

**Annual Research Report
Of the
NABC
Research Committee**

By:
Dr. Jerry Krause, Chair

*National Association
Of
Basketball Coaches Convention
Atlanta, Georgia
March 2002*

2001-02
Research Committee Report
Atlanta, Georgia
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I. 2001-2002 OBJECTIVES

A. Encourage basketball research.

1. Administer the NABC research grant program.

STATUS: The committee annually solicits, screens, recommends to the Board of Directors and monitors completion of basketball research grants (ten possible awards/up to \$1,000 per grant)

The present summary:

- a) Awarded/completed/funded _____35
- b) Awarded/in-progress _____5
- c) Applications pending _____1 **See TAB A**

2. Publish basketball research in the NABC Courtside.

STATUS: Research articles/reports/grants abstracts are edited and submitted for publication. Adapting process to NABC website.

3. Conduct cooperative rules experimentation with the NCAA Basketball Rules Committees.

STATUS: Focus continues on the evaluation of basketball equipment with priorities to protect players, improve performance, and maintain the quality and integrity of the game.

Efforts are still being placed on the problem of rebound/shooting differences attributed to inconsistencies in rim/backboard/support systems from court to court and especially between both baskets on the same court.

The rim testing process and parameters that were developed are still recommended, though not required, for college basketball. The NCAA Rules Committees have adopted acceptable energy absorption ranges from 35% to 50% for each basket and a maximum difference of 5% between baskets on the same court to keep the game the same on every court. In 1998-99 the committee revised the recommendation to preseason

and pre-tourney testing so every competition gym would at least be tested before each season.

The NCAA I Men's Tournament Committee does require rim testing at all NCAA tournament sites (third year). The NAIA also mandates rim testing at all national tournament sites.

Findings confirm a relationship between energy absorption values and field goal shooting percentages as well as rebound differences. Increased incidents of variability of rim/backboard/support systems also are evident due to adjustability of rims and existing differences between approved equipment from many manufacturers. The NBA has also chosen to adopt standards in the 20% - 25% range (very tight and elastic).

It is still concluded that this problem threatens the fair play concept in basketball; i.e., rim & backboard equipment differences are influencing game outcome and the extent of the problem is increasing.

Mandatory rim testing would solve this problem and insure that all baskets are at the same height and have similar ball-rim rebound to make the game the same everywhere. The technology is there based on solid research done over a fourteen-year period. Equipment adjustments/changes can be made to bring present equipment/systems into compliance.

4. Continue basketball equipment improvement/testing.

STATUS: In 1993-95, the US Military Academy Engineering Departments began a study centered on ball-rim and ball-floor interaction plus the development of an engineering model to evaluate the effect of additions/changes in equipment for basketball.

During 1985-97 experiments were conducted to determine possible elasticity **changes** on breakaway rims that affect rebound and shooting percentages. The variability problems continue to grow. **SEE TAB B.**

In 1997-98, a preliminary pilot study was begun to examine the extent of variability on ball-floor interactions. No significant differences were detected in the pilot study using a variety of floor surfaces. During 1997-1998 rim testing was carried out successfully in the Southeastern Conference, the NCAA I tournament (including the Final Four) and at the NAIA I tourney in Tulsa at the Mabee Center.

In 1998-99 rim testing was required at all sites for the NCAA I and the NAIA tournaments as well as in the Missouri Valley Conference.

In 1999-00 testing experiments were carried out in the Mountain West Conference, the NCAA I Men's tourney sites, and NAIA I, II Men's and Women's tourney sites. **SEE TAB C.**

In 2000-01 & 2001-02 the NCAA I and NAIA tourney sites were also tested.

- B. Compile and maintain a bibliographic reference source of all basketball-printed materials in the United States.

STATUS: Updating was carried out in 1993-94. Revision of the *Basketball Resource Guide (Second Edition)* published by Human Kinetics Publishers, Champaign, Illinois was completed in 1995-96 for publication of the third edition in 1997 (five year publishing intervals). This edition is in computer disc format and is available from Human Kinetics (800-747-4457). It is also on the NABC website.

