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Specifying dance floors, a guide for architects



The purpose of this guide is to introduce architects to developments in dance floor technology and practice, specification issues including aesthetic versus performance considerations and why the choice of floor is also critical in minimising injuries to dancers.

Introduction

For over 35 years, Harlequin Floors have been manufacturing and supplying a range of long-lasting, durable portable and permanent sprung and vinyl floors for the dance, theatre and the performing arts industries. World leader in advanced technology flooring for dance, the Harlequin brand is firmly established worldwide with branches in the UK, Europe, The US, Asia and Australia.

Until the advent of purpose-made vinyl floors during the 1970s, the choice was limited to a wooden floor or a linoleum dance surface. Harlequin has lead the way

in developing and evolving the modern dance floor and has been involved with extensive research into reducing dancer injury, whilst placing trust and innovation at the heart of everything it does to become a brand that dancers and performers depend on.

With a growing interest in the provision of spaces suitable for dance – for professional performance and rehearsal, private dance schools and throughout the education sector, there is increasing focus towards specifying dance floors that meet both performance aspirations as well as conforming to health and safety requirements.

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OVER 35 YEARS OF DEDICATION

Over 35 years after its creation, Bob Dagger, founder and CEO of the Harlequin Group says, “When I launched my company, I aimed at designing floors for theatre and dance using new, advanced materials. I am pleased to note that today, nearly all of the world’s most prestigious dance companies, along with many of the world’s largest venues, recognise the advantages of Harlequin floors; fewer injury risks and improvement of artists’ trust in the floor”.



Main considerations when specifying floors for dance

Although it may be tempting to opt for a wooden floor for aesthetic reasons, or a commercial grade vinyl for reasons of cost, these are not always the most practical nor the safest options.

It may seem obvious but specifying the correct floor to meet the end users' requirements starts with asking the right questions.

Harlequin Liberty sprung floor with Harlequin Studio vinyl at the Conservatoire de Paris.

Basic requirements of a dance floor

- Not too hard with just the right amount of “give” to avoid repetitive strain injuries, and not too soft which can be tiring and cause muscle fatigue.
 - Responsiveness - Returning energy to lift the feet when moving but not too springy like a trampoline.
 - It should not be too noisy in use. Room acoustics can have an impact on this too, although percussive dance such as tap, Irish and flamenco use their shoes together with the floor to make certain sounds for the rhythm of their dance.
 - There should be an appropriate level of “traction” or “slip-resistance”. Too much can block movement and cause the foot to twist. Too little and it can be dangerously slippery.
 - Absorb energy of falls. Using a thick performance surface alone does not provide sufficient protection from serious injury and does therefore render it unsuitable for most types of dance.
 - It should be ‘area elastic’ in preference to ‘point elastic’ (See page 5 for details).
- **Type of dance/usage?** The type of floor to specify will depend on the type of dance or usage. Most professional studios cover a range of different types of dance and it is worth remembering that different genres may require varying amounts of space.
 - **Is a sprung floor needed?** A sprung floor may not be required or budgetary restrictions may prevent it. Not all styles of dance require a sprung floor, however increased awareness of health and safety legislation leans towards having a sprung floor.
 - **Is the space large enough for dance and are the ceilings sufficiently high enough?** Physically it is important to have headroom so that the dancer never feels inhibited in achieving height, especially when jumping. The opportunity for one dancer to stand on the shoulders of another and raise her or his arms in the air makes a ceiling height of at least 3.5 metres ideal.
 - **Will the floor need to be portable or permanent?** Whether a portable or permanent floor is required again depends on the client's needs and budget and whether the studio is owned or rented. A permanently installed floor will cost more but last longer making it a good long-term investment.
- **New build or existing building?**
Normal design criteria apply such as:
 - Moisture barriers
 - Floor strength and construction
 - Dance floor thickness and weight
 - Ceiling height
 - Door swing or ramps required
 - The heating system, is it under the floor?
 - Is there an adequate void to allow for a level transition between the sprung floor and adjoining areas?
 - **Depth of floor.** A depth of at least 100mm should be allowed for the floor. This can be a major constraint when laying a sprung floor in a space not designed for it. Most can accommodate a maximum of 50mm. A damp-proof membrane should be used to prevent moisture from the ground rising which can cause dimensional instability and vapour blisters in the performance surface.
 - **What is the sub-floor?** Is the sub-floor solid or suspended? Is it concrete or wooden? Is it level or does it need a screed? All aspects of sub-floor preparation and floor covering installation should be carried out in accordance with the appropriate standard. All wooden floors must be structurally sound, level, smooth, dry and clean.
 - **Type of performance surface required.** The performance surface will normally be vinyl or hardwood depending on the usage and footwear. Surface friction has to be a good balance between slip and grip, as too much of either can cause early muscle fatigue resulting in injury and premature wear in the cartilage.

Dance floors V sports floors

When it comes to specifying a floor for a dance studio or stage, there is increasing focus towards choosing dance floors that meet both performance aspirations as well as conforming to health and safety requirements to minimise the risk of falling or incurring injury.

It is common for a sprung floor to be required by those involved in dance, indoor sports and physical recreation but it is vital that fundamental differences between sprung floors for dance and sprung floors for sport are understood.



A common misconception...

It is a common assumption that a well-designed sports floor will suit the needs of dancers, but there are two differences: the construction of the sprung sub-floor and the performance surface. Many think that dancers have the same requirements as athletes when it comes to floor criteria. Sprung floors for sport are tested for adequate ball bounce and athletes require a high degree of energy return – i.e. spring. Evidently, dancers have little interest in ball bounce and are focussed on a combination of shock absorption and energy return. (See page 6 for more about tests).

A dancer's interest in the quality and consistency of both the sprung floor and dance surface is for artistic performance as well as health reasons. Every dance step or jump on an unyielding surface wears down the resilience of the body and brings about the risk of injury and the prospect of long-term damage.

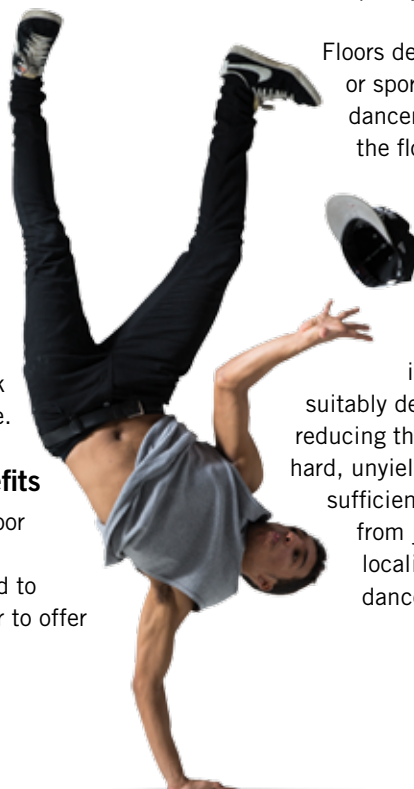
Sprung dance floors have unique benefits

It is important to understand when a sprung floor is required and what benefits it provides to the users. A sprung floor is not essentially designed to provide performers with lift or spring but rather to offer

cushioning and impact reduction when landing after jumps or similar movements. Lower limb problems such as tendonitis, 'shin splints', knee pain and ankle strain can all be attributed to incorrectly specified sprung floors and can take several weeks of physiotherapy and recovery time to correct. Such injuries can also have a significant bearing on the longevity of a performer's career and quality of performance.

Floors developed for general industrial, commercial or sports applications do not offer the benefits that dancers appreciate when they talk about the 'feel' of the floor. Only floors developed for dance do that.

Confidence is inspired by a dance surface that offers the right degree of 'traction' or 'grip' that guards against the risk of slipping or falling. The degree of spring provided by the sprung sub-floor beneath the dance surface is important too. Medical research into dance injuries supports the benefits a suitably designed sprung floor contributes towards reducing the type of injuries associated with dancing on hard, unyielding floors. The degree of spring is also critical, sufficient to absorb the impact of dancers landing from jumps, but not bouncy like a trampoline and localised so that the landing does not affect other dancers nearby.



Dance floor construction

Types of sprung floor

Although the first sprung floor installation was circa 1872, the history of sprung floors does not really begin until the 1920s, whereby dance venues in America were installing wooden floors supported by uniquely produced metal spring units.

With metal parts likely to seize and be difficult to maintain, current sprung floors are now normally constructed in one of three ways:

- Traditional basket weave substructure.
- Fully floating with no fixings to the walls or sub-floor.
- Inter-locking sprung floor panels (modular portable version available for touring).

What is a sprung and semi-sprung floor?

A sprung floor is a floor that provides some degree of bounce and flexes under impact giving a softer feel. Performers need a floor to absorb the shock of repeated impact to their joints and reduce injury from falls. Modern sprung floors are supported by foam backing or rubber pads while traditional floors provide their spring through bending woven wooden battens.

Semi-sprung floors are designed to dampen bounce. Very thick vinyl flooring is often referred to as semi-sprung.



AREA/POINT ELASTICITY

An area elastic floor flexes over a wider area to avoid the 'trampoline effect' whereas a point elastic floor shows deflection or 'give' only at the point of contact.

Conventional wooden floors have inconsistencies of area and point elasticity, which are unavoidable owing to their construction.

A performance surface is point elastic whereas area elasticity, as provided by a sprung floor, is mainly preferred. No roll-out dance floor, no matter how thick or heavily cushioned can fully fit the description of a 'sprung floor'.

Standards and tests

Currently, no standards exist which relate specifically to dance floors. Partly the reason for the lack of standards relating specifically to dance floors is the sheer size of sports activity in comparison. Harlequin floors are fully tested in accordance with DIN standard 18032-2. DIN standard is satisfactory on sprung floors but with regards to slip resistance, it is too restrictive.

DIN STANDARD TEST 18032-2

DIN 18032-2 is the German standard for floor requirements for sports halls.

Summary: tests of shock absorption, vertical deformation, area deflection and behaviour under rolling load, described under DIN 18032-2, were carried out on Harlequin sprung floors by the Centre for Sports Technology Ltd in London. Outline descriptions of the methods are given below:

Force Reduction (shock absorption)

The 'Force Reduction' test measures the degree by which the floor reduces the impact force which occurs when an athlete, or dancer, lands on it. The test was devised to simulate the forces observed when a runner's heel strikes the ground. The test is carried out on a concrete floor as well as on the floor under test and the result quoted is the amount by which the force measured on the test floor is lower than the force measured on concrete.

