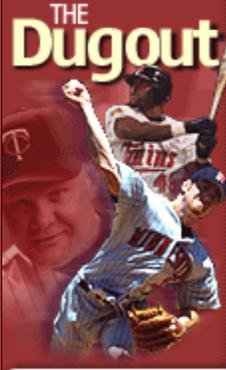


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Taxes?

Did the Dome's air flow turn pop flies into home runs? Retired Metrodome superintendent says he did his best to affect Twins games

Randy Furst, Star Tribune

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Bobby Valentine and his players had begun to suspect that someone was manipulating the ventilation system in the Metrodome in 1987.

The manager of the Texas Rangers wondered whether electric fans blew air toward the outfield in late innings, giving an edge to Twins batters when they were at the plate.

"I became very suspicious, maybe paranoid," Valentine, now a commentator for ESPN, said in a recent interview. "They had such an uncanny way of winning."

So Valentine tried an experiment. Before a game in late September 1987, he hung a strip of white tape from the front of an air intake duct behind home plate to see how it fluttered. A Twins coach ripped it down, he recalled.

He put up another strip of tape between innings. This time, an umpire removed it.

Speculation about favorable air currents in the Metrodome was widespread among opposing teams during those years and became a regular source of media conjecture, deepening the mystique of the Metrodome.

Now, it appears, teams might not have been entirely off base in their apprehensions about the ventilation system.

In a series of interviews, Dick Ericson, former Metrodome superintendent, said that he did, indeed, try to manipulate the trajectory of baseballs by turning on more electric fans behind home plate and



Dick Ericson
Carlos Gonzalez
Star Tribune

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adjusting the air conditioning in late innings of close games.



Air vent in the Metrodome
Carlos Gonzalez
Star Tribune

A current Metrodome employee confirmed in an interview that he saw Ericson manipulate the fans and that Ericson talked about doing it.

Ericson, retired for eight years, told the Star Tribune: "If they [the Twins] were down two runs and you're still hoping for them to have the advantage, you'd want to be blowing all the air out and up as much as you can."

Ericson added, "I don't feel guilty. . . . It's your home-field advantage. Every stadium has got one."

Whether Ericson and his electric fans truly affected the outcome of Twins games is debatable; independent tests conducted this year by a University of Minnesota professor were inconclusive.

But if Ericson is telling the truth, even *trying* to manipulate the balls gives new fuel to an old argument about an even playing field inside the Metrodome.

"This is the first that I have heard of this," Pat Courtney, a spokesman for Major League Baseball, said Wednesday. "In order to comment further, we would have to do our own internal investigation."



Taking a shot at figuring it out.
Kyndell Harkness
Star Tribune



Adjusting the controls
Kyndell Harkness
Star Tribune

Twins and Metrodome officials said they had no knowledge of Ericson or anyone else attempting to manipulate the air currents, and they have doubts it ever happened.

"It's kind of romantic to speculate about it," said Matt Hoy, Twins vice president of operations. "But in a practical sense, I don't know if it holds a lot of water."

Bill Lester, executive director of the Metropolitan Sports Facilities Commission, which operates the Metrodome, said Ericson was "a wonderful employee, a wonderful elderly man," but he called his claim "a bunch of hooley."

No one in Dome management was aware that Ericson could manipulate air currents, Lester said, and he remains "totally skeptical" that Ericson did. The air flow from Dome vents, Dome officials say, is not strong enough to affect how far a ball travels.



Equipment check in the Dome

Kyndell Harkness
Star Tribune

Steve Maki, director of facilities and engineering at the Metrodome, said that while it is possible to turn on mechanical fans in the area between first and third base behind home plate, he has never seen any operator attempt to manipulate the air currents.



Taking the issue in hand

Kyndell Harkness
Star Tribune

He says he has been in and out of the operations center, where the electric-fan controls are situated, a "bazillion times," including during the 1987 and 1991 World Series.

Still, the subject of air conditioning affecting games arose repeatedly in a chapter on the Twins in Bill James' book "Baseball Abstract 1988." He is one of baseball's top statistics analysts and is now an operations consultant with the Boston Red Sox.