- C. Communicate basketball rules and equipment information to NABC members.

1. Via the NABC Courtside or NABC website

STATUS: It is recommended that the following schedule be adopted:

- a) Summer
Current year questionnaire results/new rules changes/comments on rules/NABC research grant guidelines.
- b) Fall
Rules changes/points of emphasis/NABC research grant guidelines
- c) Winter
Rules editor comments/grant guidelines
- d) Spring
Last year's questionnaire results/rules issues article
- e) Periodic articles on rules and research

2. Via the NCAA Men's Basketball Rules Committee

STATUS: The NABC Research Committee Chair has attended rules committee meetings as an official representative of the NABC to the rules committee (since 1982). The NABC Board has agreed to carry forward official equipment recommendations for rules changes as approved by the Board. **See TAB D.**

D. Develop and maintain the NABC Research Committee link on the NABC website.

STATUS: The design and implementation of the NABC website will again be continued during the coming year.

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National Association of Basketball Coaches
Research Committee

RESEARCH GRANT REPORT

Spring 2002

A. History

1. Created/authorized in 1983-84 with a maximum of \$1,000 per grant and no more than ten per year.
2. Approved/Completed grants – 28
 - Dan Smith – Imagery Training in Basketball, 1984.
 - Peter Ryan – Prediction of Free Throw Shooting Accuracy in Basketball, 1986.
 - Steve Brennan – NCAA Division I Basketball Officials Survey, 1986.
 - Ralph Schuetzle – The Relationship of Free Throw Shooting to Game Outcome, 1988
 - James Kayajan – NCAA Basketball Rules Changes 1970-1986 and Their Effect on the game, 1988
 - Ken Swalgin – A Computer Assisted Individual Player Evaluation System for NCAA Division I Basketball, 1988
 - Gerald Myers/Bill Kozar – Influence of Selected Basketball Game Situations on Free Throw Shooting (2 parts), 1989
 - Gundar Andreason – A Followup Study on the Effect of the Three Point Field Goal on NCAA Division I College Basketball, 1998.
 - Dennis Phillips – The Evaluation of International Basketball Rules and Their Effect Upon the Game, 1990.
 - Jim Brandenburg/Bob Metchikoff – Perceptions of NCAA Division I Basketball Coaches Regarding the Influence of Selected Player Characteristics and Game Situations on Free Throw Success, 1991.
 - Jeffrey Kohls – The Effects of Flexibility Training on Vertical Leap, 1992.

- Craig Jonas – The Three Point Shot in College Basketball – A Statistical Assessment and Coaching Implications, 1992.
- Bobby Dye/Bill Kozar – The Changes in Free Throw Importance as a Basketball Game Proceeds, 1992.
- Mark Few – The Relationship of Three Point Field Goal Shooting to Game Outcome in Men’s College Basketball, 1992.
- Michael Madagan – Hiring Criteria Used by Division I Head Men’s Basketball Coaches, 1993.
- Mark Hein – Leadership Preferences of Male College Basketball Players, 1993
- Steve Brennan – The Birth and Evaluation of the Zone Defense in the Game of Basketball from 1891-1992, 1993
- Robin Hester – Collective and Self-efficacy and Their Relationship to Team and Individual Performance in Male Intercollegiate Basketball Players, 1994
- Raymond LaBate – A Comparison of the Effects of a Target Rim on the Basketball Shooting Accuracy of Intercollegiate Basketball Teams, 1994.
- Robert Schneider – The Effects of a Target Rim on Male College Basketball Players, 1994.
- Ron Cox – Effects of an Aiming Device on Basketball Shooting Accuracy and Self-Efficacy, 1995.
- David DeFerrari – NCAA III Basketball Player Dropout Reasons, 1995.
- Stan Morrison/Lee Neidleman – Critical Factors in Forecasting Success of College Basketball Teams, 1995.
- Jeff Jonas – Trash Talking Study, 1996.
- Brian Priebe – Turnover Effect on Winning, 1996.
- Sam Dixon – A Study of Academic Learning Time – Physical Education and Opportunity to Respond to Determine Teaching Effectiveness of College Basketball Coaches, 1997.
- Scott Eaton – Computerized Administration Application of NCAA Men’s Basketball Programs, 1999.
- Bob Schneider – The Three Point Shot: Is It Becoming Too Much of the Offense?, 1996 (\$950).
- Mike Blum – Values and Ethics for Basketball, 1998 (\$50).

