



Stage Building and Technical Solutions



Vienna State Opera

Birmingham Hippodrome

Gloya Kaufman Performing Arts Center
Photo ©Nic Lehoux



American Ballet Theatre @ The Metropolitan Opera House

Harlequin is the world leader in advanced technology floors for dance, performing arts, entertainment, and events.

Harlequin's reputation is founded on the manufacture and supply of a range of hard-wearing and long-lasting portable and permanent sprung and vinyl floors preferred by dancers and performers at the world's leading venues, including the Royal Opera House, the Bolshoi Theatre, and The Metropolitan Opera House.



Backed by an engineering team and independent research, Harlequin brings over 40 years' experience specializing in stages and floors for performing arts. Traditional floor construction skills and materials are combined with advances in engineered flooring products and components to meet the most demanding stage specifications. Whether working to designs by architects or a venue's in-house technical crew, Harlequin's skilled teams deliver the finished stage efficiently, on time and on budget.

Stages need to be load-bearing for performers, scenery, props, and trucks, as well as hard-wearing to stand up to set-ups, breakdowns, and rigging – show after show. The floor surface should provide a safe working environment for performers and technical teams alike.



Houston Ballet, Texas

Following Hurricane Harvey in August 2017, Houston Ballet was left without rehearsal spaces and a performance venue due to flooding. With their season opening in just weeks, they contacted Harlequin for assistance.

The company secured a temporary performance venue to use while the Wortham Theater Center was being repaired; Harlequin Liberty® LatchLoc panels provided a proper performance surface that could be moved as needed. There were concerns, however, about whether the panels would sustain the weight of the scenery used in The Nutcracker performances. With Harlequin's extensive experience with this issue they provided specially customized panels to support the heavy scenery in the required timeframe.

In the Center for Dance rehearsal studios, Harlequin WoodSpring® sprung floors and Harlequin Studio™ marley floors were installed following remediation and restoration.



Artists of Houston Ballet in Margaret Alkek Williams Dance Lab
Photo by Nic Lehoux (2011)
Photo Courtesy of Gensler and Houston Ballet

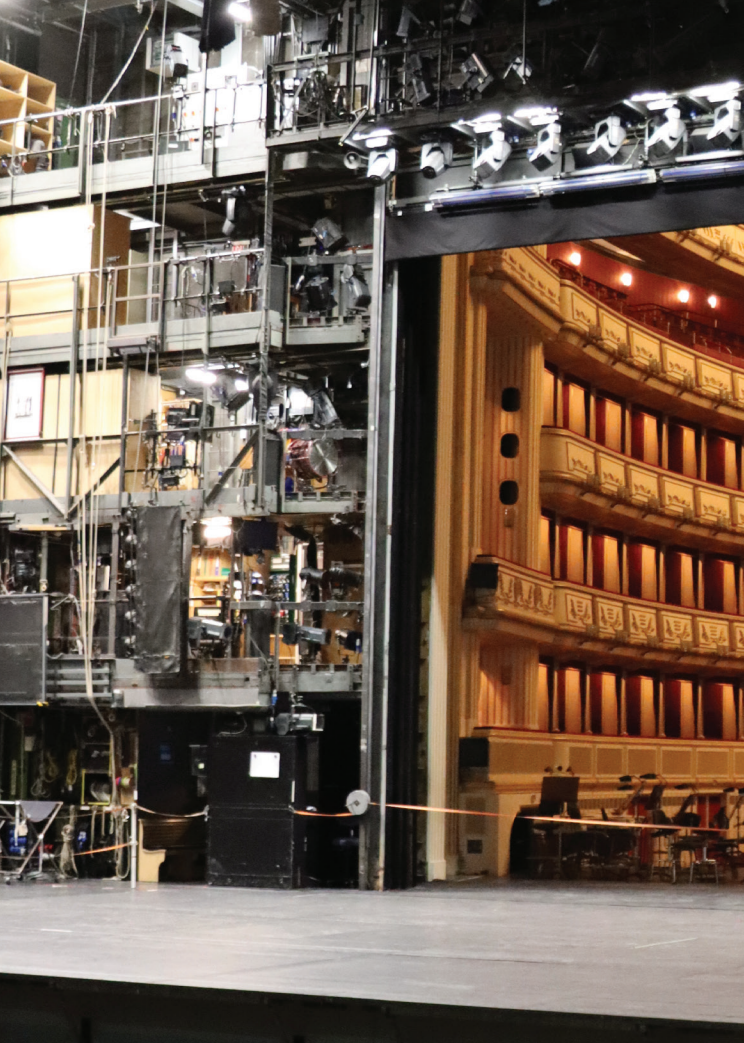
Kennesaw State University, Georgia

Kennesaw State University sought to renovate the Joe Mack Wilson Theatre because their Department of Dance, the largest collegiate dance program in Georgia, lacked a permanent space suitable for dance. The project design team requested Harlequin to provide a permanent sprung dance floor with a durable performance surface for the stage floor. Additionally, they required installation of trap doors in the main stage floor that would leave a seamless horizon, and unsprung wings for the stage structure.

