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# Incidence of Injury Study: Maple Flooring vs. Synthetic

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*A Summary of Findings*

## Purpose of the Study

Amidst growing confusion and concern about sports injuries and their relationships to different types of indoor sports surfaces, this study was conducted to analyze the incidence of floor-related injuries on maple sports flooring and synthetic sports flooring. The study was designed and conducted in 1988 by Ducker Research Co., Inc., of Birmingham, Michigan, specialists in industrial marketing research. Funding was provided by the Maple Flooring Manufacturers Association of Northbrook, Illinois.

## Study Objectives

1. Quantification of sports injuries  
The number of injuries incurred while participating in games or practicing on or exercising on a sports floor will be reported as follows:
  - a. Injuries on maple floors separate from those on synthetic sports flooring.
  - b. Injuries over a specific time frame in terms of the type of injury

Respondents will be asked to report the incidence of injuries as recorded by school records; reporting of injuries based on "rough estimates" will be strongly discouraged.
2. Qualitative information Supplemental qualitative information, to be sought from qualified respondents, will include:
  - a. Injury level by types of activity
  - b. Type of synthetic sports flooring material.
  - c. Level of injuries among men and women.
  - d. Seasonality of injury rates.
  - e. Attitudes toward wood and synthetic flooring in terms of the incidence of injuries.

## Methodology

The study is based upon a canvass of sports flooring owners where maple flooring has replaced a synthetic sports floor or where owners have both synthetic and maple sports floors in similar use. A total of 50 such installations were studied. (See Tables 1 and 2.)

*TABLE 1*  
BUILDING OWNER CASE STUDIES  
SEGMENTED BY TYPE OF BUILDING

BUILDING TYPE	NUMBER OF CASES	PERCENT OF TOTAL
Universities and colleges	27	54%
Primary and secondary schools	23	46%
<b>Total</b>	<b>50</b>	<b>100%</b>

*TABLE 2*  
BUILDING OWNER CASE STUDIES  
SEGMENTED BY EXPERIENCE WITH  
SPORTS FLOORING

EXPERIENCE	NUMBER OF CASES	PERCENT OF TOTAL
Maple and synthetic sports flooring	32	64%
Switched from synthetic to maple	18	36%
<b>Total</b>	<b>50</b>	<b>100%</b>

It was necessary to contact more than 250 owners to generate 50 qualified case studies. Such a large number of contacts was required because of the common practice to use synthetic flooring and maple flooring for separate activities (e.g., synthetic flooring often is used for recreational activity while maple flooring is used for competitive sports.)

Universities and colleges account for a slight majority of the total cases as personnel at these facilities maintain better records and are more abreast of the incidence of sports injuries and any relationship to sports flooring. Racquetball and health club facilities are not represented in these case studies as it was extremely difficult to find such facilities/owners that had experience on both types of flooring.

A total of 74 individuals were interviewed to complete the 50 case studies. During field interviewing, several individuals representing different job functions within one facility were interviewed. They included:

- Athletic Directors
- Coaches
- Trainers
- Principals (primary and secondary schools)

## Incidence of Sports Injuries

### Awareness among respondents

The incidence of sports injuries has become an important issue in the sports flooring industry. Owners are becoming increasingly aware of the incidence of sports injuries and the relationship of such injuries to flooring material. It is evident, when comparing maple and synthetic sports flooring in like applications, that more injuries occur on synthetic flooring. Several verbatim comments assist in illustrating this fact:

“We are conducting our own research project on the incidence of sports injuries. We have experienced so many injuries on our synthetic floor that we are switching to maple. Our research will help convince some skeptical decision makers.”

— Athletic Director  
College/University

“There are far more injuries on synthetic floors than on maple floors. We are discontinuing all use on our synthetic floors, except mild recreational activity for that reason.”

— Athletic Director  
College/University

“With synthetic floors, there is a major problem with positive friction. Players start and stop quickly and the floor does not give at all. This results in rolled ankles, sprained ankles and torn ligaments.”

— Principal  
High School

During field interviewing, respondents were asked to calculate the number of injuries that have occurred on both types of sports flooring in the last year. It is important to note that owners reported the number of injuries that were attributed to contact with the floor (floor-related). Injuries such as broken noses, concussions, exhaustion and other accidents not caused by the floor were excluded from injury reports.

### Injuries recorded during one year

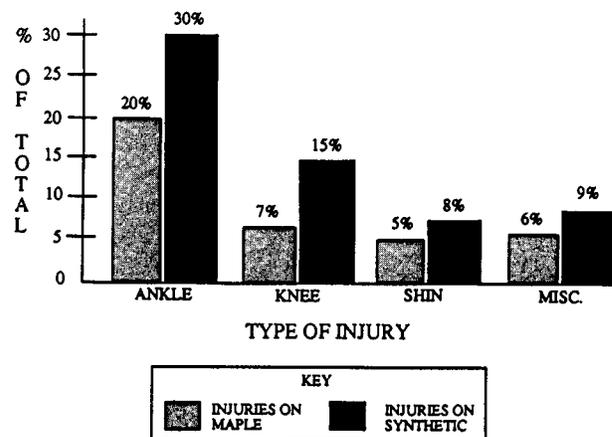
TABLE 3  
INCIDENCE OF SPORTS INJURIES  
AVERAGE PER CASE STUDY

SPORTS FLOORING	NUMBER OF INJURIES	(PERCENT)	CASE STUDIES	AVERAGE PER CASE STUDY
Maple	361	(37%)	50	7
Synthetic	606	(63%)	50	12
<b>Total</b>	<b>967</b>	<b>(100%)</b>	<b>50</b>	<b>19</b>

Table 3 shows the total number of injuries in one year on maple and synthetic flooring which are attributed to the floor. 37% of the injuries reported in this study occurred on maple flooring, while 63% were on synthetic floors. Put another way there is a 70% higher incidence of injuries on synthetic sports flooring.