From 1983-1987, James observed, the differential between the Twins' winning home record and their abysmal losing road record was the largest in the majors. They were 232-176 at the Metrodome and 152-250 on the road.

The Twins' personnel "is well-suited to this park," James wrote. "Either that, or they really are playing tricks with the air conditioning . . ."

Ericson is not convinced that his manipulation of the fans made any difference. He says the powerful electric fans had to be turned up anyway in the game's final innings to keep the roof inflated as doors were opened and spectators left the stadium.

But he readily admits to increasing the number of fans blowing from behind home plate, between first and third bases, starting in the bottom of the eighth inning if the Twins were behind. That way, the Twins got two at-bats with the extra air currents, while the visiting team got one, he said. And if the game was tied, he might not turn up the air flow until the bottom of the ninth.

Ericson said that manipulating the air flow was his idea and that he was never asked to do it by Twins officials or by the sports commission. Nor did Twins or Dome officials ever ask him whether he manipulated air flow, he said.

Never saw him do it

Leo Pidde, who was hired by Ericson in 1984 and who replaced him when Ericson retired in 1995, said he never saw Ericson try to manipulate the air flow for that purpose and doesn't think it would have made a difference anyway.

But the subject had come up in the past, he said.

"I don't remember if it came directly from Dick," Pidde said. "I never tried to manipulate the fans when I was assigned to duty in the control room. . . . I never saw any of my workers doing it, and I haven't ordered any of my current subordinates to do it. . . ."

"We strive for equal playing conditions for both teams."

In the Metrodome -- the only major league stadium with an inflatable roof -- air pressure to keep the roof inflated is generated from fans that blow air in a special corridor, sealed off to the public, called a "plenum," which encircles the Dome above the second-level concourse. The air then flows over the field from vents above the private suites between the first and second decks.

The operations room, where someone controls the electric fans, is staffed 24 hours a day, in case of changing weather conditions and to prevent a roof collapse.

World Series blowout?

Ericson, who supervised the operations center and field maintenance, said he cranked up the artificial wind power throughout his years at the Dome, including the Twins' two greatest seasons, 1987 and 1991, when they won the World Series.

He said the fans were blowing out when Kirby Puckett knocked his famous 11th-inning home run to win Game 6 of the 1991 Series.

Still, Ericson said he believes that the Twins won their games on their own ability, and he also believes that Puckett hit that home-run ball hard enough to knock it out without an extra push from the ventilation system.

Although Ericson gave his account to the Star Tribune last fall, the newspaper did not report it then because no one who worked at the Dome would verify his comments.

This spring, however, the newspaper received confirmation from Virgil Ophus, who worked under Ericson and is still employed at the Dome.

Ophus recalls being in the operations center and watching Ericson come in and turn on various fans in hopes of affecting the game.

"He'd start the fans and he thought it'd help," Ophus said. "He did it when he felt like doing it."

Ophus said he was in no position to question Ericson, who was his supervisor. And Ophus insisted that he himself had not manipulated the fans to the Twins' advantage when he was at the controls. He also didn't believe that the air flow could alter the ball's trajectory.

"I do agree the wind affects the ball," he said, "but I don't think it matters much."

The Star Tribune attempted to find out.

Dome air-flow test

Last fall, the newspaper asked Ivan Marusic, a professor of fluid dynamics with expertise in aerodynamics at the University of Minnesota, whether he could test the Metrodome's air flows.

The newspaper bought some major league baseballs, and Marusic, overnight, rigged up a catapult to launch the balls into the outfield. He and some students, with permission of Metrodome officials, set up the device near home plate, but the catapult lacked sufficient power and the balls never left the infield.

Marusic remained intrigued with the issues and saw it as a good academic exercise for students in his aerospace engineering program.

During the second semester, which started in January, he offered a special class on the effect of air currents on the trajectory of baseballs inside an indoor stadium.

The students built an air cannon with enough power to launch baseballs into the upper deck. To ensure consistency during the test, the device included an electromagnetic trigger, a gauge to monitor air pressure, and a gauge to measure the velocity of each ball fired into the outfield.