Knowing that the stage floor would need to be sturdy enough to withstand the rigors of heavy stage props and equipment, Harlequin WoodSpring® was installed as the sprung floor system along with Harlequin Cascade™ as the top performance surface. Cascade is a hardwearing, multipurpose floor designed specifically for dance and was an ideal solution for KSU.

Harlequin completed the customized installation of the new stage floor, complete with trap doors and unsprung wings, in less than a week's time, ensuring the new dance theater would meet their opening date. KSU is equipped with a permanent, professional dance floor in the venue.





Vienna State Opera, Austria

The Vienna State Opera and Vienna State Ballet needed a rehearsal space with both a sprung and rigid floor that they could use on a daily basis. Following over two years of development, Harlequin's technical teams from the UK, Luxembourg, and Germany worked together to install Harlequin Liberty Switch® at The Vienna State Opera House.

Before the installation of the Liberty Switch system could begin, a sub-floor was constructed using timber battens to provide a completely level surface onto which the pre-manufactured Liberty Switch base panels, complete with the drives and control mechanism, were installed.

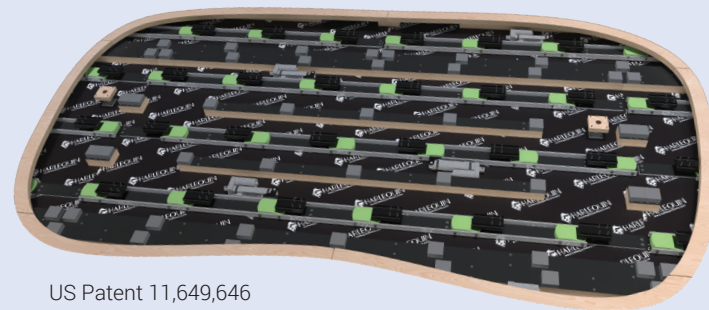
The Harlequin Liberty® LatchLoc top panels were then laid and locked into place, finally being topped with a Harlequin Cascade™ performance vinyl floor.

The whole system is operated via a master control unit using a simple touch screen placed on the wall of the room which enables rapid transformation.

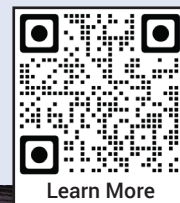
Harlequin Liberty Switch®

Liberty Switch is an award-winning, professional multi-use floor system which transforms between a rigid theatrical floor and a sprung performance floor at the touch of a button.

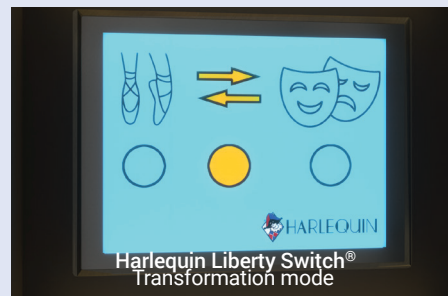
It is designed for venues that regularly put on both dance and theatrical performances and so require both a sprung and rigid floor in the same performance or rehearsal space.



US Patent 11,649,646



Harlequin Liberty Switch® Professional load-bearing theatre floor



Harlequin Liberty Switch® Transformation mode



Harlequin Liberty Switch® Professional sprung dance floor

Sprung floors for performance

International venues with a large stage that is shared alternately between the resident ballet and opera companies are constantly presented with a problem: how to manage the regular transition of a stage floor designed for dance into a multi-purpose floor with scenery tracks and elevators required for opera productions.