Will Collenan – Decision Making and Stress of College Basketball Coaches, 1998 (\$1,000).

Bob Baker – The Development of an Instrument to Assess the Phenomenon of “Trash Talking” in Sport, 2000 (\$1,000).

Mike Voigt – Sources of Stress and Coping Strategics of Collegiate Basketball Referees, 2000 (\$955).

Steve Brennan – Coping Methods of Male and Female Division I Basketball Referees under Stressful Game Conditions, 2000 (\$1,000).

3. Approved/Ongoing

Mark Boyea – Basketball Coaching History – Phase I, 1996, (\$1,000).

Bill Kozar/Rod Jensen, et al – The Influence of the Three Point Shot on College Basketball (\$1,000).

Doug Peters – Recruiting Factors in NCAA II Basketball, 1998 (\$1,000).

Brent Williams – An Anaerobic Fatigue Test for College Basketball, 1998 (\$1,000).

Deron Grabel – Leadership Styles of NCAA I Men;s Basketball Coaches, 2000 (\$1,000).

Basketball Equipment Testing

1. Research Rationale
 - The Profession of coaching
 - Solution of Basketball Problems
 - Ethics
 - Duty to serve
 - Character base
2. History
 - 1980 origin-research chairman
 - Criteria
 - Player safety
 - Standardize equipment
 - Equity and fairness of competition
3. Focus
 - Rim/backboard/support system
 - Ball/floor
 - Other – clocks/training aide
4. Results – over 51 specific equipment improvements
 - Most during Steitz era
 - Example breakaway rim/glass backboard/portable support systems
5. Primary Equipment Problem – baskets (ring/rim)
 - Baseline standard (1976) – rigid ring with 18 inches inside diameter, weight of 11 lb. and 40% rebound/elasticity
 - 1977 breakaway ring introduced
 - player safety (protect hands by absorbing impact energy)
 - weight 20-22 lb. (not controlled by rule)
 - increased forces on rims and backboard (added a rules recommendation)
 - increased weight and safety (required safety strap restraint)
 - change of rim to machine with moving parts with wear and tear (not controlled by rule)
 - non-positive or positive lock rules change
 - field adjustable rule requirement
 - rim testing only recommended
6. Breakaway Rim Experimentation (1986-2000)
 - Identify Problem (changes in game)
 - Rebound distance
 - Shooting percentages
 - Development of Testing Device
 - Inadequate manufacturer response
 - NABC sponsored experiments (10 years/\$125,000)

- Valid, reliable testing instrument
 - Determine Reasonable Play Parameter for Rebound/Elasticity
 - High School, college, professional site sampling
 - Comparison with rigid rim
 - Wear and Team Testing
 - Eight years
 - Variability is increasing (use of breakaway rims and lack of regulation)
 - Rims too loose, too tight or too different
 - Differences from court to court and basket to basket
 - Testing and Control
 - 60% of variation in rim
 - Trust but verify by testing
 - Preseason and pretourney
7. 1997-2002 Experimentation
- Regular Season
 - 97-98 Southeastern Conference
 - 98-99 Missouri Valley Conference
 - 99-00 Mountain West Conference
 - Tournament Play
 - 97-02 NCAA I Men's Tourney
 - 97-99 NAIA I Men's Tourney
 - 99-02 NAIA, I, II Men's and Women's Tourney
 - NBA Adoption and Use
 - NCAA range (35% - 50%)
 - NBA range – new rim standard (20% - 30%)
8. 1997-02 Experimental Results
- 97-98 Southeastern Conference – 10 of 12 failures
 - 97-98 Tournament Sites (NCAA I, NAIA I) – 13 of 14 failures
 - 98-99 Missouri Valley Conference – 10 of 10 failures
 - 98-99 Tournament Sites
 - NCAA I Men's Requirement (no verification)
 - NAIA I Men's 1 of 1 failure
 - 99-00 Mountain West Conference – 9 of 10 failures (Rules Committee Chair site passed)
 - 99-02 Tournament Sites – failures at an increasing rate
 - NCAA I Men's Requirement
 - NAIA I, II Men's and Women's – 4 of 4 failure in 99-00
9. Rebound/Elasticity Testing Issues
- Problem/Need
 - Affects the game (rebound distance and shooting percentages)
 - Variability increasing
 - Competitive advantage due to equipment
 - Conflict of Interest

