

## GEN-008: A Guide to Water Damage Repair of Hardwood Sport/Dance Systems

*Water damage is a common occurrence within sport/dance facilities. ASET Services has seen remediation firms charge facilities and insurance companies exorbitant fees while accomplishing little to no actual remediation, or repairs. Few remediation firms actually know how sport/dance floors are installed and what can cause failures after their repair attempts. This document discusses the various extent of damage that may occur, how to determine if, when, and how restoration efforts should be made. This guide has been developed as an informative document and has been made available to the entire market under a Creative Commons License.*

*This is provided as an informative guide, not an official recommendation. There may be steps that your project does not need, and there may be steps that are not mentioned. It is impossible to develop a one-size-fits-all guide that applies to every project.*

**Why did ASET develop this document?** Two years ago, ASET provided consulting services for a contracting firm that was brought in after a failed remediation. That failed remediation cost well over \$80,000 and accomplished very little with regard to delivering a repaired and restored gym floor. Even after the \$80,000 bill, large sections of the floor still had to be replaced and the entire floor still had to be resanded, painted and finished. That waste of time and money occurred, in part, because those involved (contractor, owner, insurance company) did not understand, or appreciate, the unique characteristics of a sport/dance surface.

This document is developed as a guide. It attempts to include the important steps and things to consider during a remediation. Admittedly, some unique circumstances will not be covered in this guide. Also, not every step or action listed in this guide will be necessary for every situation. The amount of water and the duration of its exposure to the room may mean that certain steps are not critical to a successful repair.

**What are some common categories of water damage?** – ASET Services breaks water damage into 4 categories:

- **Cosmetic:** This category only involves changes in the appearance of the surface where there is no further damage. Cosmetic damage may be discoloration, or something reversible like cupping of the flooring strips.
- **Structural:** Structural damage means that the structural strength of the system has been compromised in some manner. Structural damage may include delamination of plywood layers, loosening of nails and other fasteners, and even the introduction of stress fractures to the playing surface that can cause large splinters.
- **Performance:** Many systems are selected and specified based on their performance (safety, comfort) characteristics. Performance damage is when any of the key performance properties have been altered in a negative way, which can include making the performance less uniform.
- **Mold:** Depending on how long elevated moisture is present there is always the chance of the establishment of mold colonies within the floor system.

## Remediation Plan

In this section we'll provide a guide that facility owners and insurance companies can refer to as a comprehensive remediation plan that restores the appearance, strength and performance of the system is developed.

**Step 1:** Identify the water source and stop more water from entering! Often this is rather straightforward and involves shutting off a pipe, or patching a roof. However, it is possible that the water source can be up through the slab or even through a wall. Obviously in instances such as these stopping the water might take more time and effort.

**Step 2:** Remove all standing surface water that is easily accessible. Free, or standing water on the surface should be mopped up as soon as possible. Take care to avoid directing it down expansion voids, perimeter wall voids, or insert covers. This is especially true if there are electrical inserts in the floor.

**Step 3:** Call for an initial assessment. Early on before significant money is spent on the remediation, ASET Services advises conducting an assessment of damage. ASET believes this should happen early on in the process. In the case mentioned before, an early assessment might have utilized the \$80,000 in a manner that actually helped restore that facilities floor rather than wasting it.

- **Informal Assessment:** Sport flooring contractors typically have years of experience with hardwood courts and represent a wealth of knowledge. They are typically close by and able to respond within a few days. Their informal assessment of the damage and likely repairs needed is often invaluable and can save significant wasted time and money resources. They may quickly indicate that the repairs could be limited to sand/paint/finish, small sections, large sections or total replacement.
- **Formal Assessment:** Third party test and inspection organizations can be called on to

render a formal assessment to confirm or refute the informal assessment. This may be most appropriate when extensive repairs or replacement are suggested. Formal assessments may be in the form of on-site visits, reviewing information from the facility, or contractor, and may be included during a performance testing inspection.

**Step 4:** Identify where additional water remains in the facility. Here is where remediation firms often fail due to a lack of understanding of the unique characteristics of these systems. Selecting the appropriate tests from this list depends on the amount of water and the duration that the floor system was exposed to it.