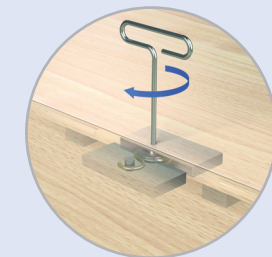
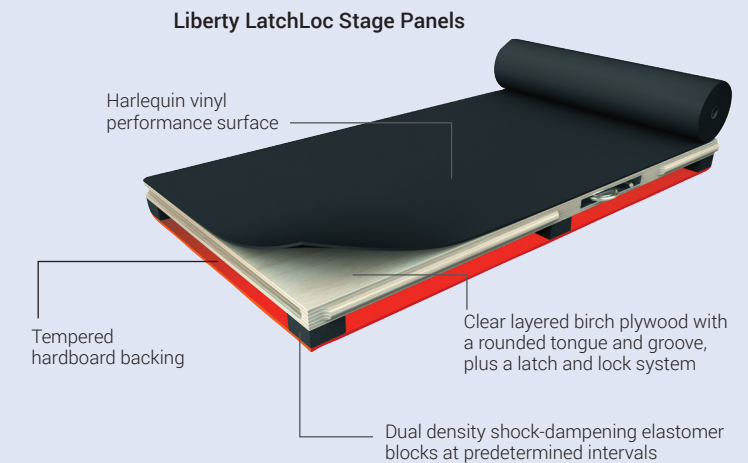
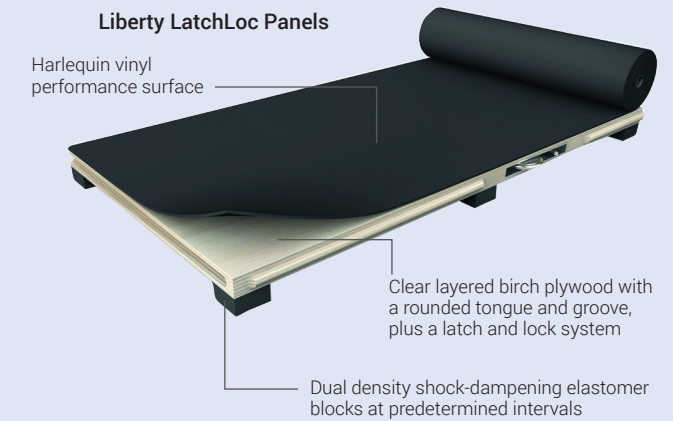
A sprung floor designed for dance flexes under impact giving a softer feel and reduces the risk of injury to the performer. Harlequin Liberty® LatchLoc is a sprung floor panel system with good area elasticity, originally designed for both permanent or portable installation due to a patented inter-locking feature. This flexibility means that the panels can be easily installed and removed by a theater's own technical team or permanently installed onto a ballet wagon.

Harlequin Liberty® LatchLoc

Harlequin Liberty LatchLoc is a modular, sprung floor panel system manufactured from engineered boards with dual density elastomer blocks on the underside to give uniform and consistent shock damping. The panels are laid in a brickwork fashion onto the subfloor, so that cross-joins do not coincide. They are linked to each other by a hardwood dowel, which is secured into place using our 'one turn of the key' latch and lock mechanism.

Specification Guide

Installation	Portable / Modular
Floor panel size	Full 96" x 48", Half 48" x 48"
Overall thickness	1 1/2" nominal (without vinyl performance surface) 1 5/8" nominal (with vinyl performance surface)
Weight	92 lb full size, 46 lb half size Stage 94 lb full size, 47 lb half size
Testing standards	DIN 18032-2
Average shock absorption	67%
Uniform distribution Load	>2248 lb
Point load	>809 lb
Rolling load	>1500 N
Vertical deformation	4.1mm
Area deflection	12.8%
Fire rating	Bfls 1 to EN 13501



Harlequin's 'latch and lock' system

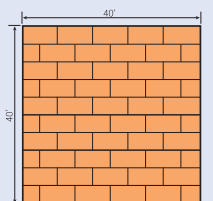


Diagram of 'brickwork fashion'



Harlequin Liberty portable panels for Staatstheater, Nürnberg

American Ballet Theatre, Metropolitan Opera House, New York City

As America's National Ballet Company, flooring is a major consideration for ABT. Over nearly a three-quarters of a century, they have showcased many of the finest dancers and choreographers.

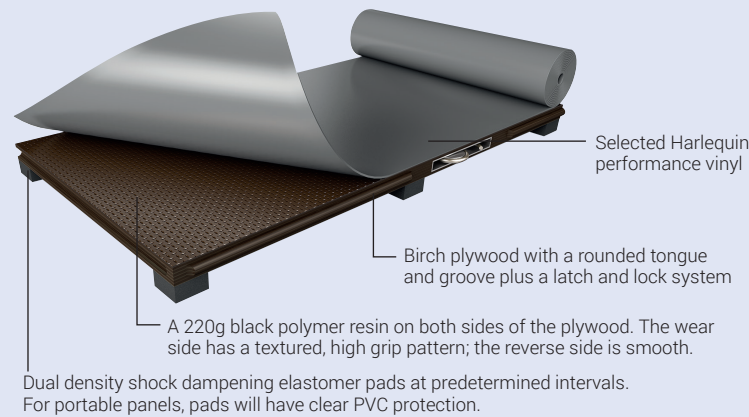
To accommodate over 4,000 lbs of scenery for recent productions at The Metropolitan Opera House ABT's production team chose Harlequin Liberty® HD.