- Royalties and patent (royalties to NABC)
- Development costs (primarily done by grants)
- Manufacturer Involvement
 - Original offer to all
 - Porter and BPI development
 - Available to all manufacturers
 - Porter Athletic Co. commitment long term
- Ethics
 - Equity/fairness (equipment affect on game outcome)
 - Gamesmanship/home court advantage
- Cost (\$1,400 per testing device)
 - Purchase options (one time only)
 - a) Individual school (Men and Women's programs)
 - b) Conference sharing
 - c) Free maintenance and testing check (height, rebound/elasticity, adjustments and wear) – most equipment companies will do this.

10. Millennium Rules Recommendations

- Ball-rim interaction rule change (Rules Supplement, Court and Equipment, #9 Ring Testing)
 - Require rim testing
 - Pre-season and pre-tournament “It is required that all competitive rings be tested prior to each season and prior to post season tournament play for rebound-elasticity to ensure this factor is controlled for equitable competition”
- Basket height rule recommendation
 - Recommended tolerance range for maintenance emphasis
 - Tolerance of 10 ft. \pm 1/8 in.

Note: The NABC Board of Directors passed this rim testing proposal unanimously at the Spring, 2000 Board meeting. Cost should not be an issue – It can be done at no cost or at minimal cost.

Mountain West Leads the Way into New Millennium

By

Jerry Krause NABC Research Committee Chair

The Mountain West Conference, whose Commissioner is Craig Thompson (was Chair of the NCAA I Men's Basketball tournament Committee) and member Air Force Academy, whose coach Reggie Minton is Chair of the NCAA Men's Basketball Rules Committee, cooperated with the NABC to ensure basketball equipment equity in the 21st century.

When the breakaway rim was introduced over twenty years ago, the rim was lauded for reducing the possibility of hand injuries and protecting rims and backboards from breakage. Little was known about the long-term effects of this rule change. Research since then under the auspices of the National Association of Basketball Coaches (NABC) has confirmed that the solution of the rim/glass backboard and hand injury problem inadvertently led to the creation of another problem – rebound variability and the possible play inequities from that situation.

Critical equipment for basketball that affect playing and mechanics of the game are the ball, rim, backboard and the floor. NABC studies have focused on that equipment for over 20 years in order to ensure player safety, equipment equity and quality control. It was found at all levels of basketball that the wear and tear on breakaway rims has produced differences in how the game is played, i.e., variability in ball-rim rebound that affects rebound distance and shooting percentages. That is, newer/tighter rims produce longer rebound and lower shooting percentages than old and worn/looser rims. This problem was compounded by a rules change, which allowed rim adjustability but didn't require testing for maintenance of reasonable rebound standards.

A rim testing solution was developed 16 years ago by the NABC with the longtime support of Porter Athletic Equipment Co. This testing device, called the Faircourt, allow s any school to test the rebound/elasticity of any rim/backboard/support system to ensure compliance with reasonable rebound standards as specified by NCAA rules (a range of 3.5% to 50% – from too hard/tight to too soft/loose or worn).