Vertical Deflection

In the 'Vertical Deflection' test, the amount by which the floor deflects under impact load is measured directly. The test is similar in principle to the force reduction test.

DIN standard 18032-2 test results on Harlequin sprung floors

	Force reduction	Vertical deformation	Area deflection	Rolling load
Requirement	Min. 53%	Min. 2.3mm	Max 15%	Min. 1500 N
Harlequin Activity	59.6%	3.8mm	7.2%	>1500 N
Harlequin Liberty	67%	4.1mm	12.8%	>1500 N
Harlequin WoodSpring	64%	3.3mm	14.9%	>1500 N



Area Deflection

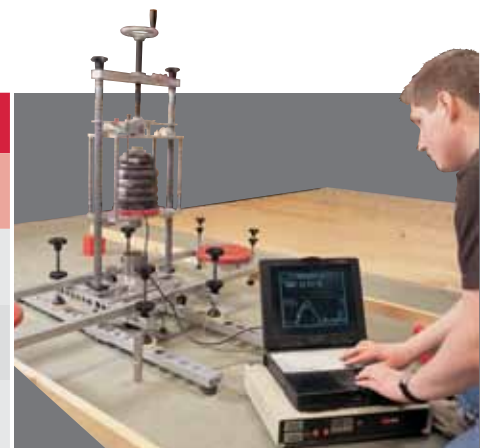
Area Deflection is measured using a modification of the vertical deflection apparatus. The purpose of the test is to ensure that one athlete or dancer standing on the floor will not be excessively disturbed by the movements of another nearby.

Resistance to a Rolling Load

The 'Rolling Load Resistance' test is carried out on two structurally critical areas of the floor. A steel wheel whose width, diameter and corner radii are defined, is loaded to 1500 N and is rolled repeatedly over the surface of each area. After 300 passes, the floor is examined for damage.



The photos show tests to DIN 18032-2 in progress on Harlequin's WoodSpring basket weave floor with Harlequin Cascade surface and dancers from The Royal Ballet, London, approving the test floor.



Harlequin sprung floors

Harlequin Activity™ permanent sprung floor

Harlequin Activity is a permanently installed sprung floor system, based on the well-established 'triple sandwich' construction. It is a fully-floating system with no fixings to the sub-floor and can be laid on any reasonably smooth and flat surface without prior preparation.

The construction of Harlequin Activity is shock-damped to avoid a 'trampoline' effect and provides area elasticity to offer identical characteristics across the whole floor. Correctly reinforced, Harlequin Activity can withstand heavy loading including retractable seating.

Along with the DIN standard test, Harlequin Activity has been tested for impact sound reduction with a variety of different Harlequin surfaces, according to BS EN ISO 140-8; 1998. The excellent results achieved ranged from 22 to 24dB.



Different surface options to consider:

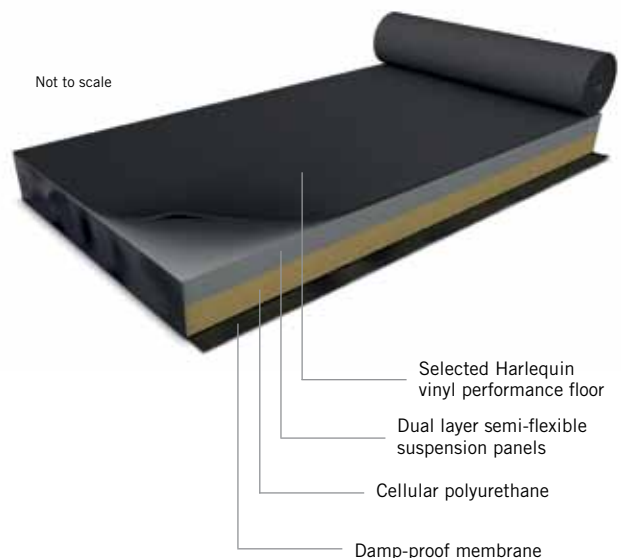
- Harlequin vinyl surface: for all types of dance, but particularly ballet.
- Hardwood surface in beech, oak or maple, for specifiers who need a hardwood surface for multi-purpose use, including traffic by the general public, full stage entertainment, ballroom dance or even for designers obliged to match existing décor.
- Engineered board with a hardwood wear layer - in beech, oak or maple.

Harlequin Activity™ with vinyl surface

A polymer damp-proof membrane is laid across the sub-floor onto which is placed a layer of cellular polyurethane of proprietary density.

Two layers of moisture-resistant semi-flexible panels are then installed and staggered, so that the joins do not coincide. The top layer of panels is bonded to the one below with a non-setting adhesive and fastened mechanically.

The damp-proof membrane is folded onto the surface and secured to form a damp-proof seal. Then the selected Harlequin vinyl performance surface is installed and adhered. The seams are welded to form an unbroken surface and, finally, the gap between the flooring and the wall is filled with a composite skirting profile, screwed to the edge of the floor structure to form a flexible seal to the wall.



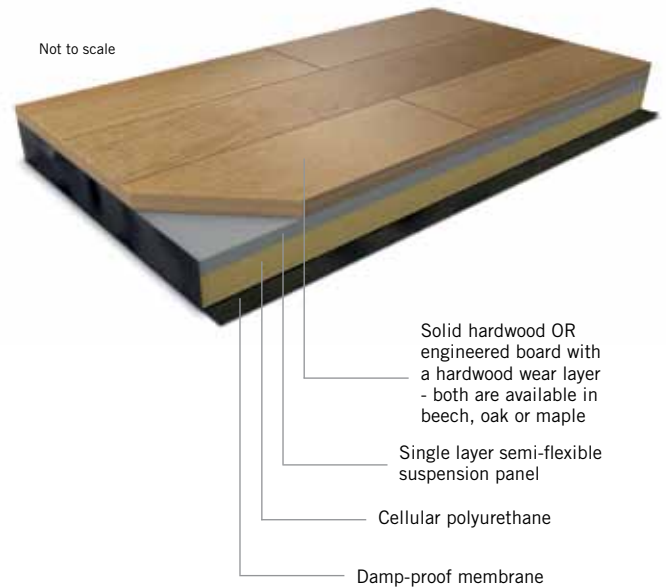
Specification guide

Overall thickness:	46mm nominal excluding vinyl surface
Weight:	15 - 19kg/m ² depending on surface specification

Harlequin sprung floors

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.



Harlequin Activity with hardwood surface Sackler Studios, Shakespeare's Globe, London

Specification guide

(Typical construction using engineered board)

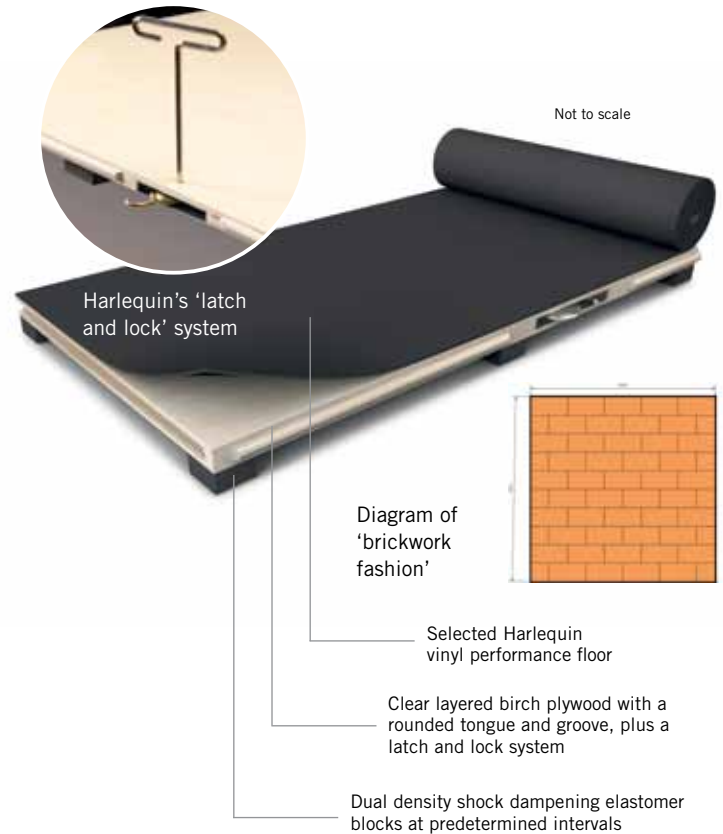
Overall thickness:	52mm
Description of board:	14mm thick 2-ply engineered hardwood
Total thickness of hardwood wear layer:	4mm
Weight:	16 - 22kg/m ² depending on hardwood surface chosen
Laying time:	A floor of 100-150m ² can generally be installed in five days
Maximum designed distributed load:	750kg/m ²
Maximum designed dynamic load:	750kg/m ²
Tested maximum point load (BS EN 1195):	549kg

Harlequin Liberty™

permanent or portable sprung floor

Harlequin Liberty is a modular sprung floor panel system, designed for permanent or portable installation. 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, which is secured in place using our latch and lock mechanism.

Harlequin Liberty is a relatively “springy” floor, with good area elasticity. The corners and sides of each large panel are fully supported by dual density elastomer blocks spaced at regular intervals, giving uniform and consistent shock damping and provide the same “feel” and energy return to one or several dancers on the same panel, and with no hard spots at the joints.



Specification guide	
Permanent or portable:	Both
Dimensions:	Full size panel 2m x 1m. Half size panel 1m x 1m
Weight:	12.5kg/m ²
Installed thickness:	37mm (before inclusion of chosen finish)
Installation time:	Permanent panels approx. 100m ² per day with two persons
Maximum designed distributed load:	650kg/m ²
Maximum designed dynamic load:	650kg/m ²
Tested maximum point load (BS EN 1195):	1,126kg



Portable Harlequin Liberty at Staatstheater, Nuremberg, Germany.

Harlequin sprung floors

Harlequin WoodSpring™ basket weave floor

Harlequin WoodSpring is a permanently installed sprung floor system. It is a modern update of the traditional 'basket weave' construction. It is a counterbatten configuration comprising at least three layers of highly flexible softwood battens, arranged at right angles.

