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CASE-002: Performance of an 8 Year Old Competition Hardwood Court at an NCAA Div-I University

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ASET Services recently evaluated an 8 year old competition court used for Men's and Women's Basketballl at a Division I NCAA University. The goal was to determine if the floor was likely to contribute to inuries. The system had been promoted and sold as being 'DIN-2001-Certified' (this will be explained in further detail). The floor was not commission tested so it is impossible to know how it performed immediately after installation. Every force reduction reading was below 48%, and 5 of the 10 test points were 10% or more below the minimum 53% required by DIN 18032-2 (2001). Every vertical deformation point was below 1.4 mm, which is roughly 40% below the minimum 2.3 mm required by DIN 18032-2 (2001). It is impossible to determine if the system was simply installed at these performance levels or if the performance has deteriorated over time.

Introduction:

ASET Services, Inc was hired to determine the force reduction and vertical deformation of a hardwood court at an NCAA Division I university. The court was installed in the competitive arena used for Men's and Women's Basketball. Testing for two common performance and safety properties were conducted; Force Reduction and Vertical Deformation. The goal was to determine if there was a logical link between the hardness of the court and injury rates.

Note: While there are ample case studies that link these performance properties to greater comfort and less stress on joints, there is no clear data linking them to safety. There also is no clear minimum or maximum for these values above or below which injuries have been shown to decrease. The university was provided with a summary showing how their results compare to DIN 18032-2 as well as other standards such as ASTM F2772, EN 14904, FIBA and MFMA-PUR.

Testing Methods:

The surfaces were tested for Force Reduction and Vertical Deformation using equipment that conforms with DIN 18032-2, ASTM F2772, FIBA, and MFMA PUR standards. The force reduction equipment is shown in Illustration 1. Vertical Deformation test equipment is shown in Illustration 2.

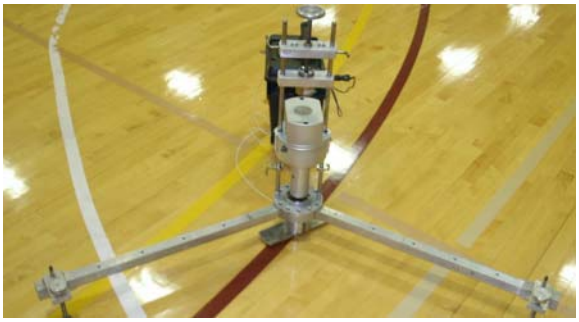

Illustration 1: Shock Absorption and Thickness Test Equipment

Detailed articles on the equipment and methods used can be found at ASET Services' Online Library, in the 'Educational White Papers' Section (http://asetservices.com/library/aset-publications/).

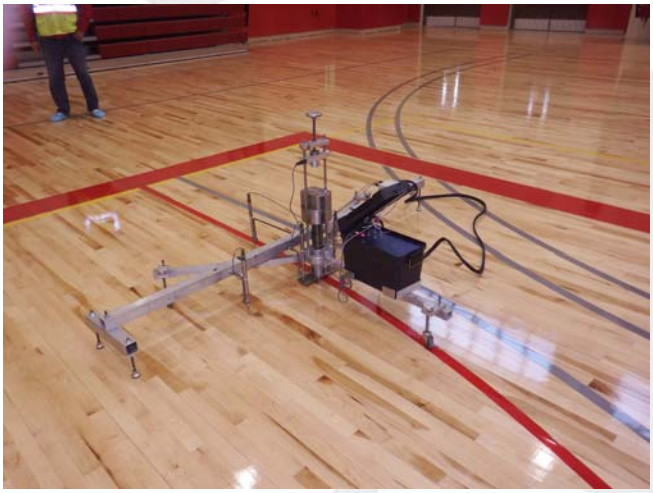

Illustration 2: Vertical Deformation Test Equipment

Determining the Original Performance:

ASET spoke with representatives from the school and they were able to identify the system name and manufacturer. They were also able to confirm that the system had been specified as a DIN-2001-Certified. They were unable to locate an original specification to see if performance levels even more stringent than DIN 18032-2 (2001) were specified. Based on this information, and based on the product information available online the original installation should have conformed to the following:

- Minimum Force Reduction: 53%
- Minimum Vertical Deformation: 2.3 mm
- Minimum values applied at every test point.
- Force Reduction Uniformity: +/- 5% from average
- Vert Deformation Uniformity: No Limit

Results:

Force Reduction (Shock Absorption)

The following illustration contains the Force Reduction readings recorded from 10 test points. None of the points met the 2001 DIN minimum force reduction requirement (53%). Four of the 10 points were 10% or more below the minimum level required by this standard. The lowest reading was 42%.

