



MFMA PRESENTS

Northern hard maple flooring... the multipurpose surface

Maple flooring has been the ideal choice for sports and athletic facilities for over a century due to its strength, durability and beauty. It is also an excellent choice for multipurpose facilities that host more than sporting events. Maple's versatility and aesthetic qualities make it a wise choice for elementary schools, middle and high schools, college recreation facilities, YMCAs, family centers, churches, aerobic and dance rooms and military bases. Correctly specified, installed and maintained, maple floors can provide a dependable flooring surface for more than 60 years, despite varied uses.

This section will help architects understand, identify and take advantage of the multipurpose opportunities that northern hard maple flooring offers. Upon completion of this section, you will be able to identify details necessary to write a specification for a multipurpose floor.

Northern hard maple is an organic product consisting of patterns of fibers and air pockets that give it a natural shock-absorbing quality. These characteristics, combined with specially designed and engineered subfloor systems, deliver performance and safety ideally suited for a variety of sporting and non-sporting activities. Because multipurpose floors differ immensely from strictly sports floors, it is critical that architects identify the intended functions of the room and select the proper subfloor system. This is especially true for elementary and high school gyms.

"Gymnasiums are constantly being used for more than sports activities; they are used for community meetings, health fairs, bake sales and bazaars. A typical gymnasium will have a gym class throughout the day and then a community meeting in the evening. Northern hard maple flooring functions extremely well in that kind of multi-purpose environment," says Daniel Heney, technical director of the Northbrook, IL-based MFMA. "Regardless of the activity, the floors are expected to maintain their aesthetic appearance, deliver dependable traction and be easily cleaned for the next event."

CONTINUING EDUCATION



Use the learning objectives below to focus your study as you read **Northern hard maple flooring... the multipurpose surface.**

To earn one AIA/CES Learning Unit, including one hour of health safety welfare credit, answer the questions on page 255, then follow the reporting instructions on page 320 or go to the Continuing Education section on archrecord.construction.com and follow the reporting instructions.

LEARNING OBJECTIVES

After reading this article, you should be able to:

- Describe the various characteristics that make maple flooring an ideal multipurpose surface.
- Describe what is important to consider when writing a specification for a multipurpose floor.
- Describe what things you should NEVER do to a multipurpose maple floor.

Safety

Northern hard maple's hard-but-resilient character, natural shock absorption and area elasticity are enhanced by specially engineered subfloor systems. Subfloor systems can be customized to emphasize maple's natural elasticity and shock absorption (ideal for aerobics rooms or dance floors), stiffness (ideal for basketball or volleyball) or both. This versatility makes maple floors ideal for multiple uses including athletic performance, dances, roller skating, etc. Whatever the intended purpose or subfloor, northern hard maple provides dependably uniform grip and traction to athletic footwear that can maximize performance and safety while minimizing injuries.

According to candidates for the certification of the American Board of Orthopaedic Surgeons, the majority of anterior cruciate ligament (ACL) injuries are non-contact in nature and high school aged students are far more likely to undergo ACL reconstruction than college aged students. These injuries can be attributed to planting and cutting, straight-knee landing, and one-step stop landing with the knee hyperextended³. Pivoting and sudden deceleration are also common mechanisms of non-contact ACL injury^{2,4}. Considering that basketball ranks second among the top eight recreational activities with the largest number of musculoskeletal injuries among children ages five to 14 years with the most common injury sites being the ankle, hand and knee¹ and that common causes of these injuries (running, jumping, quick stops, etc.) routinely occur on all gymnasium and non-gymnasium floors in athletic and non-athletic settings, it is vital that the flooring possesses the greatest number of safety characteristics while offering maximum versatility. Northern hard maple offers a proven track record performance and safety when used in competitive and multipurpose settings.

The Birmingham, Mich.-based Ducker Research Co. Inc., conducted a survey in 1998 (funded by the MFMA) of sports flooring owners who had maple and synthetic floors or who had replaced synthetic flooring with maple. This survey compared incidence of injuries that occurred on each sporting surface. The resulting data indicated that athletes were 70 percent more likely to sustain a floor-related injury on a synthetic floor than on a maple floor.