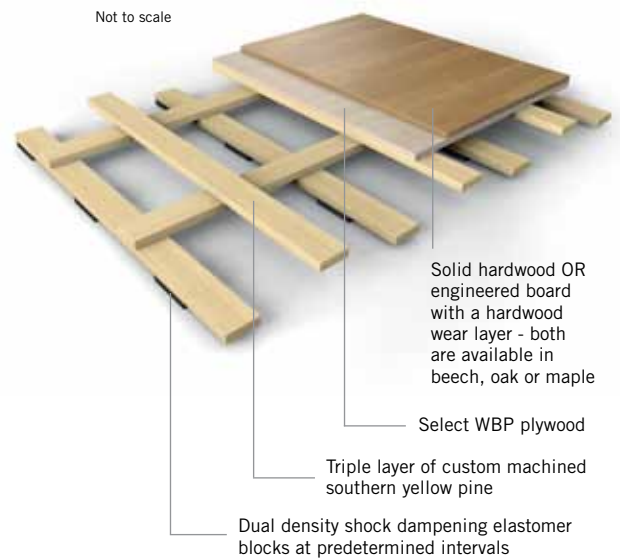
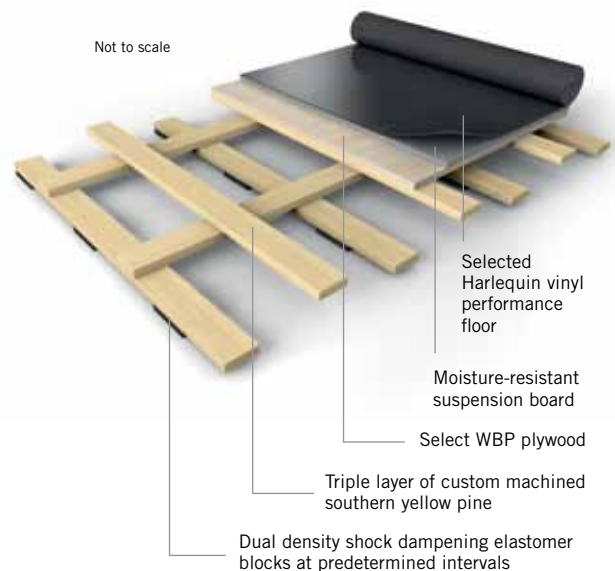
The intermediate layer acts as a spring to the top layer, which is laid at the centre of the span formed by the intermediate layer over the bottom layer (see diagram). Theoretically the more intermediate layers incorporated in a basket weave floor the more flexible it becomes.

In the Harlequin WoodSpring system, shock absorption and energy return are enhanced by pads attached to the underside of the bottom layer. Onto this structure are installed two layers of flexible panels (typically plywood and MDF), which support the Harlequin dance floor.

Specification guide

Top panel:	9mm moisture-resistant MDF or, optionally, solid hardwood or engineered panels/boards
Lower panel:	12mm WBP plywood with marine adhesive
Basket weave:	3-layer counterbattens nominally 75mm x 20mm PAR in long-grain American Southern Pine
Minimum floor thickness:	91mm (before inclusion of chosen finish)
Minimum floor weight:	24kg/m ² (before inclusion of chosen finish)
Maximum designed distributed load:	650kg/m ²
Maximum designed dynamic load:	650kg/m ²
Tested maximum point load (BS EN 1195):	924kg

Claire Robertson, Adam Blyde and
The Company - Scottish Ballet -
Peter Darrell Studio - Photo Andrew Ross



Different surface options to consider:

- Harlequin vinyl surface: for all types of dance, but particularly ballet.
- Hardwood surface in beech, oak or maple, for specifiers who need a hardwood surface for multi-purpose use, including traffic by the general public, full stage entertainment, ballroom dance or even for designers obliged to match existing décor.
- Engineered board with a hardwood wear layer - in beech, oak or maple.

If a Harlequin vinyl performance floor is chosen, a moisture resistant suspension board will be included underneath, along with a colour matched composite edging profile, which will be installed around the finished edges. If solid hardwood or engineered board is chosen, the skirting will be 'optional'.

Harlequin's range of permanent and portable vinyl floors

Harlequin's range of vinyl floors can be used alone or as a dance surface on a sprung sub-floor. They offer added assurance for better protection from injuries for dancers, providing them with a feeling of optimum safety.

The main criterion for dancers is slip-resistance or "traction". The term "speed" refers to the traction of performance surfaces: "fast" describes a slippery surface and "slow" describes a higher-traction surface, like a gym floor.

Vinyl flooring

Vinyl floors are supplied on rolls. They can be rolled up and stored after use, or permanently installed. When laid down, adjoining areas of vinyl can be taped together for temporary use or welded for permanent installation.

Our vinyl floor application guide provides recommendations for use, which are indicative only and are based on our extensive experience and client preferences. There are exceptions to almost every suggestion, so we strongly advise that you request samples and contact us if you have any questions.

Loose-laid, semi-permanent or permanent?

Harlequin's range of surfaces have been developed to meet the needs of the dance community. The range includes vinyls with varying degrees of cushioning, durability and grip or 'traction'.

- A loose-laid vinyl floor is rolled out and the seams are either covered with tape or temporarily secured to the sub-floor on the underside with double-sided tape.
- A semi-permanent vinyl floor is loose-laid using double-sided tape and then welded at the seams. The seams can later be cut and the floor taken up.
- A permanent vinyl floor is stuck down with adhesive and the seams sealed by hot or cold welding. These welds are unobtrusive and waterproof but can't be removed without risking damage to the floor.

Application guide

✓ = We recommend.	Aerobics/ Zumba	Ballet	Ballroom/ Salsa	Concerts	Contemporary	Hip-Hop/ Jazz/Street	Modern	Multi-purpose	Percussive* (Flamenco, Irish, Tap)	Theatre/ Opera
Allegro	✓				✓	✓	✓			
Cascade	✓	✓		✓	✓	✓	✓	✓	✓	✓
Fiesta	✓		✓			✓		✓	✓	✓
Marine				✓				✓	✓	✓
Reversible	✓	✓		✓	✓	✓		✓	✓	✓
Standfast	✓	✓			✓	✓	✓	✓	✓	✓
Studio	✓	✓			✓	✓	✓			

* = Please ensure tap screws are fully tightened before use.

Specification guide

✓ = We recommend.	Permanent or Portable	Roll width (m)	Roll length (m)	Thickness (mm)	Weight (kg/m ²)	Standard colours	Fire rating
Allegro	Both	1.5	10, 15, 18, 20, 25	8.5	6	Black, Grey	Cfl-s1 (EN 13501-1)
Cascade	Both	2	10, 15, 18, 20, 25	2	2.6	Black, Light grey, Dark grey, Hazelnut, White	Bfl-s1 (EN 13501-1)
Fiesta	Permanent	2	10, 15, 20, 25	2	3	Oak strip effect	Bfl-s1 (EN 13501-1)
Marine	Permanent	2	23	2	3.35	Black	IMO FTP Code part 2 & 5
Reversible	Portable	2	10, 15, 18, 20, 25	1.3	1.6	Dark grey/Light grey, Black/White, Black/Grey, Chroma key green/Yellow, Chroma key blue/Red, Fog/Tan, Hazelnut/Beige	Bfl-s1 (EN 13501-1)
Standfast	Permanent	1.5	10, 15, 20	2.6	3.4	Black, Grey, Dark grey, Light grey	Cfl-s1 (EN 13501-1)
Studio	Both	1.5	10, 15, 18, 20, 25	3	2.3	Black, Grey, Dark grey, White	Bfl-s1 (EN 13501-1)



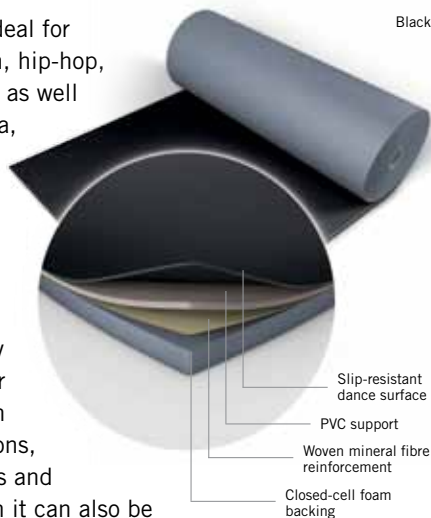
Harlequin's range of permanent and portable vinyl floors

Harlequin Allegro™

Harlequin Allegro was developed to protect against hard sub-floors and is a popular choice as a semi-sprung flooring option. It is the thickest roll-out dance floor available worldwide and provides great protection for dancers due to its point-elasticity and slip-resistant dance surface.

Harlequin Allegro is ideal for contemporary, modern, hip-hop, jazz and street dance, as well as aerobics and zumba, as it can help to reduce performer fatigue and impact injuries.

Harlequin Allegro is a substantial heavy-duty floor. It is specified for permanent installation within dance institutions, dance studios, schools and gymnasiums, although it can also be utilised as a loose-lay option.



PERMANENT PORTABLE 1.5m

Harlequin Allegro. Dança Livre, Lisbon



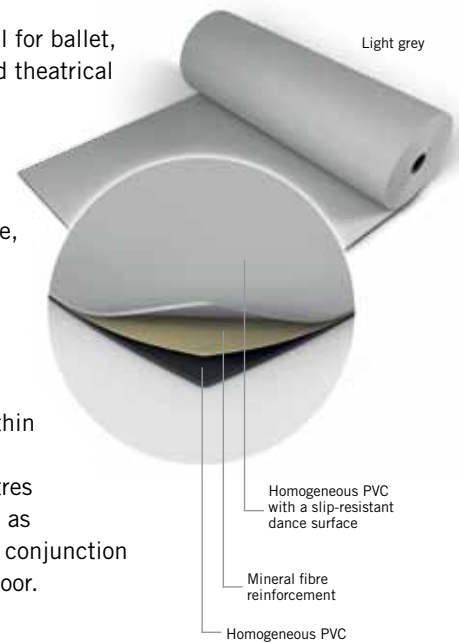
Harlequin Liberty with Harlequin Cascade

Harlequin Cascade™

Harlequin Cascade still delights generations of professional dancers, artistic directors and technical and stage managers as the ultimate heavy-duty dance floor. The silky smooth embossed surface that's often described as giving 'warmth' to a performance, also provides deceptively good grip, as well as a high-quality base for lighting designers.

