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# Carter Racing

by Jack Brittain & Sim Sitkin



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6-001-06

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BJ Carter was not sure. Chris Carter (a sibling and business partner) was on the phone and needed a decision. Should they run in the race or not? It had been a successful season so far, but the Pocono race was important because of the prize money and TV exposure it promised. This first year was hard because the team was trying to make a name for itself. They had run in a lot of small races to get this shot at “the big time”. A successful outing could mean more sponsors, a chance to start making some profit for a change, and the luxury of racing only the major events. But if they suffered another engine failure on national television...

“These engine failures are exasperating,” thought BJ. The team’s car had failed seven times in twenty-four outings this season, with various degrees of damage to the engine and car. No one could figure out why. It took a lot of sponsor money to replace a \$50,000 racing engine, and the wasted entry fees were no small matter either. BJ and Chris had everything they owned riding on Carter Racing. This season had to be a success.

Pat Edwards, the engine mechanic, was guessing the engine problem was related to ambient air temperature. When it was cold, the different expansion rates for the head and block seemed to be damaging the head gasket and causing the engine failures. It was below freezing last night, which meant a cold morning for starting the race.

Robin Burns, the chief mechanic, did not agree with Pat’s “gut feeling”. The data seemed to support Robin’s position (see Exhibit 1) in that the gasket failures had occurred over the entire temperature range. This suggested that temperature was not the issue. Robin had been racing for twenty years and believed that luck

was an important element in success. “In racing, you are pushing the limits of what is known,” Robin argued, “and that means some things are not going to be under control. If you want to win, you have to take risks. Everybody in racing knows it. The drivers have their lives on the line, I have a career that hangs on every race, and you have every dime tied up in the business. That’s the thrill: beating the odds and winning.” Last night over dinner Robin had added to this argument forcefully with *Burns’ First Law of Racing*: “Nobody ever won a race sitting in the pits.”

BJ, Chris and Robin had discussed Carter Racing’s situation the previous evening. This first season was a success from a racing standpoint, with the team’s car finishing “in the money” (one of the top five) in 12 of the 15 races it completed. As a result, the sponsorship offers critical to the team’s business success were starting to come in. A big break had come two weeks ago after the Dunham race, where the team scored its fourth first-place finish. Goodstone Tire had finally decided Carter Racing deserved its sponsorship at Pocono -- worth a much needed \$40,000 -- and was considering a full season contract for next year if the team’s car finished in the top five in this race. The Goodstone sponsorship was two million a year, plus incentives. BJ and Chris had gotten a favorable response from Goodstone’s Racing Program Director last week when they presented their plans for next season, but it was clear that Goodstone’s support depended on the visibility they generated in this race.

“BJ, we only have another hour to decide,” Chris said over the phone. “At the end of the Dunham race, we were \$80,000 in the hole. Since Dunham, we got the \$40,000 from

Goodstone and paid the \$30,000 Pocono entry fee. If we withdraw now, we can get back half the \$30,000 entry. We'll lose Goodstone, they'll want \$25,000 of their money back, and we'll end the season \$80,000 in the hole. If we run and finish in the top five, we have Goodstone in our pocket and can add another car next season. You know as well as I do, though, that if we run and lose another engine, we're back at square one next season. We'll lose the tire sponsorship, and a blown engine is going to lose us the new \$800,000 oil contract. No oil company wants a national TV audience to see a smoker being dragged off the track with their name plastered all over it. We can't live without the oil

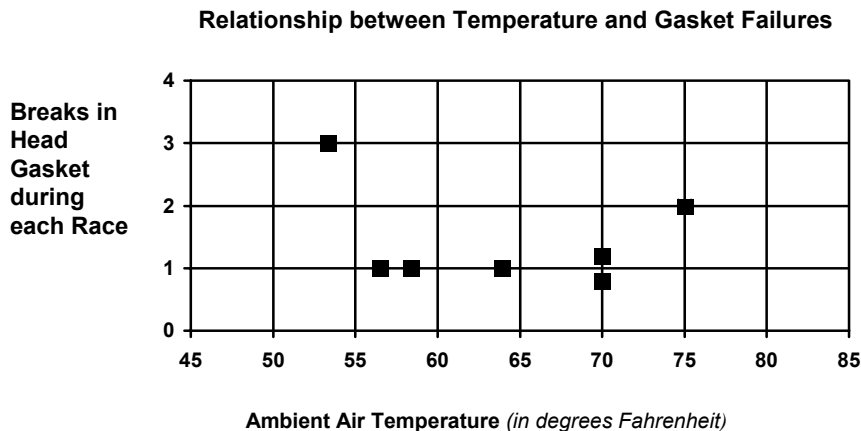
sponsorship. Think about it -- call Pat and Robin if you want -- but I need a decision in an hour."

