

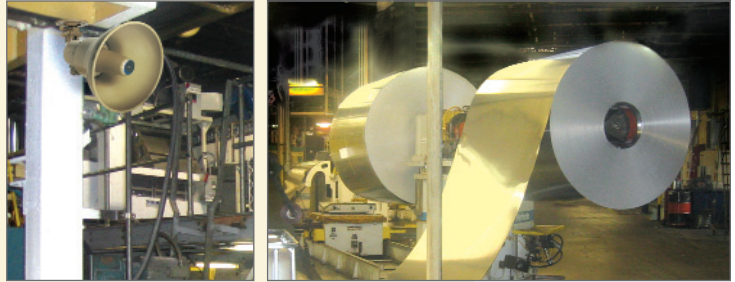
## Bogen Sound System Permits Paging Despite 104-Decibel Levels

### CROWN BEVERAGE PACKAGING DIVISION

Lawrence, MA

#### The Challenge

- Continuous decibel levels ranging from 86 to 104 in manufacturing plant
- 187,500 square feet (over 4.3 acres)
- 18-foot high ceilings, concrete floors
- Reliable 24/7 service required



Single-Zone System

#### The Solution

We seldom think about all the functional and attractive packaging we use, or where it comes from. In the packaging industry, there are some notable star companies such as Crown Holdings. It is the world's leading manufacturer of packaging for consumer goods. The company makes one out of every five beverage cans used in the world and one out of every three used in North America and Europe. The Crown Beverage Packaging Division manufactures aluminum cans that are used in the Northeast.

Making these cans from 12-ton rolls of sheet aluminum requires large stamping machines, going full speed 24/7. During the process, the noise levels are such that employees are required to wear hearing protection to prevent hearing impairment. Crown had previously used Bill Comeau, Engineer at Spencer Communications to install the wiring for a telephone system so they turned to Comeau again, now with Summatis, to install a paging system. He recommended Bogen horn loudspeakers and amplifiers to greatly improve communication in the plant.

The plant had relied on a buzzer system since 1969 in which only a few messages could be conveyed using Morse code-like combinations of long and short buzzes to signal who should report to the chalkboard to learn where maintenance was needed.

"We had asked several other audio equipment suppliers if they could install a sound system that would enable 120 employees to hear messages above the 30 pieces of processing equipment in our rectangular building," said Steve Kilberg, Plant Manager, Crown Beverage Packaging. "These suppliers said they didn't have sound systems powerful enough for overcoming noise peaking at 104 dB," said Ron Caredeo, Plant Accountant, for Crown Beverage Packaging. To put this sound pressure level in perspective, speech between individuals is almost impossible to hear in this environment.

Comeau had worked with Bogen audio system products and knew the company had equipment that would fit and operate well in this challenging environment. "We used a digital sound level meter to accurately evaluate what would be needed in the plant," said Ray Clontz, Northeast Regional Sales Manager for Bogen Communications. The data served as a starting point for Bogen's Free Design Service along with descriptions of dimensions and materials at the plant. "Since we believe in the value of follow-up, Comeau used a sound meter after the preliminary installation to determine if there were any areas not receiving clear messages," according to Clontz. Despite the acoustical challenges presented in Crown's manufacturing plant, Bogen's Free Design Service had so accurately specified the system in advance that only two additional speakers were needed to ensure customer satisfaction with the sound level in all areas of the 4.3-acre facility.

#### The Results

"The new Bogen sound system has proven effective and works reliably in the plant. We find this Bogen audio system has helped us improve communication and productivity," said Kilberg. He explained that when employees used the old buzzer system, they had to report to one of two chalkboards to view messages and then go to the place needing maintenance or repairs. With the Bogen loudspeakers, all pages are heard clearly, despite high noise levels and wearing of hearing protection aids. Now, employees hear the message and go directly to the location needing attention, eliminating the time wasted walking to the chalkboards.

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## Product Highlights

### System Components

Because the building measures 500 feet by 375 feet, 40 Bogen 30-watt horn loudspeakers (SPT30A) were needed to enable employees to hear pages over the machine noise. These speakers are powered by a Bogen M-Class Power Amplifier (M600). For voice input, the Bogen Single-Zone Universal Telephone Interface (UT11) was installed, enabling plant staff to speak into their phone handset and have their message carried to the speakers in the plant and office area. "To prevent squeals associated with any feedback that might occur, Crown also relies on a Bogen Digital Feedback Terminator," explained Leon Didow, Systems Design Engineer for Bogen. "With such a high sound pressure level in the plant, it's important to ensure that messages are clear. With the Bogen horn loudspeakers and amplifiers, the message can be heard 99.9 percent of the time," he added.

### Quick and Easy to Install

"Installation took about five days," said Comeau. He and his two-man crew could have completed installation even more quickly but there were tight spaces to access and some surfaces were slippery because oil and lubricants are used during the cutting, stamping, drawing, and other operations making physical installation slower.

The speakers are located 10 feet to 12 feet above the floor. To attach the 40 speakers, Comeau used Bogen Beam Clamps (BC1) to mount them to the I-beams. Spacing between the speakers ranges from 40 to 50 feet, according to Didow. In extreme high-noise areas speakers must be installed 40 feet apart. In moderate to high-noise areas speakers can be located every 50 feet.

"There are five runs of six speakers and two runs of five speakers," said Comeau. The runs follow the processing lines in the building. "We aimed all speakers 30 degrees down in the same direction so the sound flows from the main office to the back of the plant," explained Comeau. The horn's tilt and swivel base permits easy positioning. Each horn has a 100-degree sound dispersion angle to direct sound in each area.

To help hasten installation, Bogen designed its horn loudspeakers (SPT30A) with a rotary selector switch to set the particular power tap needed for each environment. "We used 3.7-watt taps for areas with 85 dB, 15-watt taps for areas with 85 to 95 dB, and 30-watt taps for locations with 95 to 104 dB," said Comeau. After the physical installation, Comeau and his crew went through every area in the plant to ensure that understandable messages could be heard throughout by using a sound meter and tweaking speakers as needed.

### Speakers

Bogen's Horn Loudspeakers (SPT30A) permit a maximum power capacity of 30 watts (125 dBspl@4 ft.) in 70-volt systems. These loudspeakers offer high efficiency and excellent intelligibility, making them ideal for an environment with excessive sound pressure levels.

### Amplifiers

Crown Beverage Packaging uses a Bogen 1200-watt M-Class Power Amplifier (M600) because of its reliability and power. The M600 relies on a massive power toroid and heat sinks. The amplifier produces more than a kilowatt of audio power and the large heat sinks keep the amplifier cool to ensure long service life. The M600's sleep mode saves energy for manufacturing plants that use their sound system intermittently. Other features include: patented Back-Slope™ AC voltage stabilization, clip limiters, DC voltage, over-current, and thermal protection circuits.

Only one zone is required at Crown Beverage Packaging so the Single-Zone Universal Telephone Interface (UT11) was appropriate. All messages whether general, routine, or emergency will go through the UT11, and then be sent to all speakers so all employees can hear the messages.

### Specifications

- 40 Bogen Horn Loudspeakers, 30-watt (SPT30A)
- 40 Bogen Beam Clamps (BC1)
- 1 Bogen Single-Zone Universal Telephone Interface (UT11)
- 1 Bogen M-Class Power Amplifier, 1200-watt (M600)
- 1 Bogen Digital Feedback Terminator (DFT120)



### Key Products



SPT30A Metal Horn Loudspeaker, 30-watt



M600 M-Class Power Amplifier



UT11 Single-Zone Universal Telephone Interface



DFT120 Digital Feedback Terminator

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