- **Play/Performance Surface:** The hardwood itself may have absorbed moisture which must be removed. A variety of wood moisture meters should be able to easily determine if the surface has an elevated moisture level.
- **System Components:** Most hardwood surfaces are installed over a subfloor system. This system normally includes different wood components. It may be possible to use a driven-pin moisture meter that allows the moisture levels of subfloor components to be measured directly. This would involve minimal damage. This may involve removing small sections of the surface to access various layers of the system if they are sufficiently deep preventing pins from reaching them.
- **Resilient Layer:** Some systems utilize foam components to provide resiliency. If foam components are wet, the only recourse is to start removing the entire system until all of the wet foam has been removed. Repairs need to wait until more data is collected though ensuring that the facility is within specified environmental conditions.
- **Subfloor Void:** Many systems have subfloors with large voids beneath the surface. Nearly

all systems will have been installed with a vapor barrier above the concrete slab. This vapor barrier can create a 'ponding' effect beneath the subfloor. Steps need to be taken to determine if there is standing water in the subfloor, and where it is. It is important to know where it so that efforts to remove it do not cause moisture damage to spread to areas that would have otherwise remained undamaged. This may require removing small sections of the floor to gain access to the subfloor void.

- Slab Moisture: In extreme cases, moisture may have been absorbed into the slab. The slab moisture should comply with product specifications before further repairs are made. Slab moisture tests should be performed using F2170. Relatively small (2") access holes can often be drilled through the system to access the slab. This allows in-slab RH meters to be installed that will provide an accurate measurement of the moisture contained within the slab and determine if the conditions conform to the product specifications. These small holes also allow a small single board patch to be made that requires minimal finish/paint touch-up. Third party F2170 tests can be performed by a variety of firms and individuals including those with engineering licenses, and CSMT certifications, or other qualified firms.

**Step 5:** Remove additional water from the facility. Once step 4 is complete, there should be a good understanding of where any additional water remains in the facility whether it is standing water, or elevated moisture content in the components or the underlying slab.

Note: ASET has been on multiple jobsites where remediation firms have deployed a 'suction' device claiming that it 'sucks' water up through the surface of the wood. First, the wood is covered with a finish that greatly hinders water transfer. Second, Maple transfers moisture poorly across its thickness. Third many systems have another ½" to 1" of plywood beneath the

maple. Lastly, *if* such a system worked, it would be drawing moisture up through the playing surface further elevating the moisture content and likely causing additional damage.

For reference, here are just some of the ways to remove the additional water:

- The most obvious and destructive is simply to remove any material that is wet. This could offer benefits that would help to remove water beneath the playing surface or in the slab as well.
- Engage the facility's HVAC system to help remove moisture. As a note though, raising the temperature significantly may not be a good idea. It could cause subfloor water to evaporate more quickly causing elevated humidity levels that will drive the wood to absorb more of the water than it would have at a lower temperature.
- Increase air flow both above and beneath the system. Again, take care not to drive subfloor moisture toward undamaged areas. Removing small sections of floor can allow the air to move more freely and allow moisture to be removed more quickly. This may reduce the severity of extent of damage, and can minimize the chance of mold growth.
- Utilize large portable dehumidifiers. Large remediation firms frequently use these, but the cost for them is significant. It may be more prudent to assess the type and scope of damage before employing this measure as the funds may be better allocated to replace, sections or the entire system.
- Remove large sections of the floor to expose the slab to allow the slab moisture to return to specified levels. Returning the slab moisture to acceptable levels will help to ensure that no damage is done at a later date as the additional moisture is released into the facility.

**Step 6:** Determine the extent of damage. Any remediation plan that takes place before knowing exactly what damage has been done is simply a guess. This step is the most critical if the goal is to restore the floor to its original condition. In the same way that remediation firms often don't understand sport/dance surfaces insurance companies and owners may fail to consider the safety, comfort and performance properties which were specified and selected. It is easy to consider these surfaces simply as part of the facility's aesthetic, or interior design, but they should be viewed as more than that.