Harlequin Cascade is ideal for ballet, contemporary, modern and theatrical use, as well as aerobics, zumba, hip-hop, jazz, street, salsa, percussive including flamenco, Irish and tap, multi-purpose use, concerts and for operatic performances.

Harlequin Cascade is specified for loose-lay or permanent installation within dance institutions, dance studios, schools and theatres and is an excellent choice as the vinyl dance surface in conjunction with a Harlequin sprung floor.



PERMANENT PORTABLE 2m

Black

Dark grey

White

Hazelnut

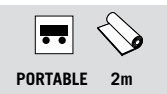
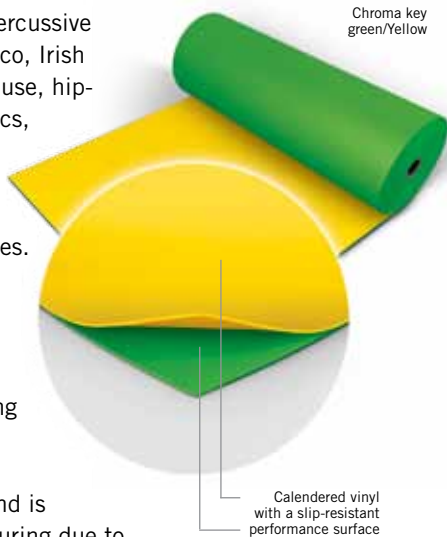


Harlequin Reversible™

Harlequin Reversible is the original double-sided dance and stage floor. It's a lightweight calendared vinyl that rolls out quickly, lays flat and stays flat. It is hard-wearing and slip-resistant on both sides, thus providing two floors in one!

Harlequin Reversible is suitable for ballet, contemporary, percussive dance including flamenco, Irish and tap, multi-purpose use, hip-hop, jazz, street, aerobics, zumba, concerts, display, exhibitions, television, theatres and for operatic performances.

Harlequin Reversible is our most versatile loose-lay floor and is extremely popular among our extensive clientèle. It is ideally laid on any hard, smooth surface and is particularly suited to touring due to ease of handling and portability.



Dark grey/Light grey



Black/Grey



Black/White



Hazelnut/Beige



Fog/Tan



Chroma key blue/Red

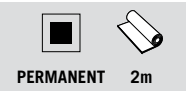
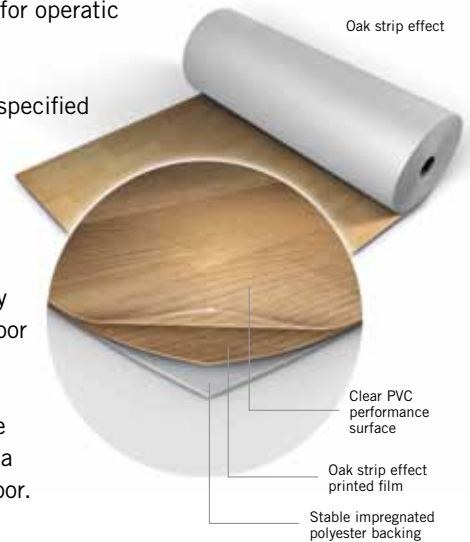


Harlequin Fiesta™

Harlequin Fiesta was developed because of the need for a floor which looked exactly like wood, but without all the associated problems of cleaning and maintenance. The floor's oak-strip performance surface provides the ideal solution.

Harlequin Fiesta is suitable for ballroom, salsa, percussive dance including flamenco, Irish and tap, multi-purpose use, hip-hop, jazz, street, aerobics, zumba and for use in theatres and for operatic performances.

Harlequin Fiesta is specified for permanent installation, when the joins are welded to provide a continuous surface. It can be laid on any hard, smooth sub-floor and is an excellent choice as the vinyl performance surface in conjunction with a Harlequin sprung floor.

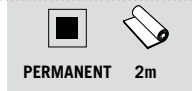


Harlequin Marine™

Harlequin Marine is extensively installed on cruise liners and conforms to marine standards and fire ratings. It is specified for permanent installation and is suitable for fitting within confined spaces on marine vessels and for scenery docks on cruise ships.

Harlequin Marine is also suitable for multi-purpose use, percussive dance including flamenco, Irish and tap, concerts, television, theatre and operatic performances.

Harlequin Marine is a hard-wearing, homogeneous PVC dance floor. It is fire resistant, with a slightly marbled surface to resist scuffing and hide marks. It can be laid on any hard, smooth sub-floor and is an excellent choice as the vinyl performance surface in conjunction with a Harlequin sprung floor.



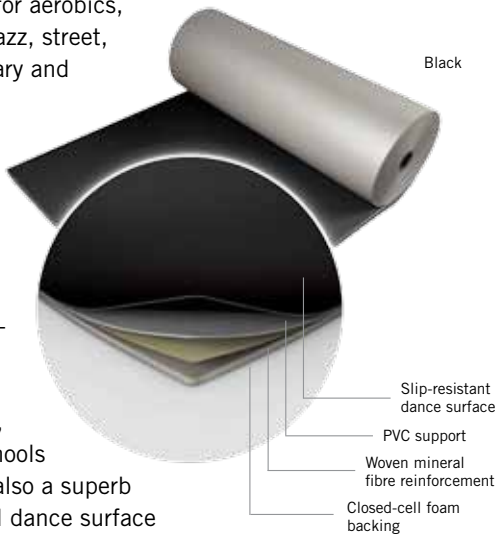
Harlequin's range of permanent and portable vinyl floors

Harlequin Studio™

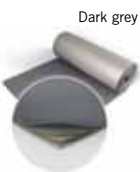
Harlequin Studio is produced from a particularly hard-wearing vinyl and its formulation focuses on the demands of dancers. The result is a slip-resistant floor that offers dancers added confidence for demanding choreography and movement.

Harlequin Studio's firm but lightweight foam backing provides protection against hard sub-floors and is a great choice when touring. It's ideal for aerobics, zumba, hip-hop, jazz, street, ballet, contemporary and modern dance.

Harlequin Studio is designed for dance, studio and stage use and is specified for loose-lay or permanent installation within dance institutions, dance studios, schools and theatres. It's also a superb choice as the vinyl dance surface in conjunction with a Harlequin sprung floor.



PERMANENT PORTABLE 1.5m



Harlequin Liberty sprung floor with Harlequin Studio vinyl, the American Academy of Dance in Paris



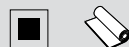
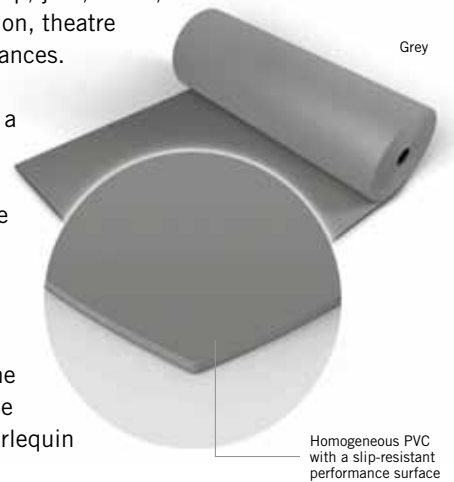
Harlequin Standfast at Birmingham Hippodrome

Harlequin Standfast™

Harlequin Standfast is a hard-wearing, durable performance floor that's intended for permanent installation into adhesive, when the joints are heat welded to form a continuous performance surface.

Harlequin Standfast is suitable for ballet, contemporary, modern, percussive dance including flamenco, Irish and tap, multi-purpose use, hip-hop, jazz, street, aerobics, zumba, television, theatre and for operatic performances.

Harlequin Standfast has a slip-resistant surface and is ideal as a permanent multi-purpose dance or stage flooring for heavy-duty use. It can be laid on any hard, smooth sub-floor and is an excellent choice as the vinyl performance surface in conjunction with a Harlequin sprung floor.



PERMANENT 1.5m



Harlequin accessories

In addition to our wide range of floors, Harlequin also supplies accessories, some of which are listed below.



Vinyl roll storage carts
4 or 6-roll carts available.



Harlequin Liberty panel move and store cart
Holds up to 20 full size panels.



Tapes
Range of double-sided, PVC or cloth tape for use with Harlequin vinyl flooring.



Storage bags
For rolls of Harlequin vinyl flooring. Two sizes available.



Harlequin roll straps
Secures rolls of vinyl. Available in seven sizes.



Cleaning & maintenance
A range of cleaning and maintenance products to ensure the longevity of a Harlequin floor.