Using these NCAA standards, experiments have been conducted to determine the extent of the problem. The testing and results:

- Southeastern Conference (97/98) – 10 out of 12 courts failed.
- NAIA I, NCAA I Men's Tournament Sites (97/98) – 13 of 14 courts failed.
- Missouri Valley Conference (98/99) – 10 of 10 courts failed.
- NAIA I, NCAA I Men's Tournament Sites (98/99) – all tested sites failed.

- Mountain West Conference (99/00) – 8 of 8 courts failed.
- NCAA I and NAIA Tournament testing – most sites regularly fail until adjustments are made. In some cases, replacement rims are required.

The Mountain West Conference conducted testing prior to the 99/00 conference season and all game sites were brought into compliance by breakaway rim adjustment (most common), adjustment/maintenance of equipment or rim replacement. Replacement rims were required with rims that were too worn or where breakaway rims were not adjustable as recommended by rule. This is a related problem compounded by NCAA rules that allow adjustability but not required rim testing – some manufacturers are now producing rims with very limited or no rebound adjustments possible.

Conclusion

The solution is clear; breakaway rims introduced over 20 years ago have solved many problems of hand injuries and rim/glass backboard breakage, they have improved the game. However, these same rims have caused rebound/elasticity variability problems. In addition, the problem is increasing; rims have mechanical moving parts that wear out and require testing and adjustability/replacement. The problem occurs in over 90% of courts at the highest level of college basketball, NCAA I. What should we expect at all levels of basketball?

The NBA and International basketball (FIBA) requires rim testing. Isn't it time for college basketball to enter the 21st century in basketball equipment equity and fix this problem? Preseason and pre tournament testing as recently conducted by the Mountain West Conference and the NCAA I; NAIA I Men's tournament committees is a practical solution to standardize the game from gym to gym, from Portland, OR to Portland, ME. Why not make it universal for all basketball?

Would you like to be coach or player in an important game that must shoot and rebound on rims that are too tight, too loose, or too different? What if you had to shoot the "tight" rim in the second half while your opponent was shooting on the "loose" rim! Let's make it a "faircourt" for all participants, and require preseason and pre tournament rim testing at all levels of basketball. It is a realistic, feasible fix to improve this basketball area.

NABC Research Committee Recommendation

by
Jerry Krause, NABC Research Committee Chair

Issue: Rule Changes – relative to equipment

Discussion: In the past, careful attention was given to basketball equipment (ball, floor, rims, backboards, support systems, timing/scoring devices, etc.). The Secretary-Editor and **NABC** Research Committee Chair worked diligently to improve basketball equipment in order to protect the players and the equipment, ensure equity, and provide greater control. The **NABC** and the Research Committee Chair have been closely involved in this process for over 20 years. Experimentation was initiated and conducted to develop specific rule recommendations relative to equipment. With the strong advocacy of Dr. Steitz and myself, over 50 equipment rules changes to improve basketball equipment were made. In fact, almost every equipment rule recommendation made prior to that time was adopted. This equipment area received minimal attention today, even though **NABC** experiments to identify, clarify, and solve equipment problems have been conducted regularly and in much detail.

Recommendation: The equipment area is one basketball rule area that truly fits the NABC slogan “**to be the Guardian of the Game.**” There is no other group or mechanism in basketball that is designed to address this area. The **NCAA** avoids equipment issues like the plague unless there are endorsement dollars involved. The Rules Committee have made few meaningful equipment rule changes in ten years. In my opinion, the **NABC** needs to carry the basketball equipment torch.

These carefully researched recommendations should be brought to the **NCAA** Rules Committee with the full force and support of the **NABC** and its coaches who are on the committee. These are changes based on solid research from the Guardians of the Game. I recommend a review process on the **NABC** Board or **NABC** Rules Recommendation Committee and strong support for adoption. If the **NABC** is to affirm its **guardian role**, then it is time to step forward. Otherwise, just focus on the visible things that everyone focuses upon and drop the appearance of support – it is a waste of time and service to basketball, and the **NABC**.