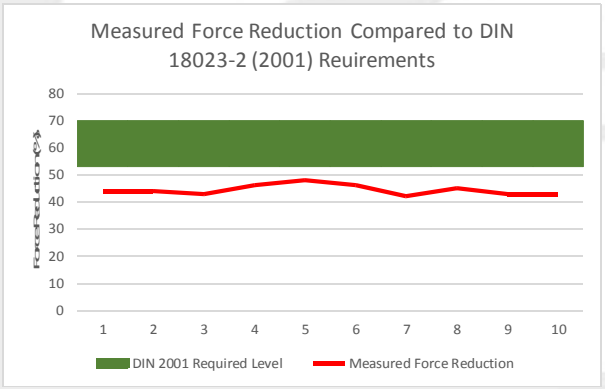

Illustration 3: Shock Absorption by Test Point

Vertical Deformation

The following illustration contains the Vertical Deformation readings recorded from the 5 test points. None of the points achieved the minimum vertical deformation requirement (2.3 mm). The minimum Vertical Deformation recorded was 1.2 mm.

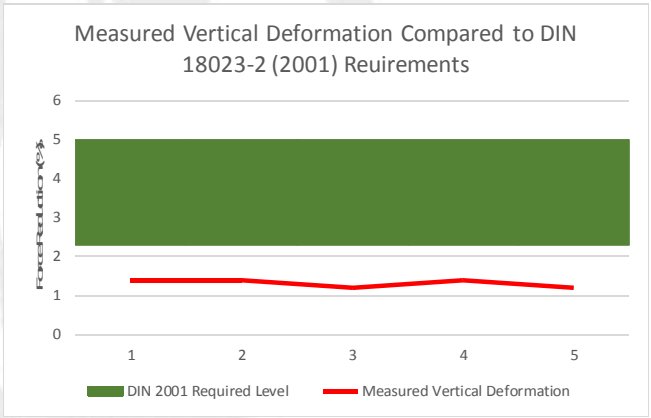

Illustration 4: Thickness Readings by Test Point

Conclusions

The court was promoted as DIN-2001-Certified. The 2001 Pre-standard version of DIN 18032-2 requires all test points to produce a Force Reduction of 53% or more, and a Vertical Deformation of 2.3 mm or more. Specifications are rarely clear as to whether they apply only to the lab results or if they apply to the performance of the actual installation.

The court's performance was well below the levels required by DIN 18032-2. It is impossible to determine if the system ever achieved the desired safety and performance levels or if they have deteriorated over time. Either way, the results show that this 8-year-old court has performance levels that are far below the minimum levels required by the standard used to promote and specify its performance.

Additions to Original Version:

Since posting this article, there is some additional information that may be relevant. Rather than insert that information within the original text, it has been added here.

The system is an anchored-resilient system. For those unfamiliar with these systems they include a system that anchors the system to the floor. Anchored-resilient systems are generally installed with no or minimal pad compression. They allow the athlete to utilize all of the cushioning designed into the pad, while minimizing area deflections and vibrations.

Anchoring systems run the range of complexity. Some systems rely on the use of special installation tools, such as a shim. Others rely on precise manufacturing of the anchors and components they engage. If systems are manufactured or installed improperly it can result in overanchoring. Overanchoring would cause a floor to exhibit this behavior. The lack of commission testing, however makes it impossible to determine the cause of the lower than expected Force Reduction and Vertical Deformation levels.

Comments:

If the initial performance is not verified, owners have no way of knowing that the surface delivers the specified protection and performance levels. The lack of verification testing also makes it impossible to determine how quickly or how much the surface changes over time. For more information on performance testing of new sport surfaces and how specifications can be written to ensure that specified safety and performance levels are delivered visit: www.aset-trueperformance.com.

Contact us with any questions you have about the performance of your new or current sport or play surface.

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