Ballet barres

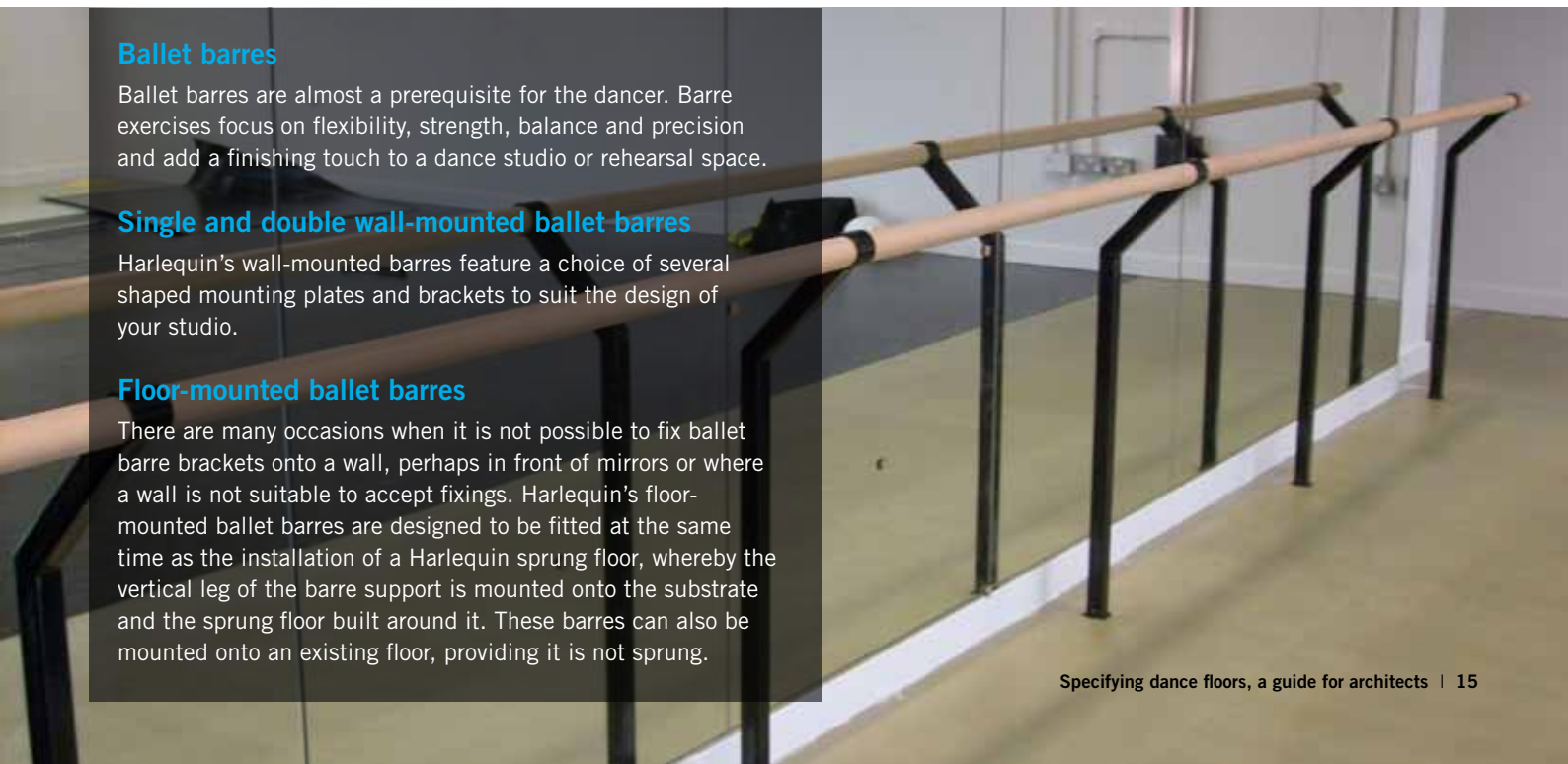
Ballet barres are almost a prerequisite for the dancer. Barre exercises focus on flexibility, strength, balance and precision and add a finishing touch to a dance studio or rehearsal space.

Single and double wall-mounted ballet barres

Harlequin's wall-mounted barres feature a choice of several shaped mounting plates and brackets to suit the design of your studio.

Floor-mounted ballet barres

There are many occasions when it is not possible to fix ballet barre brackets onto a wall, perhaps in front of mirrors or where a wall is not suitable to accept fixings. Harlequin's floor-mounted ballet barres are designed to be fitted at the same time as the installation of a Harlequin sprung floor, whereby the vertical leg of the barre support is mounted onto the substrate and the sprung floor built around it. These barres can also be mounted onto an existing floor, providing it is not sprung.



Installation, RIBA and the environment

Harlequin Activity, Harlequin Liberty and Harlequin WoodSpring permanent sprung floors are fitted by our own Contracts Division as part of our total package to ensure your new floor is correctly installed and is fully compliant with current regulations and standards.

Our Contracts Division is also expert in the installation of permanent vinyls, conventional wooden sprung floors and basket weave or even floors to custom design.

Our installation service includes:

- Initial guidance in selecting the most appropriate floor for your requirements
- Design of floors to suit existing spaces and conversions
- Design of floors for new build to architect's plans
- Supply and installation of floors and accessories
- Harlequin on-site installation team to meet your building programme timescales
- Project management for duration of the project
- Unconditionally guaranteed against defects in workmanship.

When specifying sprung and vinyl floors for dance, it is worth considering additional products that may be required such as barres and mirrors.



RIBA

In addition to this guide, Harlequin offers an online CPD entitled **'Specifying floors for dance, what you need to know'** which can be found at www.ribacpd.com

We also have an NBS specification for some of our products which can be found at ribaproductselector.com



Green issues

Environmental responsibility has been a core value within the Harlequin Group for decades. Environmentally compatible products ensure that each production stage minimises our environmental impact. We engage in responsible product sourcing, carefully selecting suppliers who reflect our environmental and social concerns. We constantly seek to improve the environmental performance of our processes from manufacture through installation and ongoing maintenance. Raw materials and energy are used efficiently, waste is recycled wherever possible and emissions are kept to an absolute minimum.



Timber certification and material sourcing

We only use FSC certified sources and documentation to support this is available on request.

PVC lifecycle and policy

PVC floor coverings can be fully recycled and are therefore often described as a sustainable product. The Harlequin Group recycles nearly 100% of its post manufacturing waste and buys in further recycled PVC material, thereby actively reducing the amount of used PVC sent to landfill. As part of our commitment to Product Stewardship, Harlequin will also recycle any Harlequin product returned to our factories in Europe for recycling at the end of its life, thus minimising carbon footprints.

VOC emission levels look set to be added to the CE marking requirements for flooring, right alongside mandatory requirements for slip-resistance and fire ratings.

Case study 1

Central Saint Martins College of Arts and Design, London

Project: Central Saint Martins College of Arts and Design, London

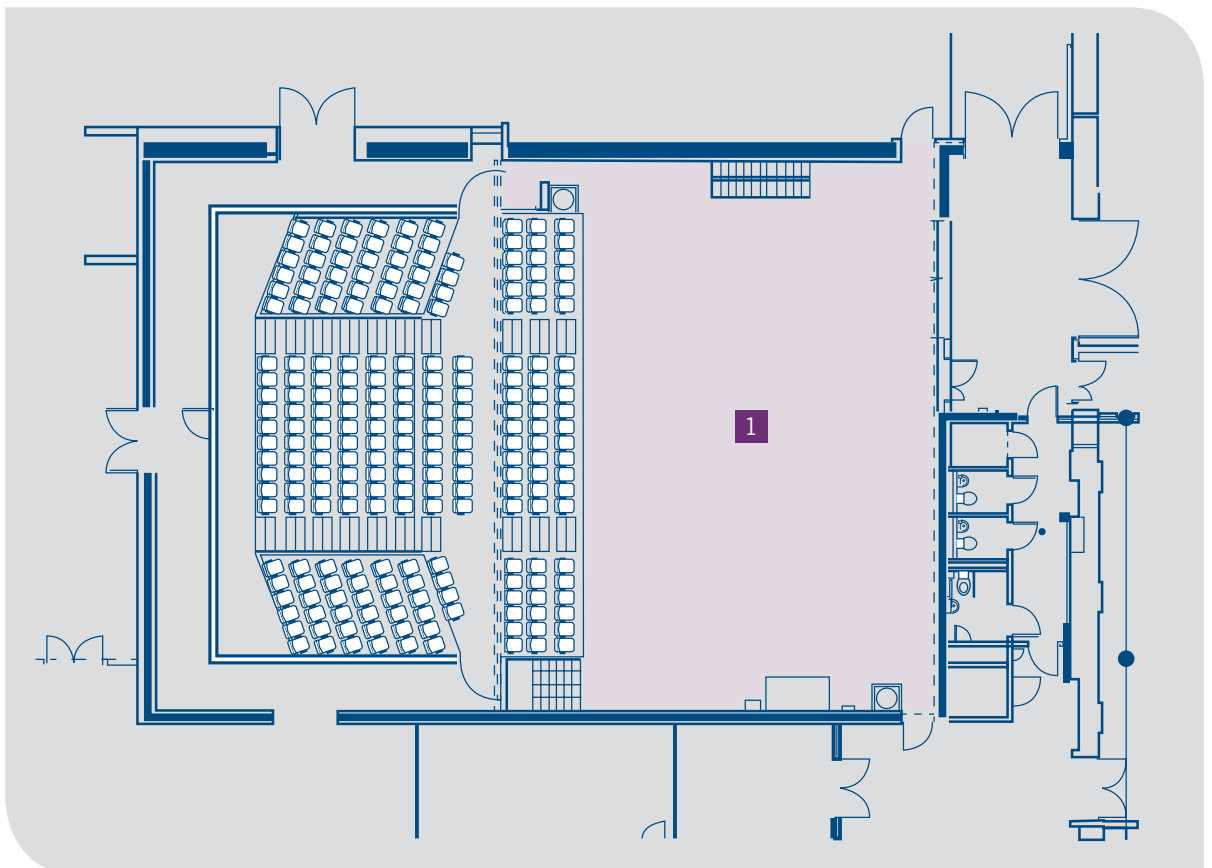
Architects: Stanton Williams

Main Contractors: Overbury plc

Harlequin **Activity**™ sprung floor

Floor dimensions

- 1 KX Platform Theatre – 351m² Harlequin Activity with Weitzer Parquet Oak surface
- 2 Multipurpose workshop spaces – 110m² and 67m² with Harlequin Activity and Harlequin Cascade in white and black
- 3 Studio Theatre space – 177m² Harlequin Activity with engineered maple
- 4 Three rehearsal spaces with Harlequin Activity and engineered maple (total area 502m²)
- 5 Four rehearsal spaces with Harlequin Activity and Harlequin Standfast (total area 684m²)



Case study 2

P&O Ship Ventura

Project: P&O Cruise Ship 'Ventura'

Stage contractor: Stage Technologies Limited

Description: 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.

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.

Harlequin Cascade was installed onto the plywood surface of the fixed stage area and revolve stage extension of the Explorer Lounge.

Initial fit-out/re-fits of Main Stage; Explorers Lounge & Deck 5 Scenery Store. Work usually carried out whilst in dry dock but sometimes whilst ship is in service.



