

# Using SPC to Cure Sales Heartburn!

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*Since sales and marketing are responsible for the “other half” of business success, understanding how to apply SPC to sales data has powerful implications.*

Have you ever suffered from heartburn—chronic business heartburn? Tom Eriksen did. His sales staff were all frowning, and the weekly happy hour was well-attended, but the participants weren't happy at all! The sales of Eriksen and Sons (fictitious names have been used), a private wholesale/distribution firm, were down—way down. The firm does no manufacturing. Instead, like other firms in the multi-billion dollar wholesale/distribution industry, its job is to sell products produced by others.

Tom Eriksen, the company's president, was going through a trying time. After years of growing and even banner sales, his business seemed to be slumping during a time in which the overall industry segment was growing. The president tried many of the usual techniques for kick-starting his sales team. He changed the commission plan, gave inspirational presentations, pointed out the dangers of the perilous road they were headed down, and so on. His people got the point—they felt under serious pressure.

Unfortunately, Tom believed that his emergency measures weren't working. But he had recently been exposed to the perspective that sales can be viewed as the output of a process (Selden, 1997). This approach holds that sales can be improved by applying the same principles that have revolutionized the manufactured products sold by Eriksen. A leader in many ways, Tom was willing to learn more about this approach.

Tom arranged a series of workshops to teach his top managers and sales people the principles of SPC and Continual Improvement, and then worked with them as a team. To make sure the training was practical, I collected the firm's annual sales records since 1974 (Table 1) and analyzed them using the process behavior chart shown in Figure 1.

Table 1: Annual Revenues for Eriksen and Sons (\$ thousands)

Year	Revenue	Year	Revenue	Year	Revenue	Year	Revenue
1974	8,043	1980	22,454	1986	38,804	1992	43,700
1975	12,082	1981	26,332	1987	27,410	1993	34,109
1976	6,730	1982	13,403	1988	28,224	1994	68,270
1977	6,411	1983	10,613	1989	36,707	1995	112,460
1978	15,960	1984	24,955	1990	43,885	1996	76,573
1979	22,025	1985	22,138	1991	35,151	1997	89,769

Scanning the numbers, the reason for Tom's recent concern stood out like a sore thumb. The company's revenues jumped above \$100 million in 1995. Then the bottom seemed to fall out. Sales plummeted by almost \$40 million dollars the next year! The numbers apparently tell a horrifying story that would trouble any businessperson.

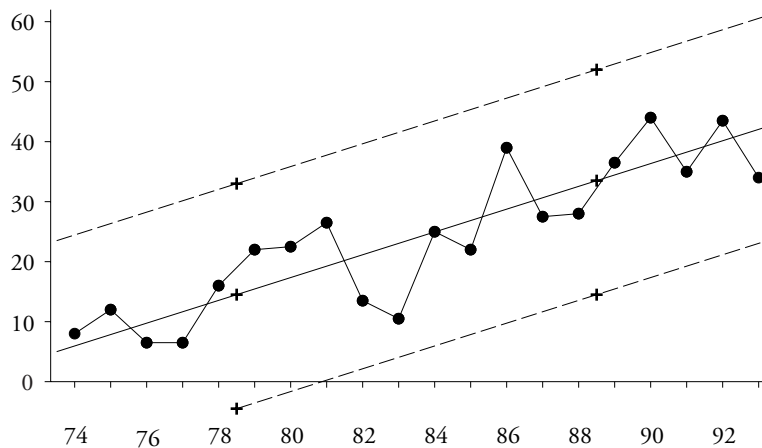


Figure 1: Eriksen & Sons Revenue 1974 -1993 (\$millions)

Quality practitioners know that data in tables often obscure more than they reveal. Since the dollar value of sales income rises (due to inflation) even when a sales process is stable, a trend control chart was chosen to more systematically remove the noise of normal process variation from the data. Such charts use a trend line to represent central tendency over time (McNeese & Klein, 1991; Wheeler & Poling, 1998). The upper and lower control limits were placed accordingly. Rules for interpreting the data do not change.

My original analysis used a computer to calculate lines of regression. But the Wheeler method is less technology-dependent, requiring only graph paper and pencil. Thus it is used here for purposes of illustration. No tedious slope, intercept, or squared deviation calculations are involved. This method resulted in the same interpretations as the one I originally used.