Durability

MFMA maple's life cycle cost is surprisingly less than that of synthetics. The issue of life cycle costing is a critical evaluation criterion for facility owners and managers. The Maple Flooring Manufacturers Association estimates that the cost of a maple floor compared to the costs of PVC and poured urethane floors are, on average 12 percent lower than the cost of PVC floors and 33 percent lower than poured urethane floors. Life cycle cost comparisons reflect original installed price plus manufacturer-recommended maintenance over a 30-year floor life:

Northern hard maple\$0.89 / sq. ft. / year

PVC.....\$1.01 / sq. ft. / year

Poured urethane\$1.42 / sq. ft. / year

(Typical life span for a 25/32" maple floor is 38 years, PVC and poured urethane products have typical life spans of 15-20 years.)

Strength

Maple floor systems vary in strength due to the thickness of the maple installed and the design of the subfloor system. Subfloor designs vary significantly among floor systems so MFMA strongly recommends consultation with an MFMA mill manufacturer prior to selecting a subfloor system in a multipurpose setting. The MFMA mill manufacturers can help you select a subfloor system that fits your needs or help you customize a subfloor system for unique requirements.



Ease of daily maintenance

Caring for a maple floor in a multipurpose setting requires only minor additional maintenance. Daily sweeping, dust mopping with a treated dust mop and cleaning up spills are all that is required to maintain the beauty of a multipurpose maple floor.

THINGS TO INVESTIGATE BEFORE WRITING THE SPECIFICATION:

Subfloor blocking

Subfloor blocking is typically needed in areas where the maple floor will be subject to heavy loads (bleachers, portable backstops, gym floor cover carts etc.). MFMA refers all inquiries concerning subfloor blocking requirements to the individual flooring system manufacturer and the specified equipment manufacturer. Variances in bleacher system design, portable backstops, loading, total weight and operation make uniform specifications for subfloor blocking impossible.

Things to Look for When Specifying Maple Floors in a Multipurpose Room

1. Specify a reputable hardwood sports flooring contractor with significant experience in projects of similar size and scope to yours.
2. Determine who will be using this floor.
3. Determine what activities will be performed on the surface.
4. Specify a subfloor system that matches the floor's designated primary activity.
5. Specify any changes to the specified subfloor system and the locations of those changes.
6. Specify pre-installation conditions of the room, including fully functioning HVAC, constant temperature and humidity, weather tightness.
7. Specify industry-recognized installation guidelines throughout process.
8. Specify following the same post installation maintenance procedures.



Proper coatings for multipurpose surfaces

The Maple Flooring Manufacturers Association has published specifications for gymnasium sealers and finishes for maple floors and lists products that conform to such specifications for the sole purpose of providing guidance to achieving the highest protection and most enduring beauty in wood floors. All of the finishes listed on the MFMA Athletic Flooring Sealer and Finish Specifications and Conformance List are tested for conditions normally associated with a multipurpose floor. Such tests include: Gloss, Color, Hardness, Abrasion Resistance, Stain Resistance and Alcohol, Beer and Coca-Cola® Resistance. When selecting a floor finish for a multipurpose floor, make sure that the product is MFMA Certified.

Surface protection

Floor covers are not always needed in multipurpose rooms but they offer an extra layer of protection and helps to keep your multipurpose maple floor looking its best. Several manufacturers produce gymnasium floor covers for that extra protection and they come in a range of styles and thicknesses. The differences among covers include thickness of the vinyl wear coating and the strength of the fabric core. When evaluating a cover for durability, remember that the more durable covers have thicker coatings. Covers with higher strength core fabric will resist more abuse and tearing.