- **Did major expansion occur?** Things that would indicate that major expansion occurred would be:
  - Did the expansion voids at the wall close?
  - Did the floor buckle?
  - Did expansion cause 'humps' in the floor?If any of these things happened it is very likely that some, or all of the following occurred:
  - Stress-fractures of tongue and groove – weakening the system, and creating potentially serious impalement splinters in the future.
  - Fastener failure – nails may have snapped, or partially pulled out of the plywood. Staples in the subfloor may have also experienced the same damage.
  - Component delamination– The various components of the system may have started to delaminate from each other or even internally?
- **Is mold present?** No one likes to think about mold, but any time wood is exposed to water there is a chance for mold growth. There are various extents to which the presence of mold could be explored. First is a test of the air above the system. Next is cutting access areas allowing the potential for subfloor mold to be more easily identified. Lastly, is to visually examine or take physical cultures from sections that have been removed.

- **Does it sound or feel different?** While this is not a quantitative test, it can help determine if further more scientific damage assessments are warranted. Spend time walking, running, jumping and dribbling on the surface. Listen for sound differences and pay attention for areas with higher vibration levels. If no such areas are present, perhaps the performance was not affected. If there are areas of concern, field testing to determine the extent to which the performance was altered may be warranted.
- **Does it look different?** It might be that compression gaps have formed leaving permanent gaps between flooring rows. It might be that the floor has 'cupped' due to expansion, or contraction.
- **Does it perform different?** If the system was selected and specified with the intent of providing safety, comfort and/or performance features to the user, it is important to know that these performance properties have not been altered. Areas that no long perform properly should be addressed even if they still 'look' good. There are 3<sup>rd</sup> party testing companies that will offer an unbiased assessment of the systems performance and help to identify where the performance is unaltered.

**Step 7:** Define the scope of any further repairs beyond removing the moisture from the facility. Developing this scope involves considering both how extensively and severely the floor was damaged and what the goal for remediation is. Here are some examples that might be appropriate in given situations:

- **No additional work:** In instances where the amount of water was relatively small, where there is only limited, and acceptable, cosmetic damage to the surface.
- **Sand and finish:** In instances where significantly cupping has occurred but there is no suspected or confirmed damage to the structure or performance.

- Limited repair + sand and finish: This would be appropriate where small patches were made in the playing surface, or where a part of the surface was replaced to restore structural or performance damage. The sanding and finishing would then help to hide the repaired areas and make them blend in with the un-touched floor.
- Total replacement: Eventually the damage becomes so extensive that the best course of action is to remove the entire surface and replace it with a new one. This totally restores the structural and performance of the system. There is a significant amount of work to 'blend' repair areas into the un-touched floor, and restore the structural integrity of the subfloor. There is also the reality that even if the same manufacture and grade of flooring is used there can be a significant color difference between the new and old sections of the floor.
- Material may be removed for issues related to mold, structural integrity, or performance.

**Step 8:** Validate that all moisture levels in the facility are within manufacturer and industry specifications. This sounds simple but before any repairs or replacement activities happen, the moisture levels need to be at the appropriate levels. Here are some examples of problems that can arise when repairs start too soon:

- Elevated moisture in wood surface: Sanding a floor with elevated moisture when it is cupped can cause permanent crowning. Crowning is where the edge of the boards become lower than the center of the board.
- Elevated moisture in the slab: Over time that moisture will be released from the slab and likely cause elevated humidity levels beneath the system. This can promote cupping, discoloration, mold growth and even fastener failure.

- Elevated moisture in the subfloor: This can create situations similar to both of the above.

**Step 9:** Depending on the goal of the repair, it may be appropriate to validate that the repairs accomplished their intended result. This is important when the comfort and safety of the athlete is paramount for the facility and organization. It is also important when the ability of the athlete to perform has significant monetary ramifications for the organization. The effect that losing a star athlete/performer can have on ticket sales, NIL revenue, and post season tournament payments should be considered. Repair validation can involve validating that performance is restored to specified levels, or that performance of the newly repaired areas is similar to un-touched areas.

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For more information on ASET Services' 3<sup>rd</sup> party water damage inspections, visit our website: <https://asetervices.com/services/inspection-services/gym-floor-inspections/>, or contact us for a custom proposal for your unique project.

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*Contact ASET to discuss your specific project, or to request a formal proposal for service.*

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