The Harlequin Liberty HD sprung floor is a further development of our renowned Liberty panel system, designed with enhanced durability in mind for more challenging environments.



Harlequin Liberty® HD

Harlequin Liberty HD a further development of our renowned Liberty panel system, is designed with enhanced durability in mind for more challenging environments. Panels are laid in a brickwork fashion onto the sub-floor so that cross joints do not coincide. The panels join together by a rounded tongue and groove and are secured using our 'one turn of the key' latch and lock mechanism. Harlequin Liberty HD panels have black polymer resin overlays on both sides with a textured, water-resistant, anti-slip, and weatherproof top surface. They can be stored on carts for easy and safe transportation on tour or within a venue.



Specification Guide

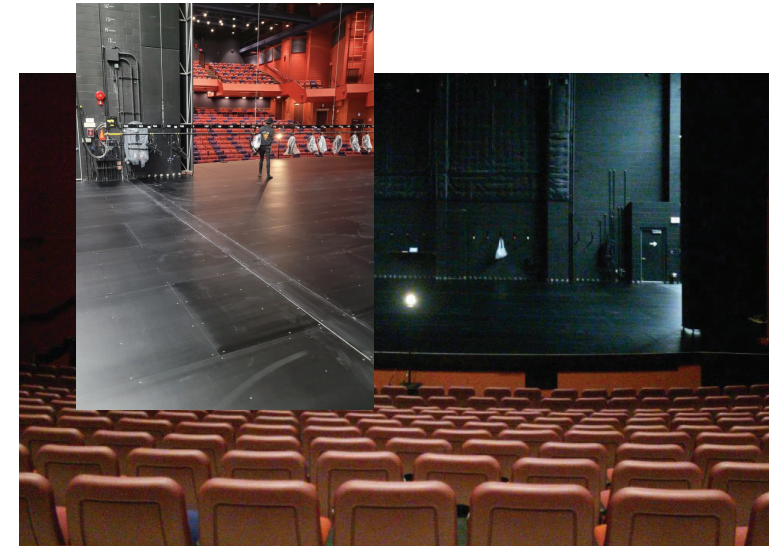
Installation	Portable / Modular
Floor panel size	96" x 48"
Overall thickness	1 1/2" nominal (without vinyl performance surface) 1 5/8" nominal (with vinyl performance surface)
Weight	84 lb full size 42 lb half size
Testing standards	DIN 18032-2
Average shock absorption	67%
Uniform distribution Load	>2248 lb
Point load	>809 lb
Rolling load	>1500 N
Vertical deformation	4.1mm
Area deflection	12.8%
Fire rating	Bfls 1 to EN 13501

Ector County Independent School District, Texas

The Ector County Independent School District encompasses 945 square miles in South Texas making it one of the largest school districts in the United States. It offers 3 high schools and 5 middle schools including South Middle School located in Edinburg, Texas. The school recently completed an expansion and improvements to their cafeteria which included renovation of the performance stage.

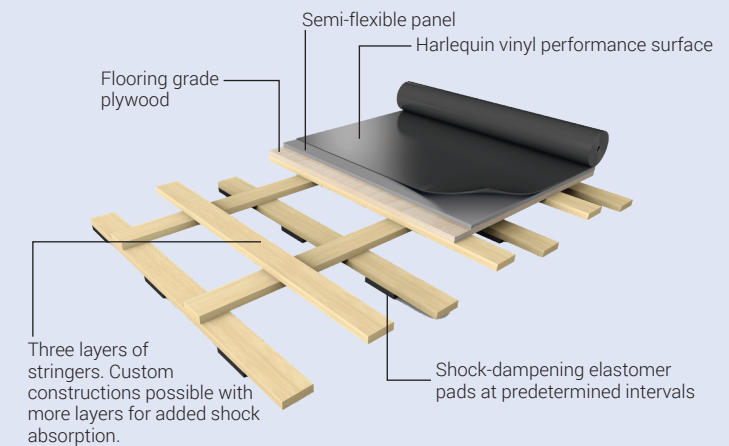
Working with the contractor, Gerlach Builders, Harlequin Floors was awarded the project to renovate the 31' x 32' stage area. In order to provide the students with state-of-the-art learning facilities, a Harlequin WoodSpring® sprung floor system was selected as the flooring for the cafeteria stage. The Harlequin team permanently installed the professional wood sprung dance floor system topped with a hardwood surface.

The project was completed in less than a week, leaving the students at South Middle School with a stage floor that allows them to dance and perform without risk of injury.