Specifying a maple sports flooring surface

There are three types of wood flooring that are considered MFMA products: Northern hard maple (*Acer saccharum*), American beech (*Fagus grandifolia*) and yellow birch (*Betula alleghaniensis*). These species of MFMA Products produced by MFMA manufacturers are available in three basic configurations: random-length strip, finger-jointed strip, and parquet. Each of these surface materials can be installed in a single direction, and parquet can be laid in patterns such as a checkerboard, chevron, etc. Here are basic descriptions of each type of flooring:

RANDOM-LENGTH STRIP — Consists of individual pieces of flooring, typically 1½ inches or 2¼ inches wide, with lengths between 9 inches and 8 feet. The most common thickness specified is 25/32 inches, but 33/32 inches thick random-length strip flooring is also available. This surface material is installed like a horizontal brick wall, with each piece being overlapped with adjacent pieces and fastened into the subfloor with cleats, staples or steel clips, depending on the subfloor chosen for the project.

FINGER-JOINTED STRIP — A number of random-length strip segments joined together at the manufacturing plant to form a consistent length board typically 1½ inches or 2¼ inches wide. The most common thickness specified is 25/32 inches, but 33/32 inches thick finger-jointed strip flooring is also available. This surface material is also installed like a horizontal brick wall, with each consistent-length board being overlapped with adjacent boards and fastened into the subfloor with cleats, staples or steel clips, depending on the subfloor chosen for the project.

PARQUET — Hard maple parquet flooring is manufactured in square and rectangular panels in a variety of dimensions. Individual picket widths range from 7/8 inch to 1¼ inches, and picket lengths range from 5½ inches to 12 inches. Minimum thickness of MFMA parquet flooring is 5/16 inch. Individual pickets are assembled into panels and either joined together by wire, mesh, or tape on the back of the panel, or paperface on the front (or surface) of the panel. Parquet flooring is typically installed directly to the concrete substrate using adhesive/mastic, or over subfloor systems that contain continuous subfloors (plywood or similar).

The use of 33/32 flooring

With recent advances in flooring system technology, many specification choices have been simplified. “Over-engineering” of wood flooring systems is quickly becoming a thing of the past. Years ago, architects and specifiers required this product to be used on many installations to ensure structural stability and to add years to the floor’s life span. Over the past twenty years, MFMA manufacturers have invested heavily in the research of structural stability and performance issues for maple flooring applications. As a result, most of the integrated flooring systems produced today do not rely in large part on the surface maple for structural stability and system performance. Subfloor design is the key. MFMA statistics showed that less than one percent of replacement floors were necessitated by depleted wear surface on the existing floor. Simply stated, the specification and use of 33/32-inch thick maple flooring is in many cases a waste of a natural resource.

FACILITY MAINTENANCE:

Equipment maintenance

Check and clean wheels — Nylon, plastic and metal wheels on storage carts, bleacher wheels and portable backstops can cause scuffmarks and scratches. Cleaning wheels, removing rocks and other hard debris, and making sure that the wheels roll easily will minimize potential damage.



Maintaining furniture

The type of furniture used in a facility should be carefully selected. Folding chairs and tables that are set up and taken down frequently can be a nightmare for any type of flooring in multipurpose spaces. Maintenance personnel should ensure that rubber caps are maintained and in place on all legs before use or the maple flooring can be scratched.

Daily maintenance

Follow MFMA recommendations in the *Caring For Your MFMA Maple Floor* pamphlet. Always keep your floor free of dust, dirt, abrasive particles, and debris. **NEVER USE WATER TO CLEAN YOUR FLOOR** and never use dust mops treated with silicone, wax, or acrylic-based products. Your floor finish manufacturer has dust mop treatments specifically designed for compatibility with the finish used on your maple floor. Clean up spills when they happen.

SIX STEPS FOR PROPER DAILY MAINTENANCE:

1. Sweep the floor daily with a properly treated dust mop. If the floor is used heavily, sweep it up to three times per day.
2. Wipe up spills and any moisture on the floor.
3. Remove heel marks using an approved floor cleaner applied with a soft cloth or dusting mop. Contact your floor finish manufacturer for approved cleaning products.
4. Make sure the heating/ventilating/air conditioning system is functioning properly and set to maintain indoor relative humidities between 35% and 50% year round. In areas of consistently high or low outside humidity, a 15% fluctuation will not adversely affect the maple.
5. Inspect floor for tightening or shrinkage. Check for water leakage around doors and windows during wet weather. Remove debris from expansion voids.
6. Always protect the floor when moving heavy portable equipment or lifts. Ensure portable equipment does NOT have crowned wheels or wheels that include center ridges remaining from the molding process. These types of wheels can create very significant point loads.