Metrodome officials continued to deny that there had ever been any improprieties in the manipulation of air currents. They said that even if manipulation had been attempted, the air flow was too small, relative to the volume of air in the Metrodome, to affect the flight of the ball. Although they disagreed with the premise, they willingly allowed the tests to proceed.

On a morning in late April, Marusic assembled his class of juniors and seniors on the Metrodome turf and set up the air cannon to the right of home plate. Students were assigned to the operations center to monitor the fan controls being run by the Dome field crew. Marusic periodically asked that operators turn various fans on or off. A student with a walkie-talkie monitored the staffers as they adjusted the fans.

Baseballs vary slightly in size, so each one was measured for weight and diameter, and the exact angle and velocity of each ball fired was recorded

so as to factor in variations. The cannon's power, driven by compressed air, was reduced so that the balls landed in the outfield rather than the stands. The distance each ball traveled was marked by students and measured afterward with a tape measure.

After firing 83 baseballs at a 50-degree angle, Marusic analyzed the results and concluded that the balls went, on average, about 3 1/2 feet farther when the fans behind home plate were blowing.

Marusic also tested the opposite scenario and discovered that balls landed about 3 1/2 feet shorter when the outfield fans were turned on, blowing the air inward, and the home plate fans were turned off.

Sanford Weisberg, director of the Statistical Consulting Service at the University of Minnesota, examined the test results at Marusic's request and concluded that there was a 95 percent confidence that the results were accurate for that one test.

But Weisberg said he could not draw conclusions beyond that. He recommended the test be repeated, saying that because of the variables, the results would likely be different.

Second test: No effect

So in May, with the cooperation of the Dome staff, Marusic ran the test again, this time firing 64 balls at angles of 36, 42 and 50 degrees. The results were markedly different. This time, Weisberg found that the air currents had no impact on the distance the ball traveled.

Weisberg concluded that on the basis of the two tests "it seems unlikely" that manipulating the fans could affect the game.

His only caveat was that air currents "potentially" might have an effect on a baseball's distance, if one could duplicate the conditions in place during the first test.

Marusic counseled caution about concluding whether air blown out of the ducts could affect the ball's trajectory.

"I'm saying it's possible," he said. "I am not saying it's probable."

The class also conducted laboratory tests. Those tests showed that it was theoretically possible for the air flow to make a difference.

From wind-tunnel experiments, they calculated the distance a ball would travel if it were perfectly aligned with the air flow from a single Metrodome duct and if the air were blowing at 19 miles per hour, the typical speed of the air as it emerges from the ducts.

Marusic concluded from those wind-tunnel tests that the ball would go several feet farther as a result of the air flow, and he calculated that the

ball would still be influenced by the air flow when it was 300 feet from the duct.

Two views on test

At the Star Tribune's request, Prof. Marvin Marshak, past chairman of the university's physics department, reviewed Marusic's test results and calculations and Weisberg's comments. Marshak said a person could draw two interpretations from the results. If the two days of tests are aggregated, he said, there is no effect.

"But if you think the two days are different, or possibly different, you would not aggregate the data and see an effect in one day," he said. "In layman's terms, setting this up to do something is tricky, and you could not be sure on any particular day whether you are actually doing something or not.

"I think there is reasonable evidence that on some days there could be an effect."

Marusic said he did not know what other factors existed on the two days of experiments that could explain the different results. But among the factors, he suggested, might be the precise settings of the intake vents and other components of the ventilation system.

Hoy, the Twins vice president, questioned whether the air flow was strong enough to affect the distance a ball flies. Puckett's home run, Hoy noted, cleared the outfield barrier by considerably more than 3 1/2 feet.

"I wonder if someone is trying to get some credit for a tremendous success and moment in our history and our state," he said.

Valentine, the former Rangers manager, said his 1987 suspicions initially came from his players, who told him that in the late innings they often felt a breeze against their faces when they were on the field, as though the air was blowing toward the outfield.

But when they took their turn at the plate, the Rangers felt the breeze against their faces, as though the currents were blowing inward to keep balls from leaving the park.

