suspend a loudspeaker enclosure correctly? The best course is to purchase a loudspeaker designed for overhead suspension with suspension points already installed by the manufacturer. The materials used for the enclosure, the fasteners used to hold it together, the type of grill attachment, and the distribution of the forces within and through the enclosure are all some of the elements that have been accounted for by the manufacturer when making a loudspeaker for overhead suspension applications.

At the current time there is no American National Standard (ANSI) for loudspeaker enclosures designed for overhead suspension, but one is being developed (E1.8, Entertainment Technology-Loudspeaker

When the message must be clear,

choose

Community



First Baptist Church, Douglasville, GA

CPL

"Great sound for speech and music"

John Fuqua, All Pro Sound, Pensacola, FL

Call us at 1-800-523-4934 or e-mail info@loudspeakers.net
to receive a house of worship information package.

www.loudspeakers.net

Loudspeaker Suspension in Houses of Worship

Enclosures Intended for Overhead Suspension-Classification, Manufacture and Structural Testing). In the meantime, you can get an idea if a loudspeaker is really suitable for overhead use by looking at the documentation provided by the manufacturer. It should point out the rigging points on the enclosure, and tell you in what positions the speaker may be hung safely, whether the speaker can be used as a structural part of an array, and who to call if you need help. This information is all an indication that the manufacturer has tended to the details of designing a product for overhead suspension.

A loudspeaker designed for suspension may provide the suspension points in many forms, but the most common is the threaded hole, which you are supposed to use as an attachment point for a forged shoulder eyebolt or high-grade bolt. A forged shoulder eyebolt is manufactured for overhead suspension and comes with a stamped working load limit right on the eyebolt. You can tell the difference between one of these and the common formed-wire eyebolt by the load-rating marked on it and by the eye that makes a complete, closed ring. This type of hardware is manufactured under careful quality controls and is identified with product traceability systems to insure compliance with many structural and safety standards. When installed and maintained properly, it will last for the lifetime of the loudspeaker installation. Hardware intended for overhead installation can be purchased from rigging suppliers and sometimes the loudspeaker manufacturers or dealerships where the loudspeakers were purchased.

The loudspeaker enclosure and the hardware on the loudspeaker are only part of the rig. The next link in the connection between the loudspeaker and the building is the suspension sling. Good suspension slings are usually fabricated from chain or wire rope. When chain is used, only grade-8 or grade-80 alloy chain are generally recognized as being suitable for overhead lifting. Wire rope is more often used, and is often times simpler to install than chain.

There are thousands of varieties of wire rope, however the entertainment industry has adopted a specific type for almost every

overhead suspension application: 7x19 galvanized aircraft cable (7x19GAC). Because this type of wire rope is manufactured to a standardized specification it will always maintain a minimum strength and can be rated for overhead suspension applications when installed with the proper terminations. Reliable terminations can be

made with either rated compression sleeves or forged wire rope clips. Be careful! Most wire rope clips that can be purchased at hardware stores are malleable iron, not forged, and are not acceptable for overhead suspension. The compression sleeves and

— Continued on page 71.

CPM

A NEW CONCEPT FOR AUDIO CONTROL

TiMax[®]

LEVEL & TIME DELAY AUDIO MATRIX



Source Oriented Reinforcement (SOR) providing accurate audio imaging to every seat in the house. TiMax is a new DSP based fully automated audio matrix that offers static and dynamic control of level and time delay at every matrix cross point.

Every Sound

Every Seat

Every Source

CIRCLE #21 ON PRODUCT INFO CARD

North American Distribution:

Solid State Logic Systems

World Leaders in Pipe Organ Control

Alexandria, Virginia

(800) 272-4775 (703) 933-0025 FAX

www.sslsys.com

For more information, please call Lori or send an email to Lorie@sslsys.com