Annual maintenance

To preserve the beauty and life of your maple floor, the MFMA recommends that multipurpose surfaces receive periodic refinishing. MFMA typically recommends that facilities having heavy use receive a new coat of floor finish every year to maintain its beauty and to protect the floor. Facility use, abuse, and maintenance will ultimately determine the appropriate recoating schedule. A typical recoating requires abrading floor's surface and applying another coat of floor finish.

From time to time, even the most meticulously cared-for maple multipurpose floor should receive a complete resurfacing. Resurfacing restores the luster in an older maple surface, and assures long life and excellent performance. The frequency of complete resurfacing depends on numerous factors, but typically is performed about every eight to ten years. Typically, the installation sanding will remove a full 1/32 inch of maple thickness above the tongue. When a floor is completely resurfaced the sanding typically does not remove any more than 1/32 inch of thickness. The maple floor should be sanded with a minimum of three cuts using coarse, medium, and fine sandpapers. The first cut using coarse sandpaper removes the majority of the material

in order to remove the scratches, dirt and stains that have accumulated since installation. The final two cuts do not remove as much material and should provide a smooth and even surface, free from scratches, drum stop marks or gouges.

Proper and preventative maintenance prevents problems

Daily maintenance of a multipurpose hardwood floor does more than keep up the appearance of the floor; it ensures that moisture-related problems are avoided whenever possible. Making certain that heat, air conditioning and humidity are set properly and that windows and doors are sealed against weather can reduce the impact of moisture on your floor. The use of appropriate equipment and cleaning agents also are essential to proper maintenance. The Maple Flooring Manufacturers Association has produced a bilingual (English and Spanish) video with instructions for proper maintenance.

NEVER Do the Following to your MFMA maple Floor

1. **NEVER** shut down the ventilating system in your facility for a prolonged period of time.
2. **NEVER** use household cleaning products or procedures. They can be harmful to the floor finish and to the wood. They may also leave floors sticky or slippery, and potentially harmful to people who walk on the floor. Your MFMA floor finish manufacturer will recommend the right cleaning and maintenance materials for your MFMA floor.
3. **NEVER** clean your MFMA floor using scrubbing machinery or power scrubbers that use water under any pressure. Water is your floor's worst enemy!
4. **NEVER** attempt to modify or repair your MFMA multipurpose floor without first consulting your MFMA contractor.

Sources

1. U.S. Consumer Product Safety Commission
2. Daniel DM, Stone ML, Dobson BE, et al: Fate of the ACL-injured patient: a prospective outcome study. *Am J Sports Med* 1994; 22(5):632-644
3. Griffis ND, Nequist SW, et al: Injury prevention of the anterior cruciate ligament, abstracted, in *American Orthopaedic Society for Sports Medicine: Meeting Abstracts, Symposia, and Instructional Courses. 15th Annual Meeting, Traverse City, MI, June 19-22, 1989*
4. Noyes FR, Moar PA, Matthews DS, et al: The symptomatic anterior cruciate-deficient knee. *J Bone Joint Surg (Am)* 1983;65(2):154-174

CLICK FOR ADDITIONAL REQUIRED READING

The article continues at: <http://www.maplefloor.org/literature/incofinjury.htm>.

To receive AIA/CES credit, you are required to read this additional text. For a faxed copy of the material, contact Daniel Heney at MFMA, (847) 480-9138 or email mfma@maplefloor.org. The following quiz questions include information from this material.

AIA/ARCHITECTURAL RECORD CONTINUING EDUCATION Series

LEARNING OBJECTIVES

- Describe the various characteristics that make maple flooring an ideal multipurpose surface.
- Describe what is important to consider when writing a specification for a multipurpose floor.
- Describe what things you should NEVER do to a multipurpose maple floor.

