



SOCIETY OF ACTUARIES

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AN ACTUARIAL GUIDE TO JAI-ALAI

By David M. Lipkin

One of Hartford's more neglected assets is its jai-alai "fronton", or arena. Jai-alai is a fast-paced Basque sport, on which betting is legalized in several states. Its scoring system presents a fascinating actuarial puzzle, in pursuit of which many area students have invested significant time, effort and computer expense.

As in other betting endeavors, the most fruitful choices, assuming that the odds are equal, are the players with greatest skill and motivation. But, unlike most other sports, each player's "post position" has a direct impact on his chances of winning. This article discusses the relative advantages of the various post positions.

Introduction to Jai-Alai

The object of the game is for a team to score seven points, a point being scored by hurling the ball against the front wall with such speed and spin that the opponent cannot return it. To make a legal return, the ball must be caught on either the fly or the first bounce. The ball is thrown and caught with a "cesta", a long, curved wicker basket worn on a player's arm. This allows for sweeping, dramatic catches, and imparts spin to many shots.

An evening's program consists of thirteen separate games, bet upon individually. Each game may last ten to twenty minutes, and there are ten minutes for betting between games. Eight teams compete in each game, although only two are on the court at any one time. Various games during the evening feature teams of one, two or three men.

The betting system of "win, place, show" is identical to that at race tracks. In addition, exotic bets are encouraged, wherein the bettor must select, e.g., the first three teams in a game in order. The state skims 18% from the betting pool, requiring the bettor to overcome this additional assault on his expected values.

How can first, second and third places be determined from an eight-team field, when only two teams are on the court at any one time? The answer lies in the game's round-robin scoring system.

Scoring System

Initially, Teams 1 and 2 play a point against each other. Teams 3 through 8 sit on benches outside the court. Importantly, they sit in post-position order, i.e.,

Team 3 on the "front" end of the bench, followed by Teams 4, 5, 6, 7 and 8.

Let's assume that Team 2 wins the initial point. Three things then occur:

- 1) Team 2 has one point credited to it on the scoreboard, and stays on the court to meet its next opponent.
- 2) Team 3 takes the court against Team 2, as Teams 4 to 8 advance by one position on the bench, and
- 3) Team 1 goes to the end of the bench, and probably will play again later in that same game.

This process continues until Team 8 has played one point, whether it wins or loses.

Now the "first round" has been completed, each team having played at least once. For the remainder of the game, the winner of each point is credited with two points on the scoreboard. (To avoid confusion, we will identify points contested on the court as "plays", and points on the scoreboard as "points". The value of a "play", then, is either one or two "points".)

The rotation continues, and the game ends when one team scores seven or more points; that team is declared the winner, the team with the next highest point total is awarded second place, and the next after that third. Ties for second or third place are settled by play-offs among the tied teams (adding to the complication).

Is It Fair?

This system has two salient features affecting the game's outcome. First, the point value of all plays after the first round is doubled, placing greater emphasis on the game's later plays. Second, when the game ends, some teams may have had two or more chances on the court, but others only one.

Certain elementary observations can be made. First the low-numbered teams enjoy significant advantage over the high-numbered, with respect to both the above features. If, for example, Team 1 loses the first play, it sits next to Team 8, guaranteeing that Team 1 will be the first to participate in the second round, where plays are worth two points each.

If Team 1 wins its first play, it earns a point and the right to try for further points, until it loses. If Team 1 wins the first seven plays, it wins the game, leaving a seven-way tie for second and third places to be resolved.

In contrast, the high-numbered team face seemingly unfair obstacles. Although every team is guaranteed at least one (first round) chance, Team 6, for example, may well not get another chance, the game having already ended before it can return.

Surprisingly, Team 8 is not as seriously disadvantaged as are Teams 5 through 7. If Team 8 wins its first play, it then has an immediate entry into the second round and can win the game by winning its first four consecutive plays. Team 1, on the other hand must win its first seven plays to win the game immediately. In actuarial jargon, Team 8 begins the game with a higher "present value" of its (more valuable) second round points than Team 1, but with a lower present value of its sole first-round point.

Can This Be Quantified?

The game can be simulated fairly easily on a computer. Can a team's chances be analytically determined? I will share my results with you in a later article.

ACTUARIAL SOFTWARE CATALOG

The second edition of this classified list of vendors can now be had for \$3.00 US per copy from Society headquarters. Compiled by our Committee on Computer Science, this is an enlarged sequel to the original which ran to 300 circulation.

THIS MONTH'S QUERY FOR ACTUARIES

For more than a year, Prof. Joseph M. Belth has been offering in *The Insurance Forum* a set of "Benchmarks" aimed at helping policyholders and prospective policyholders measure comparative values in whole life and other policies for making purchase and replacement decisions. These benchmarks are identified as yearly prices per \$1,000 of protection.

Surely some of our readers have undertaken to analyse the effectiveness of these benchmarks for their announced purpose, and would be willing to give others their verdict.

