

## Gypsum Brightens Star on Broadway

**Application/Building Type:**

Entertainment Facilities

**Project Name:**

Marquis Theatre

**Location:**

New York, NY

**Acoustical Consultant:**

Jaffe Acoustics, Inc.

**Owner:** Times Square Hotel Company**Operator:** The Nederlander Organization**General Contractor:**

Innovax-East Construction Corp.

**Drywall Contractor:**

D-A-D Construction Co.

**Featured Products:**

USG Cavity Shaft Wall System

SHEETROCK® Brand Gypsum Panels

SHEETROCK® Brand FIRECODE C

Core Panels

USG Acoustical Sealant

usg.com

**Drywall Systems Perform Aesthetic and Functional Roles in Hotel/Theater Complex**

The construction of a luxurious hotel and theater in midtown Manhattan challenged the versatility of USG drywall systems. From complex decorative shapes to miles of balcony railings... from high-performance sound walls to fire-rated shaft enclosures... USG systems met the challenge while reducing cost and weight, and expediting construction schedules.

The New York Marriott Marquis hotel was a key factor in the redevelopment of the famous Times Square area of New York City. The redevelopment plan has generated some controversy, centered on the question of how to eliminate some of the more objectionable elements in the area without sacrificing the glamour and excitement of the city's traditional entertainment center.

In its design for the Marriott Marquis, John Portman & Assoc. Inc., Atlanta, attempted to answer this question by offering the top-of-the-line furnishings, personal service and spacious rooms expected by an upscale clientele, all delivered with extra glitter and punch that make a hotel visit entertaining in itself. For example, Portman's trademark atrium is one of the tallest in the world, with almost 40 stories of open space. There are two revolving restaurant/lounges to make the most of spectacular views. The Broadway façade even boasts a huge lighted billboard as a contextual reference. The most significant of these efforts, however, is the inclusion of a new legitimate theater as part of the hotel building, required by the city to replace two old theaters previously located on the hotel site.

**In the Heart of the City**

The construction of the steel-framed, 50-story, 1,876-room hotel was complicated by the constant traffic surrounding a congested site. This factor led the architect to select materials not only with the normal concern for utility and economy, but also with an eye toward simplifying delivery, loading and installation. Drywall was often chosen over possible alternative materials because of the advantages it offered in this regard.

Architect Bob Jones of John Portman & Assoc. said, "We specified drywall systems extensively throughout the hotel. They offered several advantages over alternative materials, including not only lower material costs, but also greater ease of installation and thus easier construction scheduling.

"One example is the balcony railings that surround the atrium," Jones said. "In many of our previous jobs, such as Renaissance Center in Detroit, these railings were formed of either poured-in-place or precast concrete panels. Here, however, we selected drywall on steel studs for several reasons. One reason was a desire to reduce the weight, but another was to expedite the delivery, storage and installation of the materials on the site. Everything had to be stored on the floors since no other areas were available. The components of the drywall systems were smaller and more easily stacked to make more efficient use of the space. Besides, we've found that drywall is more easily repaired and restored to its original appearance if it's gouged, bumped or damaged. If a pre-cast concrete railing is damaged, it's virtually impossible to repair without leaving a visible patch."

**Decorative Touches in Drywall**

"Drywall also proved to be an economical and attractive way to create some of the complex decorative forms we wanted," Jones continued. "Particularly the 'starburst' ceiling design in the atrium and the variety of curved forms in the revolving restaurant at the top of the building. These decorative forms were originally conceived to be constructed of cement plaster. However, the contractor successfully reduced costs and achieved the forms we wanted, by using 1/2-inch panels to form the tightest radii.

"We used double-layer drywall to serve both aesthetic and functional purposes in a number of areas, particularly in guest-room corridor walls. This design allows the creation of reveals wherever a drywall partition or ceiling meets another material such as concrete or a metal door frame, to give greater definition and refinement to the space. At the same time, it enhances the fire rating and acoustical performance of the partitions," Jones said.

**Saving Time and Cost**

Specialized drywall products or systems were used in other ways that saved time and reduced construction costs. Although the public elevators are open to the atrium, the six service elevator shafts and some mechanical shafts are enclosed with the [USG cavity shaft wall system](#). The same system was used to create the return air shaft for the ventilation of the atrium.

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An unusual drywall assembly was used to provide eight two-hour fire-rated cylindrical enclosures to conceal elevator cables in the top-floor restaurant. Steel H-studs and narrow strips of 1-inch USG gypsum liner panels were used to form octagonal enclosures about 2 feet, 8 inches in diameter around the cables. Each of these was surrounded by two halves of a tubular form normally used for pouring concrete columns, to which was laminated a layer of ¼-in. SHEETROCK Brand Gypsum Panels. The entire assembly was then skim coated with USG all purpose joint compound, ready-mixed.

### **Drywall Systems Contribute to Theater Acoustics**

The Marquis Theatre, incorporated into the hotel, represents a new era in Broadway theater design. It is the only one in the district to be designed for contemporary productions that routinely use amplified sound systems. According to Mark Holden of Jaffe Acoustics Inc., Norwalk, Conn., “Most of the existing Broadway theaters were built in an era of natural acoustic instruments and the unassisted voice. There were built of highly sound-reflective surfaces such as thick conventional plaster and heavy wood and worked well for the spoken word, the singing voice and small pit orchestras. With the advent of amplified sound systems, and the use of more contemporary popular music in the theater, the old halls have often been criticized as deficient. Amplified sounds can be a particular problem if there are too many sound-reflective or focusing surfaces because they can produce a harsh, unpleasant, booming effect. We have provided a balance of sound-absorptive materials to reduce this echoing without completely deadening the room.

“We became involved in the project after the design work was completed and construction had begun,” Holden continued. “This is one reason why multilayered drywall systems played an important part in the theater’s acoustic design, for both room acoustics and sound-transmission control. The relatively light weight of drywall helped us to work within the limitations imposed by the existing structural system. Within the room itself, these systems offered sufficient reflectiveness to distribute sound effectively, yet were resilient enough to absorb some of the low-frequency sound energy and thus to prevent an undesirable boominess.

“As for sound isolation, the hotel’s Broadway and Westside ballrooms are immediately above the theater, so we were very concerned about the effectiveness of the separating walls and floor/ceiling assemblies. Because three separate events featuring amplified music could not take place in these three spaces simultaneously, it was important that they not interfere with another,” Holden said.

The finished theater ceiling is a system of wood slats, arranged in an undulating pattern that reflects and diffuses part of the sound and lets the rest through to be absorbed by glass-fiber panels above. To help acoustically isolate the theater from the ballroom above, a second ceiling was installed above the wood-slat finish system. A framework of metal furring channels was suspended on spring and neoprene resilient hangers from the structure above, and faced with two layers of 5/8-inch SHEETROCK brand FIRECODE® “C” gypsum panels. Three-inch batt insulation was installed on top of this drywall membrane, and all penetrations through it were carefully sealed with USG acoustical sealant.

To complete the acoustical isolation of the theater, a variation of the USG cavity shaft wall system was constructed as exterior wall furring inside of the metal-faced exterior wall of the stage house. Its function was to prevent the Broadway street noises from being heard inside the theater. The acoustical consultant estimated this construction, combined with the exterior wall and the air space in between, to provide an STC-60 sound transmission class rating.