Online Exclusive
May 26, 2004

NFPA JOURNAL® nfpa THE SOURCE FOR FIRE, ELECTRICAL, BUILDING & LIFE SAFETY INFORMATION

Expanding on the Fast Track

Tennessee motor speedway relies on NFPA codes as it more than doubles fan capacity

by Scott Hatcher

Bristol is a small city in the foothills of eastern Tennessee's Appalachian Mountains, near the Virginia state line. This community of 24,000 pulls motor racing enthusiasts from all over the Eastern Seaboard and beyond, generating crowds of more than160,000 at the Bristol Motor Speedway (BMS).

At 0.533 miles (0.857 kilometers), BMS is one of the shortest tracks on the NEXTEL Cup circuit, with the highest banking—36 degrees—in its turns. The combination makes for good sightlines and thrilling viewing from anywhere in the stadium, and appeals to drivers as well as spectators.

BMS began to reach for this super track status in 1996, when O. Bruton Smith, chair of Speedway Motorsports, Inc., bought what was then called Bristol International Raceway. At the time, the track seated 71,000, mostly in the original concrete outdoor bleachers and a few small boxes, and its fire safety arrangements were rudimentary.

In a series of yearly expansion projects, Smith added three-tier grandstand seating for 160,000 and 151 luxury skyboxes, a spectacular 100 feet (30 meters) above the circuit, and three-quarters of the way around the track. In total, the skyboxes accommodate about 10,000 fans. When another 40 are added in the near future, skyboxes will completely encircle the speedway.

Aerial view of Bristol Motor Speedway
Photo courtesy of Bristol Motor Speedway

Working on one of the three new tiers at the speedway
Photo courtesy of Bristol Motor Speedway

Upgrades demand life safety

With the addition of three tiers of grandstand seating, a terrace and tower, 10 elevator towers with 40 elevators around the circuit, a low-rise infield building topped by a victory-lane winner's circle, and, of course, the skyboxes, upgrading the track's life safety arrangements was imperative.

The first phase of the fire protection system installation began early in 1997, when the curved ends of the track were torn out and new bleachers and the first 22 skyboxes went in.

From the beginning, the new construction focused on code-approved life safety arrangements, using the 2000 edition of NFPA 101®, *Life Safety Code*®, for life safety and the 2000 edition of NFPA 1, *Fire Prevention Code*. Smoke detectors and horn/strobes were installed in each skybox suite and manual pull stations were placed at all suite exits. Corridors were fitted with smoke detectors, horns, and strobes, and pull stations were installed at entry/exit points.

In the latest generation of suites, duct detectors were provided, and smoke and heat detectors were installed in each elevator lobby. Elevator recall arrangements were also made.

All this was specified in the original plan. Essentially the same parameters are followed as new boxes are installed.

When Speedway Motorsports bought BMS in 1996, construction and renovation became a fast-track project. Kingsport Armature & Electric of Kingsport, Tennessee, was the design/build electrical subcontractor. Kingsport recommended life safety systems and fire alarm signaling from Faraday of Florham Park, New Jersey. MECA Engineering of Kingsport engineered the base system and each yearly expansion. CES Company of Bristol did the install, furnished the material, and services and inspects the systems.

"We do the life safety upgrades and related work between the last race in August and the first race in March. Last year, we worked 10 hours a day, 7 days a week to complete the new scheduled construction," says Rufus Herd, project manager with Kingsport Armature.

"The first requirement was to meet code," says Allen Ratliff, president of MECA Engineering. "It was critical to get the local authorities on board with what we wanted to do to provide optimum fire safety. We met with the local fire marshal to determine his interpretation of the code. Going into that meeting we said, 'This is our plan, what do you think?'"

All subsequent work was done in conjunction with the fire marshal and with Jack Spurgeon, the Bristol area fire inspector, who inspects every new suite.

"From there, the next stop was cost," Ratliff says. "We had to provide a system that would meet requirements at least cost and be maintainable to give the owner value for years down the road."

The approved life safety plan
Scott Larson, Faraday product manager, explains that the original system employed an addressable fire alarm control panels with 32-character alphanumeric programmable system status display. Subsequent expansions use the networking-compatible system, which offers 80-character LCD display with custom labeling.

The current facility employs a total of five panels, with 62 software zones under one control and 82 software zones under the other. Both panels are UL-listed for NFPA 72®, *National Fire Alarm Code*®, sensitivity testing.

The LCD display shows all current event data, including alarms and troubles, identifies the zone or device, and presents its history. The display is controlled by a set of four pushbutton switches commanding the control processor.

The five panels interface with, and control, photoelectric, heat, and duct detectors; horns; horn strobes; and manual pull stations. The fire alarm panels also control the elevator banks.

Presignal system limits disturbance
The presignal system at Bristol Motor Speedway is defined in Section 6.8.1.2 of the *National Fire Alarm Code*, 2002 edition: "If permitted by the authority having jurisdiction, systems shall be permitted to have a feature that allows initial fire alarm signals to sound only in department offices, control rooms, fire brigade stations, or other constantly attended central locations and for which human action is subsequently required to activate a general alarm, or a feature that allows the control equipment to delay the general alarm by more than 1 minute after the start of the alarm processing. If there is a connection to a remote location, the transmission of the alarm signal to the supervising station shall activate upon the initial alarm signal."

In the 2000 edition of NFPA 101, Section 12.3.4.3.1 has the effect of recognizing the presignal system addressed in NFPA 72: "The required fire alarm system shall sound an audible alarm in a constantly attended receiving station within the building when occupied for purposes of initiating emergency action. Positive alarm sequence in accordance with 9.6.3.4 shall be permitted."

At Bristol Motor Speedway, an alarm initiated in a skybox is reported to the panel and to a remote annunciator in the operations office, and a response team dedicated to the skyboxes is immediately dispatched by radio to check the situation. If a second alarm sounds, it automatically triggers a general alarm. The general alarm sounds at once if the first alarm activates in a hallway,

An alarm triggered in a skybox will sound in the involved suite, and the alarms in the suite on either side will annunciate locally with horn and strobe, an early warning to people closest to the problem area.

Standby technicians are stationed on-site at every race to immediately respond to any maintenance or operational problem with the life safety system.

Also running
Associated with BMS is the Bristol Motor Dragway, one of the premier drag strips in the United States. Its five-story suite tower, built in 1999, has life safety arrangements similar to those at BMS.

Now under construction at BMS is a 36,000-square-foot (3,345-square-meter) office structure, complete with a ground-floor interactive "fan zone" to amuse race-goers, scheduled to open during the 2004 racing season.

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