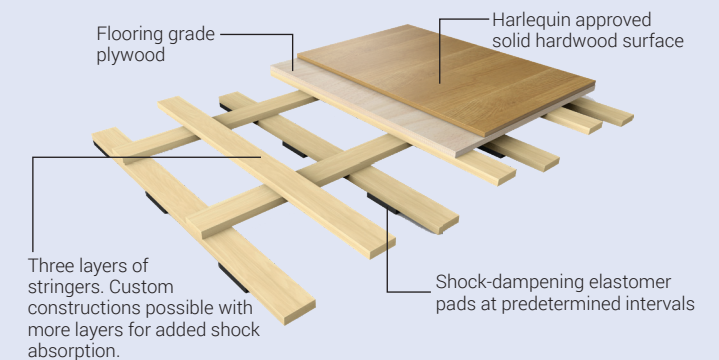
Harlequin WoodSpring®

Harlequin WoodSpring is a permanently installed sprung floor system that is a modern update of the traditional 'basket weave' construction originated in the 19th century. Harlequin's modern interpretation blends a traditional construction approach with the technology of today's materials. The "spring" in basket weave construction comes from the natural flexing and recovery of the triple layer of battens, which is enhanced by shock-absorbent elastomer pads.



Specification Guide

Installation	Permanent
Overall thickness	3 1/2" nominal (without vinyl performance surface) 3 5/8" nominal (with vinyl performance surface) 4 1/4" nominal (with hardwood)
Weight	5.6 lb/ft² (with vinyl performance surface)) 7 lb/ft² (with hardwood)
Testing standards	DIN 18032-2
Average shock absorption	64%
Uniform distribution Load	>2248 lb
Point load	>809 lb
Rolling load	>1500 N
Vertical deformation	3.3mm
Area deflection	14.9%
Fire rating	Bfls 1 to EN 13501

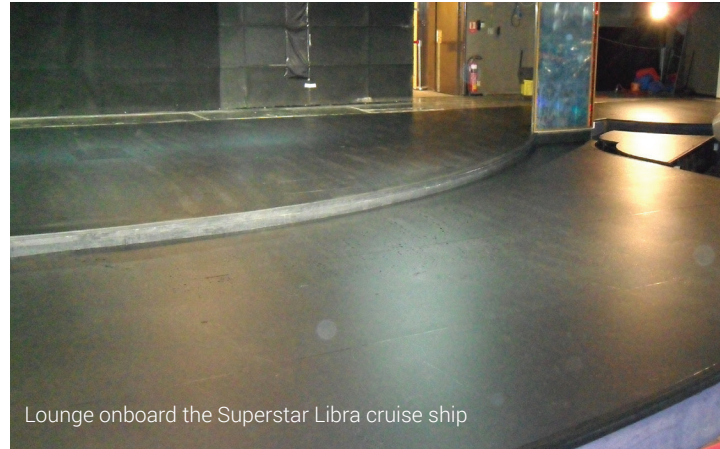


Stage floors for challenging environments

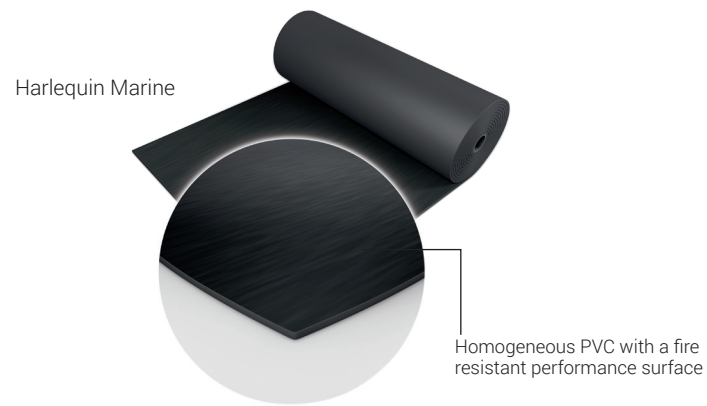
Marine environments - stages for cruise ships

The popularity of cruise vacations has led to the commissioning of larger and more lavish ships, including extensive entertainment facilities and well-equipped theaters. The marine environment and demands particular to ocean going stages are challenges met by Harlequin's experienced engineering and installation teams.

The range of specialized permanent flooring used on cruise liners includes Harlequin Marine™, a hard-wearing, homogeneous PVC which conforms to marine standards and fire ratings. It is suitable for fitting within confined spaces on marine vessels and/or scenery docks on cruise ships. It is fire resistant, with a slightly marbled surface to resist scuffing. It can be laid on any hard, smooth sub-floor and is an excellent choice as the vinyl performance surface when used in conjunction with a Harlequin sprung floor.