INSTRUCTIONS

Refer to the learning objectives above. Complete the questions below. Go to the self-report form on page 320. Follow the reporting instructions, answer the test questions and submit the form. Or use the Continuing Education self-report form on *Record's* website—archrecord.construction.com—to receive one AIA/CES Learning Unit including one hour of health safety welfare credit.

QUESTIONS

1. What characteristics of Northern grown maple make it desirable to use as a multipurpose flooring surface?
 - a. Maple flooring is a flooring surface that is as hard as concrete.
 - b. Maple is the ideal choice due to its strength, durability and beauty.
 - c. Maple flooring can be stained an array of colors.
 - d. Maple is often used in bridge building.
2. Which is the best thickness to use, 25/32 inch or 33/32 inch?
 - a. 25/32 inch is better because it is more rigid than 33/32 inch.
 - b. 33/32 inch is better because it is thicker and will last for a longer time.
 - c. 25/32 inch flooring is better than 33/32 inch because of the advancement in design of subfloor systems.
 - d. 33/32 inch is better because it is more resilient than 25/32 inch.
3. How often should a maple floor be sanded?
 - a. Yearly
 - b. After the basketball season
 - c. Every three years
 - d. Typically every eight to ten years
4. Name two of the four things you should NEVER do to your maple floor.
 - a. Never shut down the ventilating system for a prolonged period of time.
 - b. Never clean your MFMA floor using scrubbing machinery or power scrubbers.
 - c. Never use the same floor finish twice.
 - d. Never leave the lights on for extended periods of time.
5. What are the three basic configurations of maple flooring?
 - a. Elongated Parquet, Finger-Length Strip and Maple Block.
 - b. Random-Length Strip, Finger-Jointed Strip and Parquet.
 - c. Finger-Jointed Parquet, Random-Length Strip and Maple Veneer.
 - d. Random-Finger Strip, Jointed-Length Strip and Parquet.
6. The versatility of maple flooring makes it ideal for?
 - a. Shot put practice
 - b. Athletic performance, dances, roller skating, etc.
 - c. Archery
 - d. Paintball
7. Which of the following injuries is NOT commonly attributed to the floor surface?
 - a. Ankle-related sprains and torn ligaments.
 - b. Knee-related sprains and torn ligaments.
 - c. Spiral fractures of the medial condyle of the humerus.
 - d. Shin Splints.
8. What should you inspect a maple floor for on a daily basis?
 - a. Termites
 - b. Tightening or shrinkage
 - c. Bubbles
 - d. Carpenter bees
9. Where does the sport of basketball rank among the top eight recreational activities with the largest number of musculoskeletal injuries?
 - a. 8th
 - b. 5th
 - c. 1st
 - d. 2nd
10. Floor finishing products listed on the *MFMA Athletic Flooring and Sealer Specifications and Conformance List* are tested for resistance to what?
 - a. Yogurt, fruit juice and ketchup
 - b. Alcohol, beer and Pepsi®
 - c. Grain alcohol, beer and Sprite®
 - d. Alcohol, beer and Coca-Cola®

About MFMA

Established in 1897, the Maple Flooring Manufacturers Association is a trade organization representing the maple flooring industry. The MFMA is the authoritative source of technical and general information about maple flooring and related sports flooring systems. Its membership consists of manufacturers, installation contractors, distributors and allied product manufacturers who subscribe to established quality guidelines.

Through cooperative member programs, MFMA establishes product quality, performance and installation guidelines; educates end users about safety, performance and maintenance issues; and promotes the use of maple flooring products worldwide. Please call 847/480-9138, or write: MFMA, 60 Revere Drive, Suite 500, Northbrook, IL 60062. www.maplefloor.org. E-mail: mfma@maplefloor.org.



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Directions: Select one answer for each question in the exam and completely circle appropriate letter. A minimum score of 70% is required to earn credit.

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| 4. | a | b | c | d | 9. | a | b | c | d |
| 5. | a | b | c | d | 10. | a | b | c | d |

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Material resources used: Article: This article addresses issues concerning health and safety.

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