This month's query, then, is: How suitable are the Belth Benchmarks in separating attractively priced cash-value

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Competition Results

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Although most of our readers never tackle either the Actucrosswords or the Actucrostics, many, we know, do get pleasure from them. For example, after last year's announcement that all 100% solvers would be recognized, perfect solutions for the next puzzle came from 19 members who had never submitted solutions previously, and 33 more new solvers were heard from as the year went on. Because of this increased interest, the contest will be continued until further notice on the same 10-issue system, recognizing 100% solvers monthly.

Numerous comments and other displays of puzzle-addiction came in during the year, most of them correctly addressed to Milwaukee. After the C.E. told one of our winners, Noreen Shapiro, that R. Graham Deas (F.F.A., A.S.A., now in England) constructs our Actucrosswords, she wrote, "Mr. Deas is another matter! (We) suspected his fine 'British' hand. I am from England, and cut my crossword teeth on British puzzles. So I have a little insight into his wonderfully fiendish mind!" Another 100% solver, believing in tit-for-tat, identified his solution as "The avid old shoe solved the Actucrossword in just under 24 hours (5, 1, 5)"—see Yearbook, p. A-123.

Your C.E. would welcome comments from solvers of either Actucrosswords or Actucrostics that would make them more fun or of greater interest. Yours for more enjoyment!!

Ed. Note: And thanks to C.G.C., C.E. for his devotion and witty clues. □

MAIL ALERT

During October, or later in remote places, you should have received three issues of the *Record*, viz. 9-1 (Philadelphia, April 1983); 9-2 (Chicago, April); 9-3 (Vancouver, May). If you haven't, notify the Society's office.

Query

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policies from their higher priced competitors?

As is customary, responses will be summarized in a future issue, with recognition of, but not attribution to, individuals. *E.J.M.* □

NEW STUDY NOTES OF GENERAL INTEREST

9LB-414-83	Universal Life: A Product Analysis	\$3.00
9LB-509-83	Individual Life Insurance Cost Comparison and Disclosure Activity, U.S. and Canada	3.00
9LB-619-83	The Underwriter's Approach to Medically Impaired Risks	4.00
9PC-812-83	Human Rights Legislation in Canada	3.00
9PU-813-83	Actuarial Aspects of Sex Discrimination Legislation	3.00
9PC-911-83	Multi-Employer Pension Plans in Canada	3.00
9PC-912-83	The Impact of Inflation on Pension Plan Design	3.00

Orders must be prepaid, in U.S. funds. Send request, with check or money order payable to Society of Actuaries, to the Society at Box 98474, Chicago, IL 60693.

Education and Research

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How to Apply

Information, application forms and requirements may be obtained from C. J. Nesbitt, Research Director, AERF, Dept. of Mathematics, University of Michigan, Ann Arbor, MI 48104.

Awards Committee

The Awards Committee members are:

Arthur W. Anderson, A.S.A., F.C.A., M.A.A.A.
Charles A. Hachemeister, F.C.A.S., M.A.A.A.
James C. Hickman, F.S.A., A.C.A.S.,
M.A.A.A., Ph.D.
Robert V. Hogg, Ph.D., University of Iowa
John A. Mercu, F.S.A., F.C.I.A.

This Committee, coordinated by the Research Director, will evaluate proposals and make recommendations to the AERF Board.

Deadlines

Proposals must be submitted to the AERF Research Director by February 1, 1984. Proposal submission has been designed to be relatively simple. Grants will be awarded by April 1, 1984.

Distribution Rights

Since the competition's goal is to advance actuarial science, the result of each research project should be a manuscript suitable for publication in a scholarly journal. AERF reserves the right to publish the results of any project it has funded; if this right is not exercised, suitable credit should be given AERF at time of publication. □

Actuaries and Wellness

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One indication of this is that at our meetings, the left half of the meeting room reserved for smokers is now largely occupied by non-smokers who can't find a seat on the other side. A note to meeting planners: Isn't it time to reduce the allotment of seats for inveterate smokers to a small (well-ventilated) corner of the meeting room?

Some actuaries are actively promoting wellness in their own professional and personal environment. Not surprisingly, many of these are futurists, for the positive state of wellness is a "preferred future" alternative towards which we should be striving. Inspection of these actuaries reveals that they do not suffer from "furniture disease", e.g. where the chest sinks into the drawers. It has already been clearly demonstrated that actuaries practicing wellness produce more accurate valuations and earnings forecasts, are more skillful in product pricing and design, and are more popular with government examiners, accountants and even agents. Further studies suggest that they tend to be stronger and better looking, have higher morale, superior bowel movements and more antibodies to resist illness, and get better gas mileage.

Dr. Ardell recited a poem in the course of his speech, which reads in part:

"If I had my life to live over, I would relax more,
I wouldn't take so many things so seriously.
I would take more chances, I would climb more mountains and swim more rivers.
Next time, I'd start barefooted earlier in the spring and stay that way later in the fall.
I wouldn't make such good grades unless I enjoyed working for them."

While some of these sentiments may not be valid for actuaries, the general approach is. I challenge our older, wiser and more literate actuaries to develop an actuarially-oriented poem along these lines. Prizes should be awarded for the best submissions.

Ed. Note: If there are prizes, they are likely to be higher in sentimental than in material value. □