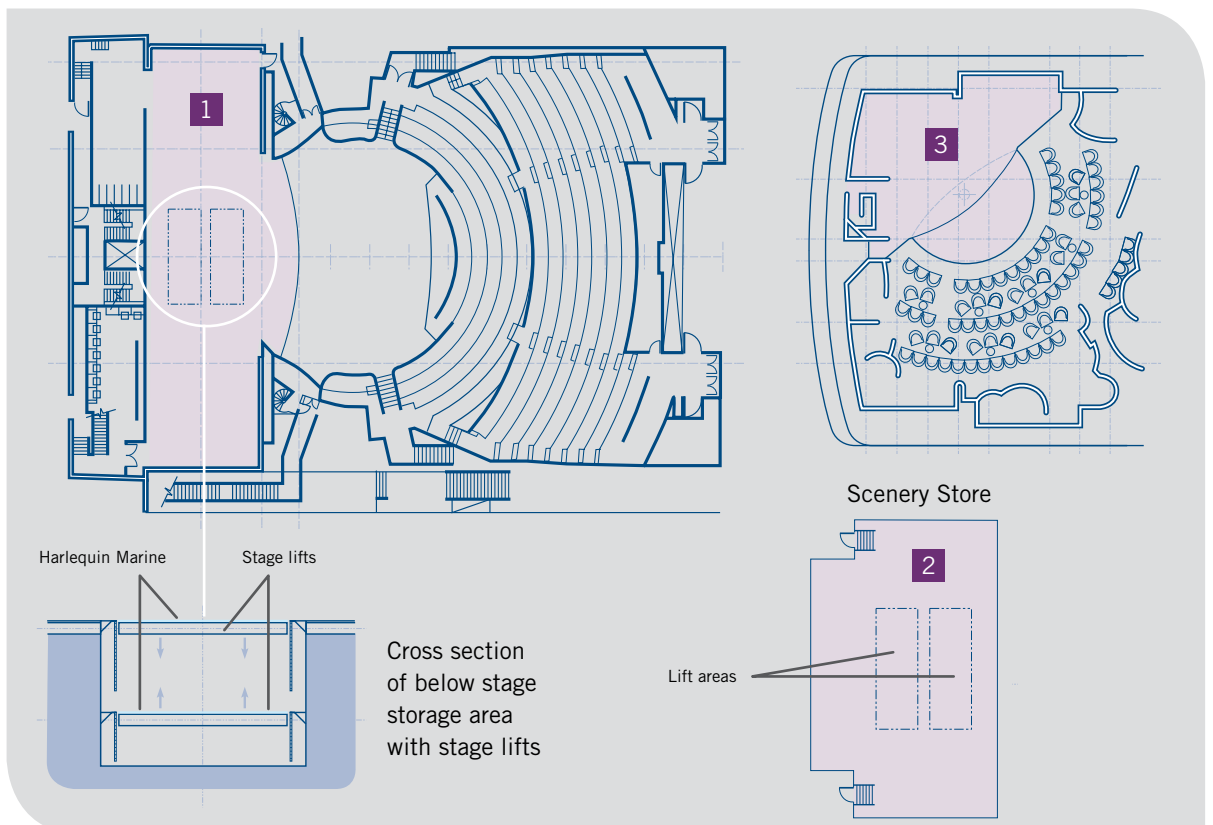
Other installations:

*Dawn Princess
Diamond Princess
Emerald Princess
Golden Princess
Grand Princess
Ocean Princess
Ruby Princess
Star Princess
Sun Princess
Azura
Seabourne Quest
Superstar Libre*
Star Cruises:
*Island Escape
Queen Victoria*

Harlequin **Cascade**™ / Harlequin **Marine**™ vinyl floors

Floor dimensions

- 1** Main Stage - 30.10m x 10.85m max at curved end - Total area: 265m²
- 2** Scenery Store - 13.5m x 8.5m - Total area: 109m²
- 3** Explorer Lounge - Total area: 168m²



Case study 3

Birmingham Hippodrome

Project: Birmingham Hippodrome refurbishment

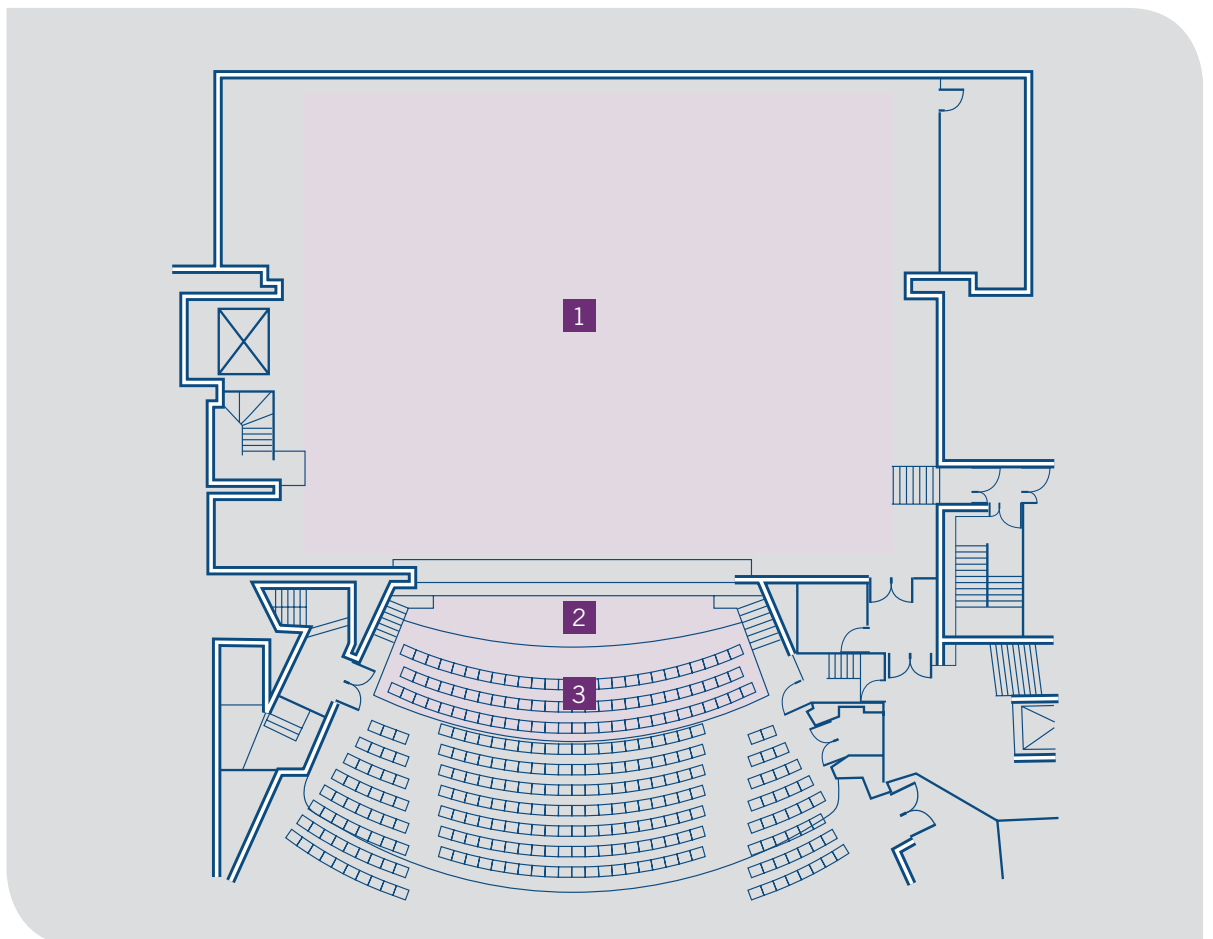
Description: After 30 years and over 1,000 performances, the main stage needed to be repaired. Harlequin removed the existing plywood stage and refurbished the under structure, fitting new dip traps and two layers of 25mm ply with Harlequin Standfast vinyl to finish.



Harlequin **Standfast™** vinyl floor

Floor dimensions

- 1 Main stage - 28m x 22m
- 2 Orchestra pit - 14m x 2m
- 3 Seating lift - 15m x 3.7m



Case study 4

Tramway, Scottish Ballet

Project: Tramway, Scottish Ballet's new headquarters (Scottish Design Awards: Architecture Grand Prix and Best Public Building 2010)

Architects: Malcolm Fraser Architects

Description: Conversion of two former stables at Glasgow's co-located Tramway venue. Harlequin WoodSpring basket weave was installed in five studios.

In the stable conversion, one was finished with Harlequin Cascade, the other with Harlequin Studio vinyl. A further three studios in the new build extension were fitted with Harlequin WoodSpring and finished with Harlequin Cascade vinyl.

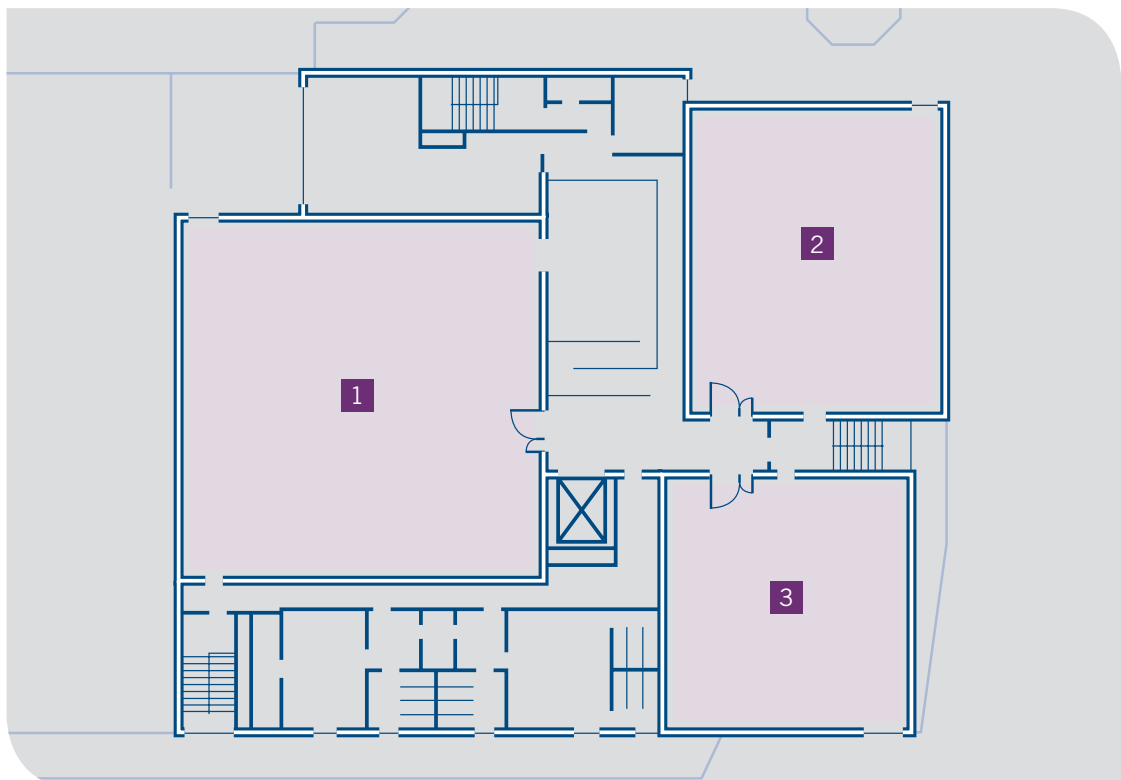
In addition to the new dance studios, Scottish Ballet enjoy the benefit of a small practise studio fitted with a Harlequin Liberty sprung panel floor, also completed with Harlequin Cascade dance surface.