Lounge onboard the Superstar Libra cruise ship



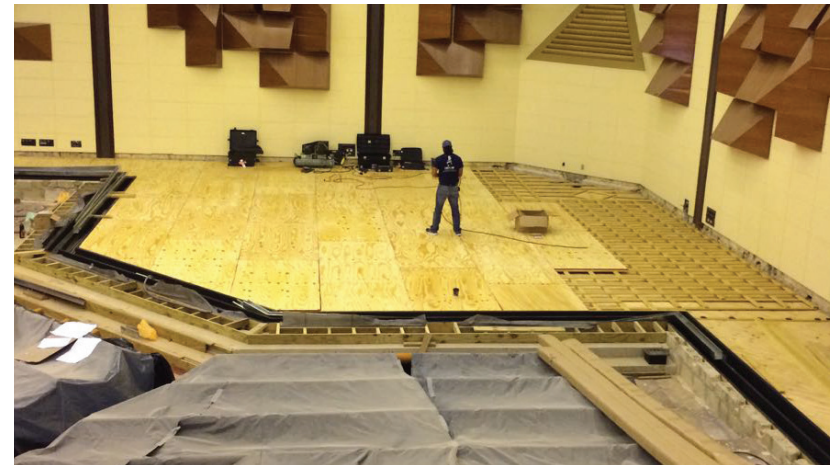
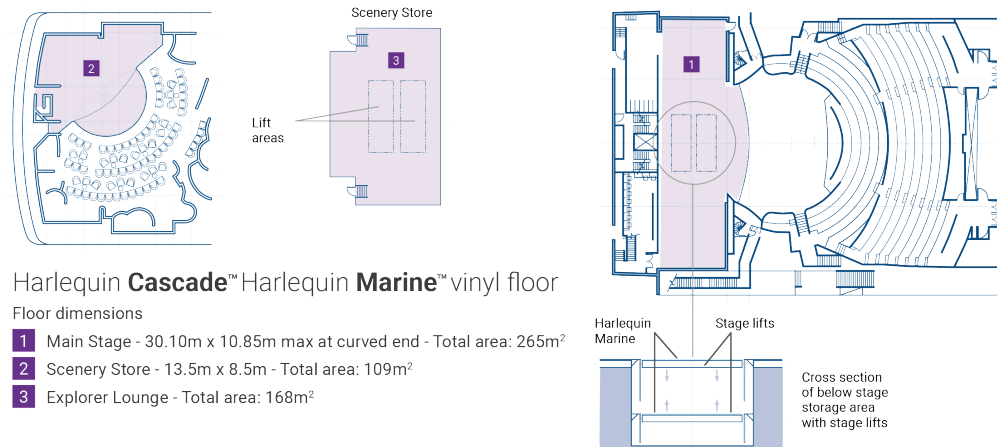
Harlequin Marine

Homogeneous PVC with a fire resistant performance surface

P&O Ship Ventura

Harlequin Cascade™ vinyl flooring was installed to the plywood sub-floor of the main stage and cut to fit around Serapid tracks, traps and stage lifts. Cascade was also installed onto the plywood surface of the fixed stage area and revolve stage extension of the Explorer Lounge.

A special screed was laid directly onto the metal deck immediately below the main stage and Harlequin Marine™ was installed onto the screeded area, including the surface of the stage lifts.



Frank Collymore Hall, Barbados

This 2,000 square foot stage project was built as a variation of our Harlequin WoodSpring®, which itself is a modern update of the traditional 'basket weave' construction that originated in the 19th Century, but with 21st Century advancements.

'Woven' using a triple construction of custom machined timber laid at right angles, all wood was specially treated to avoid warping during the transport and installation due to the local humidity.

It was to this approach that Harlequin turned for the Frank Collymore Hall in Bridgetown. This 500 seat hall is used for musical recitals, dance, dramatic presentations, and conferences.

Working in the historic building environment

Many theaters and opera houses are historic buildings in their own right, which are subject to preservation orders to conserve the integrity of the structure. Materials and working practices may be regulated and inspected to ensure the building remains true to the original design and concept of its architect. In other cases the original purpose of the building may have become obsolete and conversion into a performing arts space allows the structure to be retained and given a new lease of life.

Harlequin Floors has years of experience, working sensitively to restore, refurbish or create new stages in buildings that are listed, preserved or subject to conservation orders. This may mean working around structural features, accommodating awkward spaces, complying with fire risk requirements, and the selection of suitable materials.



Harlequin Liberty® floor installation at the Royal Albert Hall. Panels had to be cut on-site to accommodate the iconic elliptical curve of the stage.

Stages and studios with integral acoustic properties

Occasionally the choice of the appropriate stage floor construction can also contribute beneficially to the acoustic characteristics of the space. Sprung floor systems utilizing a multi-layer sandwich construction provide suitable noise damping and acoustic separation from other areas of the building.