BJ hung up the phone and looked out the window at the crisp, fall sky. The cars were already on the grid, spectators admiring the gaudy paint, excitement mounting in anticipation of the start. This was what made racing at this level special, the cars on display with crowds mingling around and waiting for the engines to roar to life. In an hour, the spectators would retreat to the stands and the cars would circle the track in anticipation of the start. The temperature sign across the street flashed "**40 DEGREES 8:23 A.M.**"

### Exhibit 1: Note from Robin Burns

BJ,

I got the data on the gasket failure problem from Pat. We've run 24 races this season, with temperatures at race time ranging from 53 to 82 degrees. Pat had a good idea in suggesting we look into this, but as you can see, this is not our problem. I tested the data for a correlation between temperature and gasket failures, and found no relationship.



In comparison with some of the other teams, we have done extremely well this season. We've finished 62.5% of the races, and when we finished, we were in the top five 80% of the time. Our rate of blown engines is 29%, but we are running fast, so we have to expect some difficulties. I'm not happy with the engine problems, but I will take the four first-place finishes and 50% rate of finishing "in the money" over seven engines any day. If we continue to run like this, we will have our pick of sponsors.

Robin

# Carter Racing - B



6-003-06

“Get Pat Edwards for me.” BJ was calling to get the engine mechanic's opinion on whether they should run today. The data Robin put together indicated temperature was not the problem, but BJ wanted to get Pat's direct assessment.

Pat Edwards was a classic “gas station mechanic,” with fingernails permanently blackened by grease and coveralls never clean for more than two minutes on Saturday mornings. Although lacking the sophisticated engineering training that was getting more common in racing, Pat had been knocking around the professional circuit for ten years after dropping out of school at sixteen to follow drag racing – and, without question, knew racing engines as well as anyone in the business.

BJ was calling Pat for more information and, while waiting, thought about their discussion about the gasket problem two days ago. “The way I see it, the turbo-pressure during warm-up, in conjunction with the different expansion rates for the head and block, is doing a number on us,” was about the extent of the analysis. This was Pat's personal opinion about the cause of the problem, and was not represented as anything else.

It was the same story BJ had heard twenty times, but it just did not match Robin's data. “Pat, we've chewed this over before. How do you know this is the problem? When we ran at Riverside the temperature was 75 degrees and we still lost the gasket and engine.”

“I'm not sure what happened at Riverside,” Pat replied. “I'm not sure that temperature is the problem, but it's the only thing I can figure that would lead to the stresses we are seeing. It's definitely the gaskets that are blowing out and causing the engine to go. All of the engines

have failed in different ways, and all the failures were due to loss of cooling or lubrication caused by a gasket failure.”

Part of Carter Racing's success was due to a unique turbo-charging system that Robin and BJ had developed. They had come up with a new head design that allowed them to get more turbo pressure to the engine while maintaining fuel consumption at a fairly constant level. By casting the head and turbo bodies in a high-strength aircraft alloy, they had also saved almost fifty pounds of weight. The alloy they were using was not as temperature sensitive as the material in the engine block, but the head gasket should have been able to handle the different expansion rates.

BJ could hear the sounds of race day in the background as Pat approached the phone. “Hello BJ.” Pat was obviously excited: “The Goodstone coveralls just got here. We are talking some fine threads, and no sew-on patches from these folks. The logo on the back and our names are stitched right into the material. I guess this means we get to keep 'em. Course, I got some grease on mine already, so they probably won't want 'em back anyway.”

“I'm glad you like them,” BJ said. “Look, I need to get some information from you. What are we doing about the gasket failure business?”

“The car is set to go. We have been using a different seating procedure since Slippery Rock and had no problems for two races. Robin says the Goodstone deal is set as long as we finish in the money today. Everyone in the shop wants this bad. Goodstone is a class act; they can make us the number one team on the circuit if we do well.”

# Carter Racing - C



6-004-06

BJ called Robin. With only ten minutes left to decide, there was one last thing BJ wanted to know. “Give me the temperatures at starting time for the races where we did not have any gasket problems.”

“What do you need them for?”

“Just curiosity. Do you have them?”

“Hold on.” Robin was organized, which counted for a lot at a time like this. “Okay, here

we are. I am going to give you the number of races at each temperature. Let's see, one race at 66 degrees; three races at 67; one each at 68 and 69 degrees; two at 70; one each at 72 and 75; two at 76; one each at 79, 80 and 82. That 82 was Tampa. What a scorcher that day turned out to be. And I don't have the last two races on my list. They were 78 and 73 degrees at race time.”

BJ plotted the points as Robin read them off (see below). It was time to call Chris.

**Exhibit C1: BJ's Plot of Ambient Air Temperature for Races**