All the rehearsal studios have been designed as naturally ventilated spaces, reducing running costs and carbon emissions.



Harlequin **WoodSpring**™ / Harlequin **Cascade**™ flooring

Diagram shows the new build extension. All fitted with Harlequin WoodSpring and Harlequin Cascade vinyl top surfaces.



Case study 5

Laban

Project: The Laban Centre
(RIBA Stirling Prize winner 2003)

Architects: Herzog & de Meuron, London

Main Contractor: Ballast Construction

Description: Harlequin Liberty sprung floor with Harlequin Studio vinyl surfaces. 13 dance studios and one clinic, Total of 1,943m²

Notes: Purpose-built Dance and Performing Arts College.



Harlequin Liberty™ sprung floor

Floor dimensions

Ground floor

- 1 12.7m x 9.3m
- 2 17.4m x 9.8m
- 3 8.1m x 6.35m

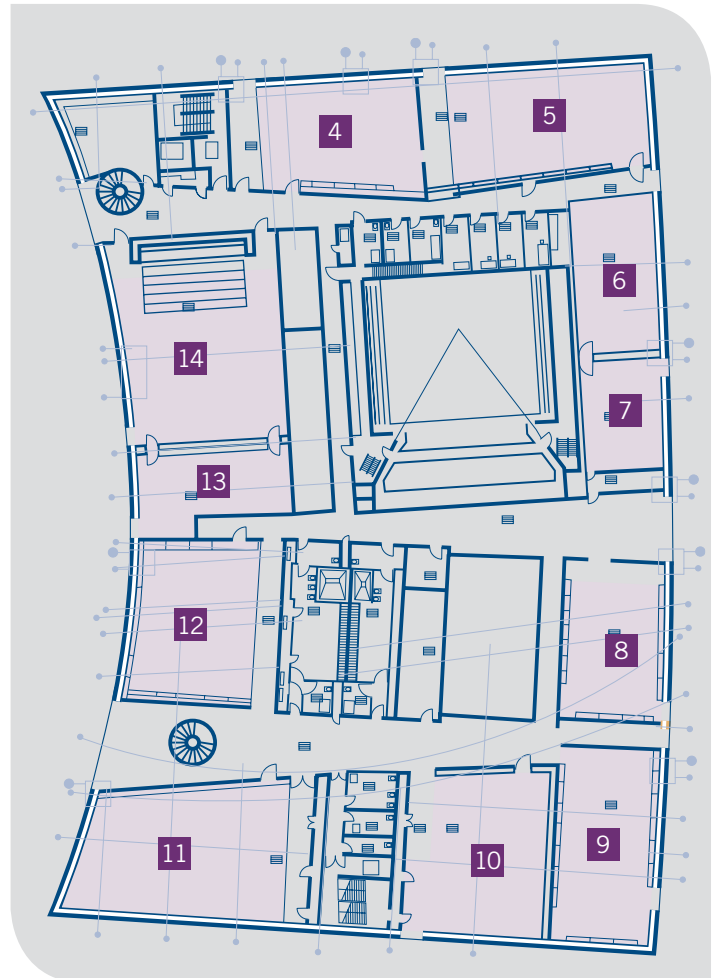
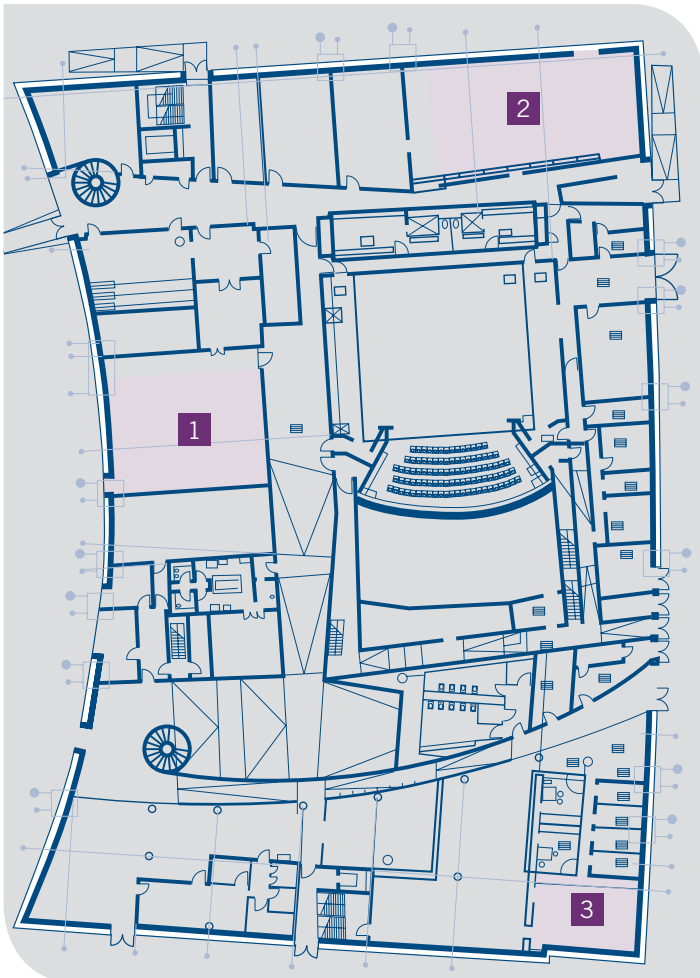
Total area: 340m²

First floor

- 4 14m x 9.85m
- 5 17.4m x 9.8m
- 6 13.8m x 7.2m
- 7 10.4m x 6.25m

- 8 11.9m x 8.2m
- 9 17.2m x 8.5m
- 10 14.3m x 11.7m
- 11 19.5m x 12m

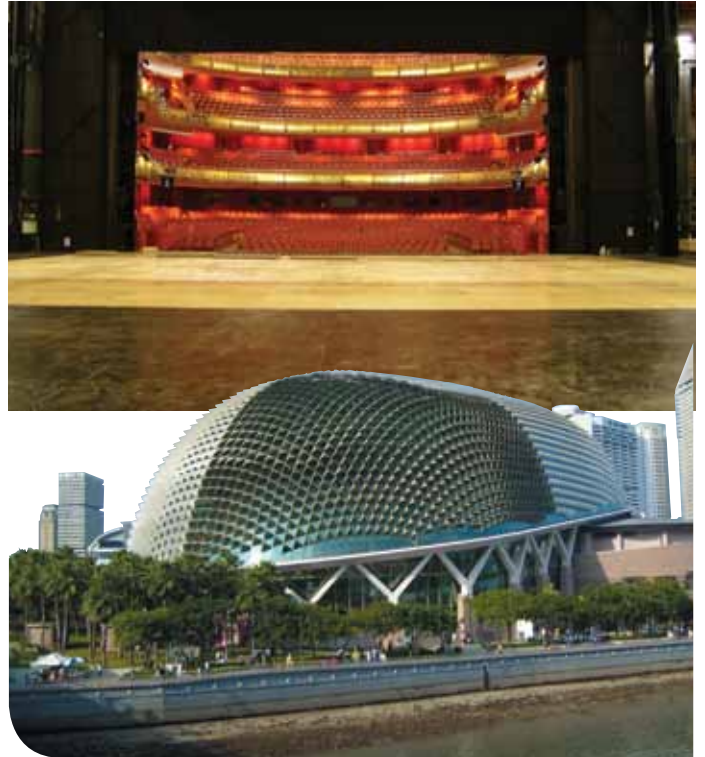
- 12 14.1m x 12.2m
 - 13 8.3m x 13.1m
 - 14 15.6m x 13.1m
- Total area: 1,603m²