Theater and acoustic consultants have the option of evaluating stage and studio flooring as an acoustic sympathetic component, whether the surface is finished in hardwood or vinyl.

The well-established 'triple sandwich' permanent sprung floor construction of Harlequin Activity® is designed to provide absorption of performer loads and sound. These fully floating floors have no fixings to the sub-floor and can be laid on any reasonably smooth and flat surface without prior preparation.

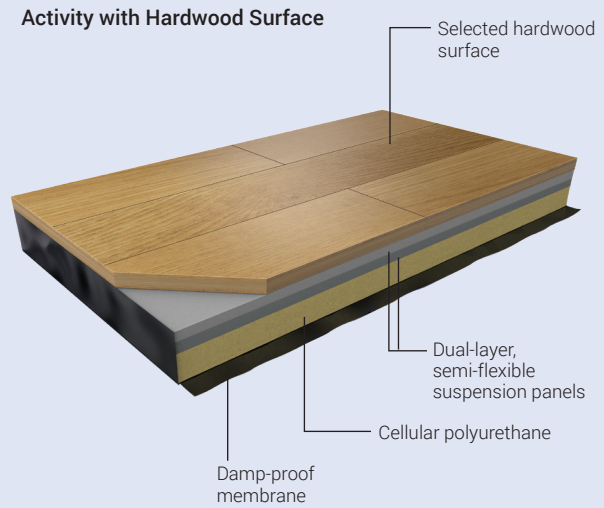
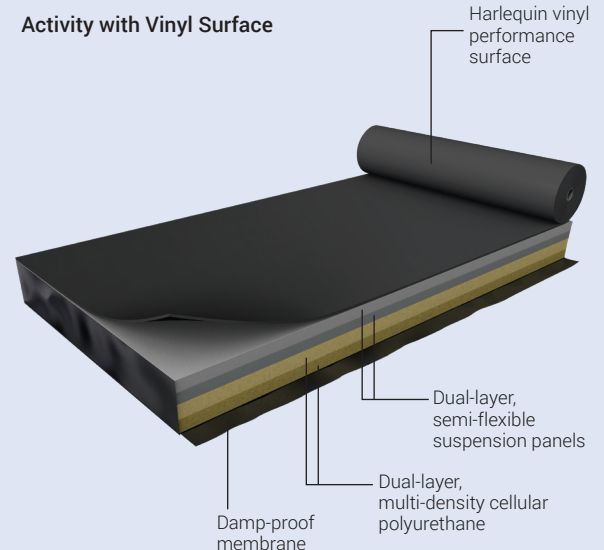
Correctly reinforced, Harlequin Activity can withstand heavy loading including retractable seating and the top surface can be chosen from a wide range of vinyl or wood options.

Harlequin Activity® with hardwood surface

The construction is identical to Harlequin Activity with a vinyl surface, but the second layer of semi-flexible panels is replaced by a selected hardwood surface layer, normally an engineered board with a choice of hardwood wear layer. (However, if desired, this can be substituted with a solid hardwood layer). This is installed with the use of a modified elastic one-component silane adhesive and secretly secured through the tongues using lost-head nails. The hardwood surface may optionally be protected by impregnation with a multi-coat hardwearing polymer lacquer. The expansion gap around the perimeter of the room can be concealed by a scotia profile of matching hardwood to form a neat edging.

Specification Guide

Installation	Permanent
Overall thickness	2" nominal (without vinyl performance surface) 2 7/8" nominal (with vinyl performance surface) 2 1/4" nominal (with hardwood)
Weight	5.1 lb/ft² (without vinyl performance surface) 6.8 lb/ft² (with hardwood)
Testing standards	DIN 18032-2
Average shock absorption	64%
Uniform distribution Load	>2248 lb
Point load	>809 lb
Rolling load	>1500 N
Vertical deformation	3.8mm
Area deflection	7.20%
Fire rating	Bfls 1 to EN 13501



