

LAS VEGAS' NEWEST CASINO

Doesn't Gamble on Fire Stops

By Marty Duffy



A mechanical floor penetration in the Las Vegas Treasure Island Hotel and Casino is firestopped.

The first step is to cut a layer of insulation to fit, then it is placed into the penetration by hand.

High rollers in Las Vegas, Nev., may risk it all at roulette, but their odds of being injured in a fire are some of the lowest in the country due to the city's cutting-edge fire provisions. With 11,000 hotel rooms being built in the city this year—over twice as many as the number that have ever been built in Minneapolis—Las Vegas feels a strong responsibility to the throng of tourists who keep it in business. The city's newest attraction, the Treasure Island Hotel and Casino, will open this fall. It is exceptional not only in its extremely high fire safety standards but in the cost-effective way they were implemented.

Since the MGM Grand Hotel fire in Las Vegas in the early 1980s, code authorities nationwide have demanded better fire control in all construction. But the demand is counterbalanced by the increased cost of building materials and labor, both at a premium. Today, firestop costs for large projects can exceed the million-dollar mark. Smart builders and contractors are responding with fire-stop construction providing safety and cost-effectiveness.

When project architect Alan Akershoek of the Las Vegas-based general contractor Marness Corrao proposed fire-stopping specifications for Treasure Island, the approach had to be a sure thing, from both financial and safety perspec-

tives. This was the city's tallest building, and there were more than 35,000 through-penetrations to be sealed, including electrical, plumbing, tub boxes and waste and storm drains.

"Treasure Island has 35 stories and 2,900 rooms. It differed from our other jobs in the number and complexity of through-penetrations,"

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Akershoek said. "We faced a maze of code restrictions."

Through-penetrations, or "poke-through" openings, are holes penetrating entire floors or wall assemblies to allow the passage of piping, ducts, conduits, cable trays, electrical cables and communications wiring. These penetrations are usually small, but are large enough to enable fire and smoke to spread from one area to another, endangering lives and property.

After reviewing fire-stopping installation and product bids, Akershoek and Marness Corrao Project Manager Todd Nisbet chose Sacramento Insulation Contractors



The compound is mixed on-site with water (left photo), then it is caulked over the insulation (two right photos).

to handle the complete installation, with a contract worth more than a quarter of a million dollars.

Sacramento's product of choice for the job was the USG Fire Stop System because it was more economical than the other fire-stop sys-

tems, according to Akershoek. The Treasure Island Hotel and Casino was the largest application of this fire stop system to date, using more than 1,500 15-pound bags of Firecode[®] compound, which can be used alone or with USG Interior's

Thermafiber[®] Safing Insulation. The compound mixes easily on the job site. It's troweled, caulked or pumped in place over the insulation, which is installed into the penetration by hand. At Treasure Island, as at other projects, Sacramento Insula-

tion Contractors mixed the compound on-site and applied it with caulking guns. "It was easy and neat," Nisbet said.

Getting Up to Code

Las Vegas is at the forefront of fire-stop provisions. Elsewhere, codes vary between localities and among building officials. Most codes are patterned after model building codes that have been established geographically. The Standard (SBCCI) is primarily used in the south, the Uniform Building Code is in the west, and BOCA is in the midwest and northeast.

Building codes require the fire-stopping of all penetrations through

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fire-rated assemblies. This typically includes floor/ceilings, elevator shafts, stairwells and corridors. Fire-stopping is also needed at other joints, voids or gaps in fire-rated assemblies, and at air passages and at plenums concealed within floor assemblies.

All recognized codes require approval of the materials and methods used, typically by an independent and recognized testing laboratory such as Underwriters Laboratories. These materials usually include common filling or damming materials such as mineral fiber, backer rod or ceramic fiber insulation and a non-combustible sealant or compound. Approved systems and materials are now clearly outlined in Underwriters Laboratories Fire Resistance Directory.

When Marnell Corrao and Sacramento Insulation Contractors first reviewed the types of systems avail-



The compound dries to a pink color, which can be easily identified by fire code inspectors.

able for use at Treasure Island, they found they liked USG's, but there was a problem. Most of the complex's pipes would be copper, and that system had not yet been UL-tested for copper piping. Working quickly, U.S. Gypsum completed the required UL testing procedures in time to meet submittal deadlines.

All major code authorities recognize the need for through-penetration fire stops and have established guidelines for systems and materials. The major model building codes have three components: the fire-rated wall or floor assembly, a penetrating item and the fire-stop mate-

rial sealing the penetration. The fire rating of the fire-stop material must be consistent with the rating of the overall floor or wall assembly.

Standardized Flame and Temperature Ratings

The guide for assessing fire performance of most construction products and assemblies is ASTI ABBE—Standard Test methods for Fire Tests of Building Construction and Materials. However, fire-stop systems are also measured in terms of F and T ratings as determined by ASTI E-814 and UL 1479. ASTI E-814 is becoming the standard for the commercial

market. USG has the F and T ratings for common applications.

The type of firestop needed to meet code depends on the penetration location (wall, floor/ceiling), type of construction (concrete, masonry, gypsum), thickness of the wall or ceiling size of the opening, type of penetrating material (metal pipe, conduit, ducts, plastic or fiberglass pipe, insulated cable) and the time and temperature performance desired. The Uniform Building Code requires all penetrations to be fire-stopped, and the Clark County Building Department (Las Vegas) requests that these systems be UL tested. In addition, the product used here has a flame spread and spread and smoke development of zero per ASTI E-814.

Two Types of Systems

While there are hundreds of types of fire-stop materials, there are just

two types of fire-stop systems: active, which reacts to fire, and passive, which doesn't. The main type of active system is called "intumescent." This type is commonly used with plastic piping, which melts or burns when exposed to fire or intense heat. As the penetrant burns or melts, the intumescent compound expands to fill the hole, blocking head and fire. Types of intumescent materials available include caulks, putties, wraps and pre-formed collars. This type of fire stop was used for a few special applications at the Treasure Island project.

Intumescent fire-stop systems are available from 3M, Dow Corning and other manufacturers. Their advantage is they can be used around plastic piping and other materials that burn. Their disadvantage is unusually high cost and difficulty of installation for some sealants and putting. Also, their expansion may

adversely affect the fire performance of the wall assembly. Wraps and collars can be installed more easily, though changing building specs and field conditions may effect the fit of these materials.

There is a wide range of passive systems, many of which were used extensively in the Treasure Island project. Passive are so named because they do not expand or contract when exposed to fire and heat. Passive systems include grout and cementitious (cement-like) types, endothermic compounds, silicones, latex compounds, job-mixed gypsum-based compounds and sheet or strip materials. Passive systems can be applied around virtually any type of through-wall penetrant that will not burn or melt, including metallic pipes and ducts, conduit and cables.

Grouts and cementitious fire stops are very inexpensive, and were used effectively in the Treasure Island project. However, because there is limited fire test data on these systems, gaining approval from local code inspectors can sometimes be difficult.

Silicone foams and sealants are probably the most widely used types of fire stops, and they were also used in the Treasure Island project. They are generally mid-range in cost. They come pre-mixed and install relatively easily. Another plus: these systems are supported by a wealth of fire-testing data, greatly facilitating the code approval process.

Endothermic latex compounds and sealants are also widely used. Like silicones, they are mid-range in cost and generally install easily and quickly. Endothermic materials release steam when exposed to intense heat, which cools the penetrant and minimizes heat transmission through the fire-rate assembly. These types of products were not used at all at Treasure Island. □

About the Author

Marty Duffy handles product publicity for the corporate communications department of USG Corporation, Chicago.