Valentine also said he noticed some pop flies that he thought should have stayed in play but went out, and other hits that he thought were home runs but stayed in the park.

Ericson said he never manipulated the fans to blow toward home plate when opposing teams were up to bat.

That, he said, would not be fair.

The 10th man

Ericson has a long reputation for doing what he could to help the home team.

When the Twins played at Metropolitan Stadium from 1961-81, Twins owner Calvin Griffith considered Ericson his "10th man." Ericson worked hard to make field conditions favorable to the home team, and disadvantageous for the visitors -- a common practice of major league grounds keepers.

When the Twins played the Los Angeles Dodgers in the 1965 World Series at Met Stadium, Ericson said, he had his crew put sand on the basepaths so that the Dodgers' fastest runner, Maury Wills, would not have good footing.

So it was natural for Ericson to look for an edge when the team moved to the Dome in 1982. During the first season, balls were flying out of the Metrodome for all teams, he recalled. Some speculated it was due to the hot, humid air. The stadium was nicknamed the "Homerdome." Air conditioning was installed the next year, and the number of home runs dropped.

Despite his claim that he manipulated the air currents to help the Twins, Ericson still had his own peculiar rules of fairness.

If the Twins were ahead late in the game, he said, he would keep the air flow "balanced" with air pouring in from all sides of the stadium.

If the game was tied, Ericson might wait until the bottom of the ninth inning, when the Twins were up, to turn up the air flow behind home plate. His justification for manipulating the fans at that moment, he said, was that if a Twin hit a walk-off home run, people would begin pouring out of the stadium, many doors would be thrown open, and he would need more air flowing into the stadium to keep the roof up.

But if the game went into extra innings, Ericson said he wouldn't turn the fans down for the opposing team's at-bat.

"That would be cheating," he said.

Believing that air conditioning reduced home runs, Ericson said he might also turn off the air conditioning in the bottom of the eighth inning.

There was a rationale for that, as well, he said. Baseball fans were leaving the park and the Dome doors were open.

Pidde, who supervises mechanical operations at the Metrodome these days, said it's true that more electric fans are turned on late in the game to maintain air pressure as baseball fans leave the stadium. But he said the air is blown into the stadium from all sides, not just from behind home plate.

Sometimes the air conditioning is turned off late in the game if outside air temperatures drop or if the doors are being opened, Pidde said.

"Leaving it on is pointless."

Bottom of the ninth

So how did the Twins do in late innings? Drawing conclusions based on statistics is difficult, because many variables can affect performance. Some teams have better relief pitchers than others, for instance, and some have better clutch hitters in late innings. Intangibles such as luck and momentum are impossible to measure.

Commission and Twins officials say for the statistics to have meaning it would be necessary to examine how the Twins fared in the eighth and ninth innings during their entire 21 years at the Dome.

While the Star Tribune did not do an exhaustive statistical analysis, it did review box score data from the 1987 season, when the Twins' record was 56-25 at home and 29-52 on the road. Although the Twins had an average eighth inning that year -- hitting seven home runs at the Dome in 81 games, compared with six homers by their opponents -- they were robust in the bottom of the ninth.

The Twins were ahead in 41 of the team's 81 home games, so they faced only 40 bottom-of-the ninth situations. In those 40 games, they hit 12 home runs. This means they hit a home run 30 percent of the time in the last of the ninth -- the best single inning for home runs that the Twins had, home or away, that year.

The Twins' next best inning was the first inning at the Dome, when they hit 20 home runs in 81 innings, which was 25 percent of the time.

In the meantime, Twins opponents hit only seven home runs in the ninth inning of 81 games at the Dome, a home-run average of 11 percent.

Of the 12 home runs the Twins hit in the bottom of the ninth, five were game-ending. They hit one walk-off homer in the 10th. Their opponents had one go-ahead homer in the ninth at the Dome and none in extra innings.

Staff writer Paul McEnroe contributed to this article, and staff librarians Roberta Hovde and Linda Scheimann and news assistant Joel Rippel did research. Randy Furst is at rfurst@startribune.com.



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