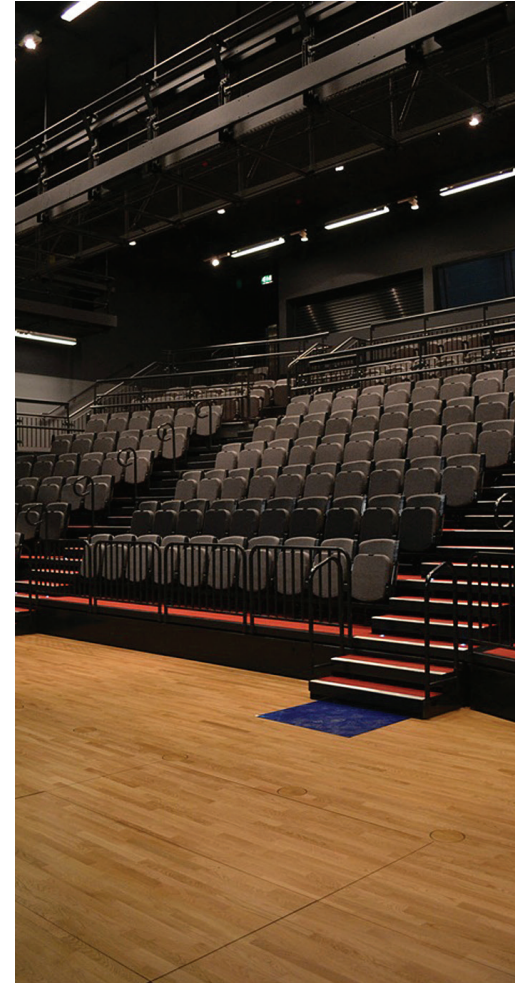
Central Saint Martins College of Arts and Design, London

The King's Cross Campus in London includes four multi-purpose performance and seven rehearsal spaces. The combination of specialized products, customization and innovation were employed to ensure individual floors matched the demands of performance styles including ballet and rock concerts.

Blending aesthetics and customization

The stylish KX Platform Theater was complemented with a Harlequin Activity® sprung floor finished in Weitzer Parkett oak to match the interior. To create an optional orchestra pit economically, Harlequin designed a 351m² floor based on Steeldeck® platforms that could be removed in sections as required.

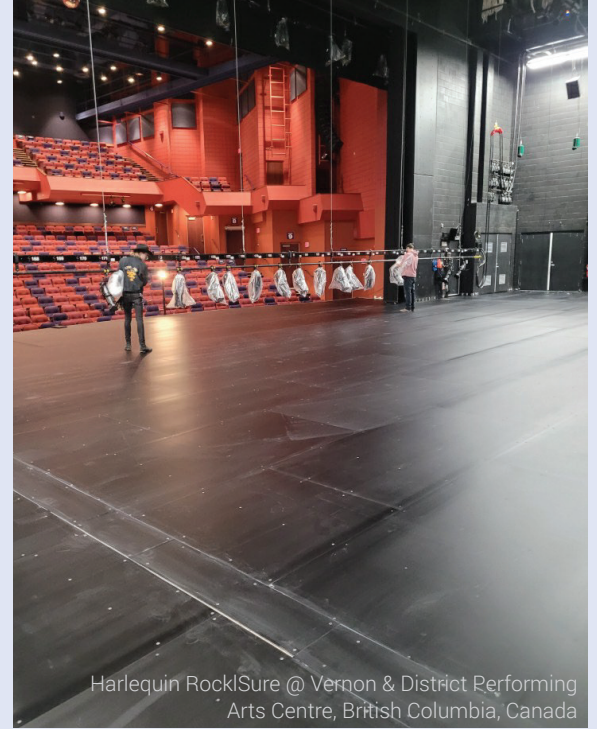
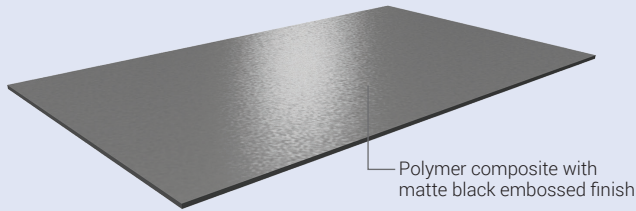
- Harlequin Cascade™ vinyl floors, one black and one white, were chosen for the multi-purpose monochrome workshop spaces
- The studio theater space has 177m² Harlequin Activity sprung floor finished in engineered maple
- Harlequin Activity fully-floating floors were also installed in seven additional rehearsal spaces and finished with engineered maple or Harlequin Standfast.™



Harlequin Activity on the Mountain Stage at Kaatsbaan Cultural Park

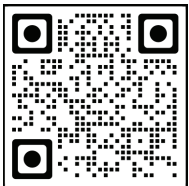
Harlequin RockSure™

Harlequin RockSure is a tough, polymer composite, easily managed stage surface designed for use in live performance spaces. Strong enough to support heavy loads, it is an ideal solution for all types of theatrical productions. Harlequin RockSure can be installed by our highly-skilled technical team or is available for purchase as a stand-alone material. It is manufactured to be squared, pre-drilled, and counter-sunk, and can be worked with standard woodworking tools.



Outdoor Spaces

Harlequin offers options for performing safely in the great outdoors. Create a space that is consistent with what performers are used to inside with Harlequin's sprung panel systems and range of vinyl performance surfaces. Contact an Account Executive to discuss creating the perfect stage for your space.



Learn more about our
Stage Floors and Stage
Building Services



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