Case study 6

Esplanade Theatre

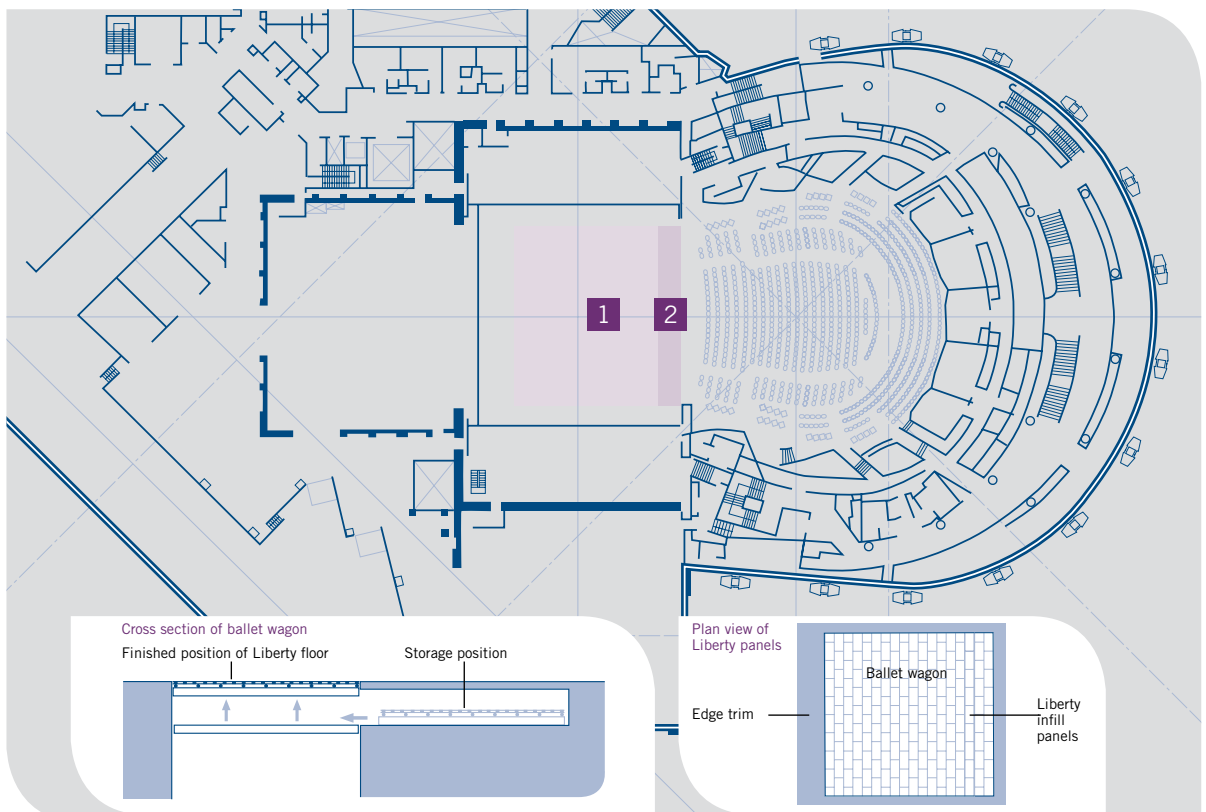
- Project:** Esplanade Theatre, Singapore
- Architects:** DP Architects
- Design:** British Harlequin plc
- Description:** Harlequin Liberty portable sprung panels, custom-sized to fit into the existing ballet wagon, which is stored horizontally below the stage and moved into place on a motorised track and elevator. Six custom traps were manufactured on site and installed within the Harlequin Liberty panels on the wagon. Extra Harlequin Liberty panels were supplied for an infill area to extend the performance area downstage. Harlequin Cascade was supplied for use as a roll-out surface.
- Notes:** Additional reinforced Harlequin Liberty panels were supplied to be used as replacements in the ballet wagon, when required to withstand heavy scenery loadings.



Harlequin **Liberty**™ sprung floor

Floor dimensions

- 1 Main wagon dimensions: 18.98m x 17.48m. Total area: 332m²
- 2 Infill panels 18.98m x 2.49m. Total area: 47m²



Case study 7

Royal Opera House

Project: Royal Ballet studios, Royal Opera House, Covent Garden, London

Description: Harlequin WoodSpring with Harlequin Cascade surface

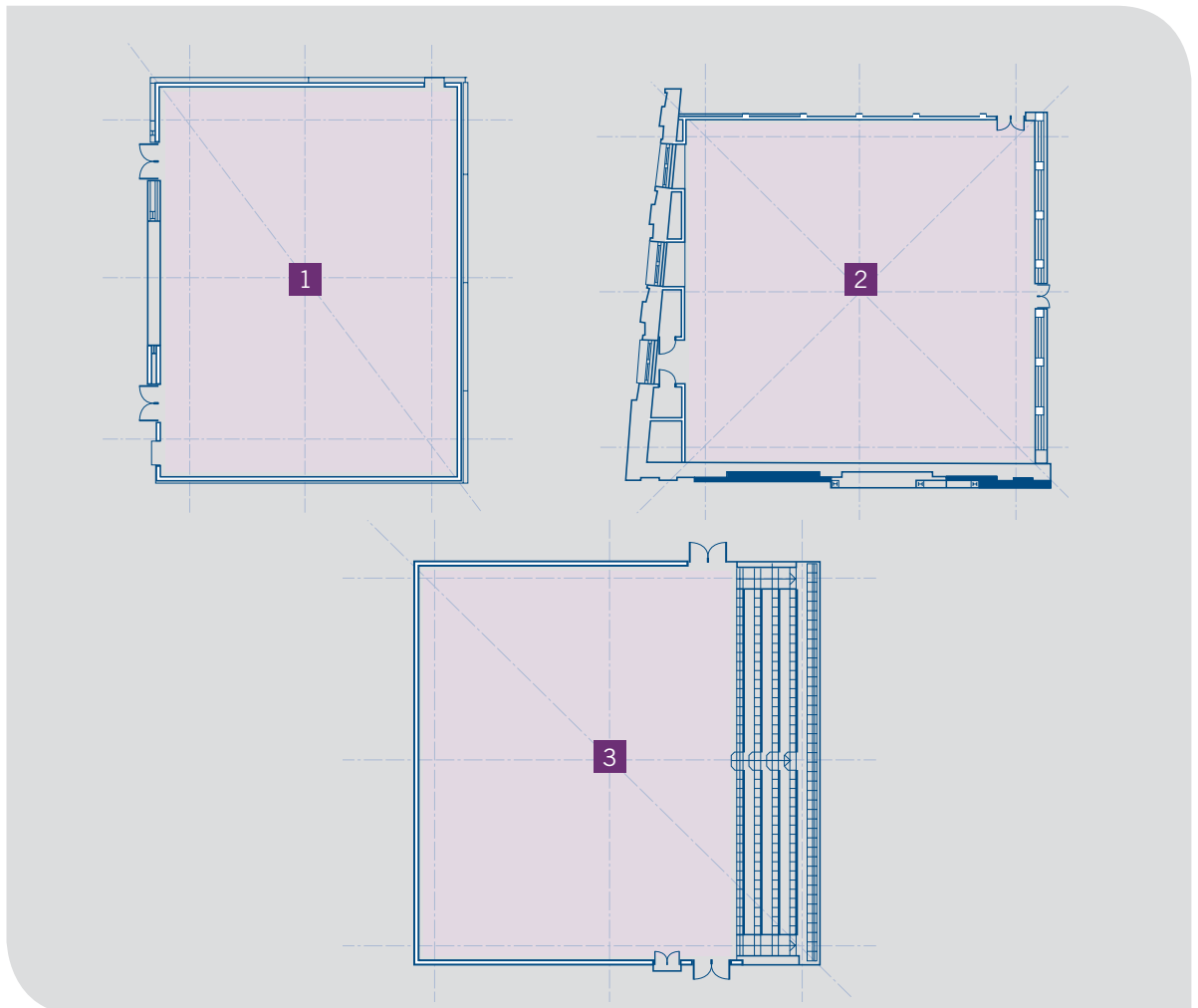


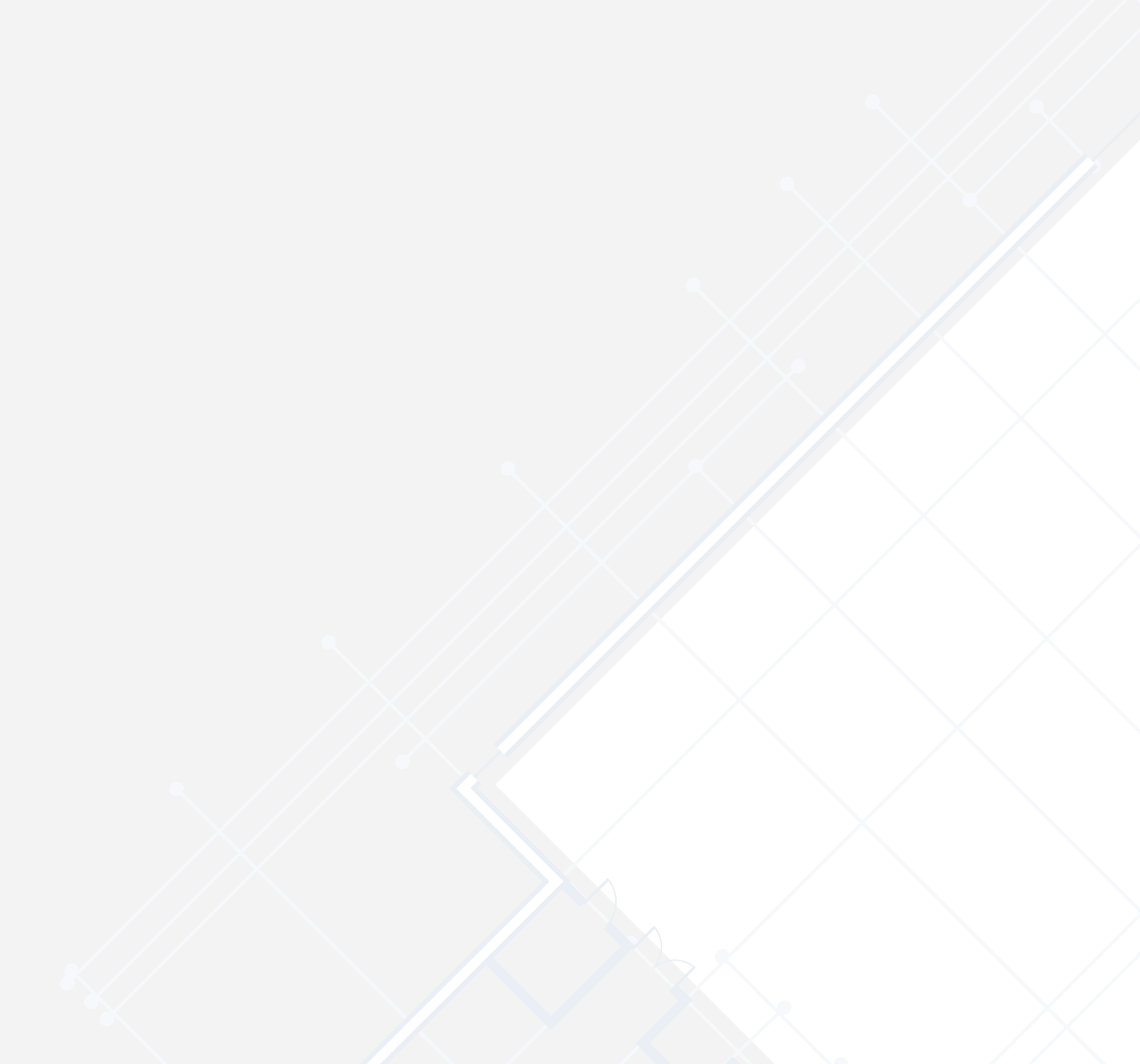
Harlequin **WoodSpring™** sprung floor

Floor dimensions

- 1 Ashton Studio - 288m²
- 2 De Valois Studio - 339m²
- 3 Clore Studio - 285m²

Total area: 912m²





HARLEQUIN

The world dances on Harlequin floors®



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