### Types of injuries recorded

EXHIBIT I  
INCIDENCE OF SPORTS INJURIES  
SEGMENTED BY TYPE OF INJURY



The most common injuries reported as being attributed to the floor include the following (see Exhibit I):

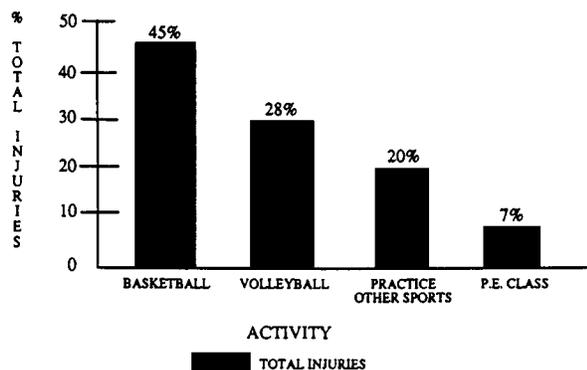
- Ankle-related sprains and torn ligaments
- Knee-related sprains and torn ligaments
- Shin splints

Other, miscellaneous injuries include lower back sprain, tendonitis, groin muscle pull, wrist and hand sprains caused by falling.

### Types of activities when injuries occurred

*EXHIBIT II*

INCIDENCE OF SPORTS INJURIES  
SEGMENTED BY ACTIVITY



In order to accurately compare the incidence of sports injuries on maple flooring versus synthetic flooring, activity levels on each type of flooring must be similar. Since usage in cases was comparable, there is no differential between maple and synthetic flooring.

In most cases (see Exhibit II), sports flooring is used for basketball, both competition and practice. Hence, more injuries occur during basketball activity with volleyball also a significant activity in terms of floor-related injuries. Injuries reported for these sports included those that occurred during competition and in practice.

Floor-related injuries reported during practice for other sports stemmed from activities including football, soccer, lacrosse, track, baseball and softball.

### Injuries recorded among males and females

*TABLE 4*

INCIDENCE OF SPORTS INJURIES  
SEGMENTATION BY SEX

SEX	SPORTS INJURIES	PERCENT OF TOTAL
Male	532	55%
Female	435	45%
<b>Total</b>	<b>967</b>	<b>100%</b>

Total injuries reported are segmented in Table 4 according to the sex of the individuals injured.

### Injuries recorded by season of the year

*TABLE 5*

INCIDENCE OF SPORTS INJURIES  
SEASONALITY STATISTICS

SEASON	% TOTAL INJURIES
Fall	18%
Winter	75%
Spring	7%
Summer	(negligible)

A greater number of floor-related injuries occur during the winter months simply because indoor sports activity increases during cold weather. Table 5 provides a seasonal segmentation of reported injuries.

## Conclusions

— A total of 967 sports floor-related injuries were reported, of which 37% were attributed to maple flooring and the remaining 63% to synthetic flooring. Based upon these findings, there is a *70% higher incidence of floor-related injuries on synthetic sports flooring.*

— The average number of floor-related injuries per case study on maple flooring is 7 per year, while on synthetic flooring the average number is 12 injuries per year.

— Based upon 50 case studies, more floor-related injuries occur during basketball than during any other type of activity. This includes both competition and practice.

— The attitudes reflected in the comments of some respondents support the finding that more floor-related injuries occur on synthetic than on maple floors:

“The higher injury count on synthetic flooring is due to the lack of absorption. When players are suffering from aching feet and knees, they practice on wood for a few days. This helps to alleviate the problem.”

— Athletic Trainer  
College/University

“Most players prefer wood over synthetic flooring. Many professional athletes refuse to play on synthetic and go as far as writing a stipulation in their contract that states they will not play on synthetic.”

— Athletic Trainer  
College/University

“Wood floors have better flex action. Players do not complain about aches and pains when playing on wood as they do when playing on synthetic.”

— Athletic Trainer  
College/University

## Postscript

In the judgement of Ducker Research Company...

“The study results in statistically reliable findings that there are a greater number of sports injuries on synthetic sports flooring than on maple sports flooring. We say this for several reasons:

- 1) the case studies are among owners with comparable experience in and comparable usage of maple and synthetic sports flooring;
- 2) there is a reasonably uniform pattern of response across the 50 case studies;
- 3) reported injuries are based upon documentation and concern injuries related to the sports floor.

In our judgement, study results show with 90% certainty that, for comparable levels of use, there is a higher incidence of floor-related injuries on synthetic sports flooring than on maple sports flooring.”

— Ducker Research Co., Inc.  
Birmingham, Michigan



### About MFMA

Founded in 1897, the Maple Flooring Manufacturers Association is the authoritative source of technical and general information about the manufacture, application, installation and maintenance of maple sports flooring. Its membership is comprised of manufacturing mills, allied product manufacturers and maple flooring contractors and distributors, all of whom subscribe to the high standards of quality manufacturing and installation established by MFMA during the 105 years of its existence.

READER NOTE:

The *STUDY OF THE INCIDENCE OF INJURIES ON MAPLE SPORTS FLOORING AND SYNTHETIC SPORTS FLOORING*, remains on file at the Maple Flooring Manufacturers Association offices in Northbrook, Illinois, and will be made available in its entirety to anyone interested.



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