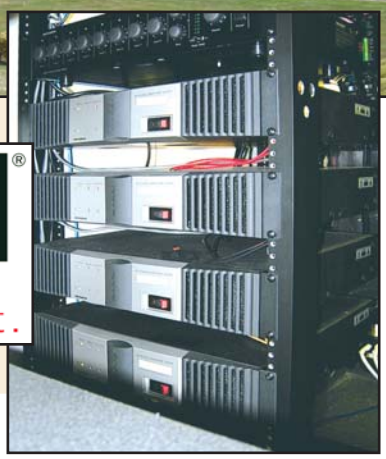
Major Plastics Manufacturer Upgrades Paging System for Wide Ranging Noise Levels

MANUFACTURING

Multi-Zone Systems

Fabri-Kal Plastic Manufacturer

Hazleton, PA



The Challenge

- Massive 200,000 sq. ft. manufacturing facility
- Varying ambient noise levels (50 dB–105 dB)
- Flexible zone paging required

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The Situation

Fabri-Kal is a major national thermoformed plastic manufacturer of standard and custom plastic packaging, primarily for the food industry. Operating an approximately 200,000 square foot manufacturing facility located in Hazleton, Pennsylvania, Fabri-Kal keeps up to 16 thermoforming lines running every day for customers such as Dannon Yogurt, Campbell's Soup, McDonald's, Dairy Queen, and other major food service distributors such as Sysco. With almost 400 employees to keep things humming along in a noisy bustling environment, it can be tough to contact someone with a page.

When Fabri-Kal opened its Hazleton facility about 40 years ago it had only four production lines running, so paging required just a handful of horn loudspeakers running off a single 100-watt Bogen amplifier. Now almost four times bigger than when they first started, the Hazleton operation struggled with a paging system they had outgrown. With manufacturing floor noise levels up to 105 dB and under-powered pages that were beginning to clip, distort and become inaudible, Fabri-Kal needed a paging system that could handle everything from a relatively quiet front office to a loud, dynamic shop floor environment and enable future expansion as well.

The Solution

To completely upgrade their paging system, Fabri-Kal turned to Bogen's free design service for help. " Bogen was very helpful," stated Frank Pangonis, LAN Manager for Fabri-Kal's Pennsylvania operations. " Their sound specialists came on site, took readings, checked levels in various areas of the plant, and went over what we wanted to accomplish with the system as a whole here. We sat down with them, answered a series of questions, and were able to pretty much map out the system in one session."

The solution was a 19-zone system featuring over 100 Bogen 15- and 30-watt Horn Loudspeakers (SPT15A and SPT30A), 31 Bogen Drop-in Ceiling Speakers (CSD2X2), 4 Bogen M-Class Power Amplifiers (M450 and M300), 15 Bogen Telephone Paging Amplifiers (TPU15A, TPU35B, and TPU250), and a Digital Feedback Terminator (DFT120) all tied together through the Bogen PCM2000 Zone Paging System. The controllers and all the amplifiers were centrally housed in Fabri-Kal's server room.

Installation of the new system's amplifiers, ambient noise sensors, and sensing microphones was handled in-house by Fabri-Kal's IT department. Speaker installation and cabling was subcontracted - almost five miles of 14 AWG two-conductor wiring had to be pulled!

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Because the old system was outdated with virtually no components being shared with the new system, they were able to perform a parallel installation to avoid having no paging at all during the 3-month project.

One key feature of Fabri-Kal's new paging system is automatic volume adjustment to accommodate changes in area noise throughout the day using ambient noise sensors. " With 16 in-line thermoformers and extruders, the shop floor is a dynamic, noisy environment," commented Pangonis. To address that issue, eight ambient noise sensor units (ANS501) were installed to monitor noise levels in the manufacturing area. Pangonis pointed out that " as the ambient noise levels change on the shop floor, the paging volume changes with them so there's always a 20 dB over-ambient gain for pages."

For the training and conference areas the problem was just the opposite, so attenuators were installed in those areas enabling employees to adjust paging volumes when training is underway. Volume control in all other areas is handled centrally from the amplifiers in the server room.

To avoid feedback when making pages from a handset close to a paging speaker, Fabri-Kal installed a Bogen DFT120 Digital Feedback Terminator, along with two Bogen UTI1 units to interface the paging system with the company phone system's analog station ports. A Bogen VMIX Power Vector Mixer was added to supply multiple general page override inputs, a tone generator module to trigger shift change bells, and multiple tones to signal key timing points for Fabri-Kal's lean manufacturing efforts.

The Results

With each zone independently controlled, Fabri-Kal is now able to page any or all of its zones from any telephone handset in the facility, assured that every page will be heard on the shop floor with ambient noise monitoring and automatic volume control. In addition, Fabri-Kal's new Bogen paging system now provides them maximum flexibility to meet future expansion needs, such as a digital messaging system and background music.

"Bogen took the ball, ran with it, and came back with a very detailed installation plan which I was very happy with," added Pangonis. "I would not have known where to begin as far as speaker placement goes, how many speakers to place and in what direction to get the sound coverage I wanted out on the shop floor."

