

Question: Can a gymnasium floor be restored after being exposed to water damage?

Several techniques are used in order to dry hardwood flooring. The most popular of these techniques is tenting the area to be dried with plastic sheeting (6mil). The plastic is affixed to the floor with adhesive and/or duct tape. The tent decreases the total volume of air to be dried and provides a controllable drying environment. Dehumidification and air movement are placed in the tent to remove excess moisture.



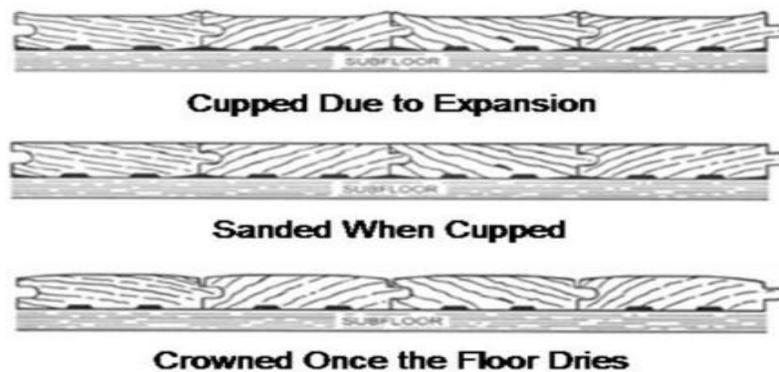
Tented Gym Floor

The ideas are all good and will work if installed and monitored properly. The things that I see wrong with the technique are as follows.

1. This process creates an environment that makes the moisture under the floor pass all the way through the grains of the wood and through the multiple coats of polyurethane that was intended originally to keep water from penetrating the wood in the unlikely event that a water loss occurred. So ultimately the polyurethane is acting as a vapor barrier which is slowing this scientific process down considerably which in turn means longer dry time, higher cost and longer time without use of the floor
2. The other major problem with this technique is that it is very difficult to monitor the progress of the floor. The floated tent either has to be shut down so that probing the floor is possible through the plastic or someone has to crawl into the tent and do the proper monitoring. If the floor is not monitored properly the risk of over drying the floor and crowning the wood becomes possible. Replacing the floor is the only option at this point.

Another technique that is common in the industry is as follows some contractors or maintenance staff elects to rush directly in after a water loss occurs and lightly sand the top few layers off of the floor. The idea is to remove the poly coating or vapor barrier to allow the moisture to pass more freely through the wood floor. Again the ideas are on the right track, **under no circumstance should this happen.** Floor replacement is inevitable for this reason.

1. When exposed to water and high levels of humidity the moisture content of wood increases and the wood expands. Woods greatest expansion occurs perpendicular to the grain, this causes the wood to become wider and cup or buckle. See diagram below.



It is impossible to get the wood sanded evenly once cupping occurs. The edges will be removed and when the wood returns to its normal EMC (equilibrium moisture content) the wood will lie back down and again crowning will happen and the floor will need to be replaced.

The technique that I have had the most success with is creating a supply at one end of the floor and a return at the other end of the floor and cycling desiccant hot dry air under the floor using high velocity air movers. Let me explain...



Above is a standard floating gymnasium floor. The technique I have found after many attempts to be the fastest and most effective way to dry gym floors by utilizing the channels created during the construction of the floor. The channels run from one end of the floor to the other.

After a quick inspection to determine which way the channels run the technician will remove two walls of the base cove. High velocity air movers will be set up to force air under the floor and down the channel. The opposite end of the floor will be set under negative pressure to pull the air from one end to the other increasing the rate of evaporation under the floor. Desiccant dehumidification is necessary to get the positive air down to a necessary 30 – 40 gpp (grains per pound) to achieve best results on the drying of very dense hard wood. The desiccant dehumidifier should be set up to recirculate the excess moisture from the ambient air inside the gym that will be present after this process begins.



The photo to the left demonstrates the previous example. Two high velocity air movers are forcing the, 100 deg. 8% RH at 31gpp. (grains per pound) air under the floor. The floor is still very accessible to walk on and monitor progress. Air intake should be monitored and documented daily to assure that the gpp is under 40 to assure the floor is drying properly. This can be achieved by using any standard issue thermal hygrometer and a psychrometric calculator.



This photo shows the opposite side set up under negative air pressure which creates a vacuum under the floor assuring that the desiccant air reaches the entire affected area of the floor. Each of these air movers should be monitored and documented daily to insure that the process is working. Each day should show a slight decrease in the gpp daily if the air is evaporating moisture properly.

Monitoring and charting progress:



Monitoring the progress of the wood should be done with a hammer probe. The meter is designed to penetrate the hard wood and measure the moisture content of the product tested. An EMC standard should be established immediately by testing an unaffected portion of the floor and subfloor if available. (I recommend testing three separate locations of the same floor and using the average.) If the entire floor is affected it is recommended to find a standard for the region or the area for the specific type of floor your attempting to restore.(maple etc.)

The monitoring of the affected areas should be done in as non destructive manner as possible utilizing expansion cracks when available. The areas should be tested in two locations. The first of the locations is achieved by pounding the hammer probe about $\frac{1}{2}$ to $\frac{3}{4}$ " and documenting this reading. The second is performed by inserting the probe the rest of the way into the wood subfloor and charting this as well.

The two separate locations necessary for monitoring are marked with red.



WoodFloor
SubFloor
Water

These readings are charted in a number of different places on the first day. This is not necessary daily because the changes are not that dramatic at first, and may create additional damage to the floor due to the penetration of the meter into the floor. Once every three days at first is sufficient. The sub floor readings will be higher than the wood floor readings at first. After several days the EMC will reduce at first in the subfloor and then the hardwood. The air cycling under the floor will force the moisture to release from the subfloor first and the wood floor second.

When the subfloor reaches its EMC the wood floor will be a day or two longer. Equipment can be safely removed when the EMC reading are between 2% and 4% of the original dry standard. General time frame is difficult to estimate based on a number of factors such as degree of saturation, environment control etc. The whole process should be between 10 and 14 days.

Refinishing is not usually necessary unless water was standing on top of the floor and if necessary, is not recommended for many months after the equipment is removed. The wood needs time to re acclimate to its natural EMC and this take time. The wood although dry may still be cupped slightly and will eventually return to its original pre loss condition.