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Product Highlights

Paging Zone Controllers

The integrated Bogen PCM2000 Paging System provides versatile zone paging for up to 99 zones and 32 zone groups. Fabri-Kal's new system required 19 separate zones to be used for paging only; however the system features capacity for zone background music (BGM) which may be added to non-production areas at a later date. Ambient noise levels are too high in manufacturing area zones to include BGM.

Amplifiers

Fabri-Kal's multi-zone paging system features Bogen's M-Class and TPU-Series amplifiers, including M300 and M450 Power Amplifiers and TPU15A 15-watt, TPU35B 35-watt, and TPU250 250-watt Telephone Paging Amplifiers. Both M-Class Power Amplifiers feature patented Back-Slope™ AC voltage stabilization, clip limiters, DC voltage, over-current, and thermal protection circuits. The TPU-Series amplifiers offer easily-accessible controls and are available in a wide range of power levels from 15 to 250 watts for small installations to larger, more demanding ones.

Speakers

This system incorporates two different styles of Bogen speakers: Horn Loudspeakers (SPT15A and SPT30A) for high efficiency and excellent intelligibility and Drop-in Ceiling Speakers (CSD2X2) for discrete, full range performance.

Equipment List

31	– CSD2X2	Drop-In Ceiling Tile Speaker, 2'x2'
1	– A2T	NEAR Armadillo Speaker, 16 Watts
3	– AT10A	Speaker Line Attenuator, 10 Watts
75	– SPT30A	Reentrant Horn, 30 Watts
26	– SPT15A	Reentrant Horn, 15 Watts
101	– BC1	SPT Beam Clamp
8	– ANS501	Ambient Noise Sensor Unit with ANS500M Sensor Microphones
1	– VMIX	Power Vector Mixer
1	– TNG1S	Tone Generator Module
2	– TBL1S	Transformer Balanced Input Module
1	– RIO1S	Relay Input/Output Module
1	– RPK87	Power Vector Rack Mounting Kit
1	– DFT120	Digital Feedback Terminator
2	– UTI1	Universal Telephone Interface, Single-Zone
2	– RPKUTI1	UTI1 Rack Mounting Kit
1	– M450	M-Class Power Amplifier
3	– M300	M-Class Power Amplifiers
4	– RPK86	M-Class Rack Mounting Kit
3	– TPU250	Telephone Paging Amplifier, 250 Watts
5	– TPU35B	Telephone Paging Amplifier, 35 Watts
5	– RPK82	TPU35B Rack Mounting Kit
7	– TPU15A	Telephone Paging Amplifier, 15 Watts
1	– PCMTIM	PCM2000 Telephone Interface Module
3	– PCMCPU	PCM2000 Central Processing Module
3	– PCMPS2	PCM2000 Power Supply
7	– PCMZPM	PCM2000 Zone Paging Module
3	– RPK84	PCM2000 Rack Mounting Kit

Equipment List

Zone #1
5 – SPT15A
5 – BC1
1 – TPU35B
1 – RPK82

Zone #2
5 – SPT15A
5 – BC1
1 – TPU35B
1 – RPK82

Zone #3
1 – SPT15A
1 – BC1
1 – TPU15A

Zone #4
10 – SPT30A
10 – BC1
1 – M300
1 – ANS501
1 – RPK86

Zone #5
8 – SPT30A
8 – BC1
1 – TPU250
1 – ANS501

Zone #6
1 – SPT15A
1 – BC1
1 – ANS501
1 – TPU15A

Zone #7
2 – CSD2X2
3 – SPT15A
3 – BC1
1 – TPU35B
1 – RPK82

Zone #8
5 – SPT15A
5 – BC1
1 – TPU35B
1 – RPK82

Zone #9
12 – SPT30A
12 – BC1
1 – M300
1 – RPK86
1 – ANS501

Zone #10
8 – SPT30A
8 – BC1
1 – TPU250
1 – ANS501

Zone #11
11 – SPT30A
11 – BC1
1 – M300
1 – RPK86
1 – ANS501

Zone #12
20 – CSD2X2
1 – A2T
3 – AT10A
1 – TPU35B
1 – RPK82

Zone #13
1 – SPT15A
1 – BC1
1 – TPU15A

Zone #14
3 – SPT15A
3 – BC1
1 – TPU15A

Zone #15
3 – CSD2X2
1 – TPU15A

Zone #16
18 – SPT30A
18 – BC1
1 – ANS501
1 – M450
1 – RPK86

Zone #17
8 – SPT30A
8 – BC1
1 – ANS501
1 – TPU250

Zone #18
2 – SPT15A
2 – BC1
1 – TPU15A

Zone #19
6 – CSD2X2
1 – TPU15A

Key Products

SPT15A
Horn Loudspeakers

CSD2X2
Ceiling Tile Speakers

TPU-Series
Telephone Paging Amplifiers

M-Class
Power Amplifiers

DFT120
Digital Feedback Terminator

PCM2000
Paging Control System

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