The "how-tos" are simple. Averages were calculated for the first ten, then last ten years respectively (indicated by the plus marks in Figure 1 at \$14,405 and \$33,508). The average moving range was calculated in the usual way, using the 19 moving ranges contained in the 20 data points to arrive at  $mR\text{-bar} = \$7,048$ . The average moving range was then multiplied by the familiar  $E_2$  constant 2.66 to arrive at \$18,748, which was added and subtracted from each of the "half averages." Lines drawn through these additional plus marks indicate upper and lower natural process limits for the entire trend.

The analysis shows that Eriksen's sales process was predictably growing through 1993. Some years were higher or lower, but the Individual Chart shown in Figure 1 indicates routine variation about the trend line. Figure 2 adds years 1994-1997 to the plot. Instead of being abysmal, sales were unusually positive. Recent performance had not dropped into unusually negative territory at all. The company's case of collective heartburn came from swallowing a false perception.

Back in the workshop, we reviewed and interpreted the charts. In particular, we explored possible special causes for the unusual sales increase. The group concluded that the overall jump came as unexpected manna from heaven. One of the manufacturers Eriksen represented credited them with an unusually large set of orders from a single customer that just happened to be in

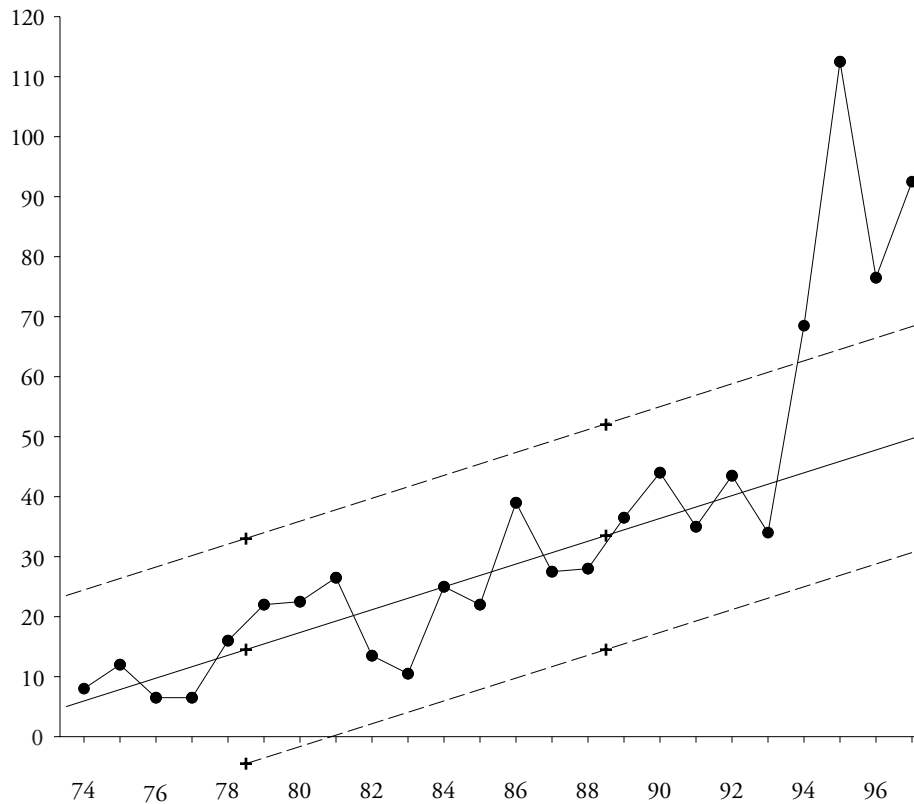


Figure 2: Eriksen & Sons Revenue 1974 -1997 (\$millions)

Eriksen's territory. Eriksen had merely been there to receive the order.

Whether Eriksen applies the principles of process improvement to sustain this higher level of sales will be revealed in the fullness of time. As Dr. Wheeler (1993) says, "Those who do not use control charts have no advantage over those who can't." Meanwhile, it is not too early to draw a few important conclusions.

First, if management is willing to use facts to guide its actions, information needed to take a great first step is readily available in the form of existing accounting and sales management data. The argument that it is too costly or cumbersome to collect and analyze the sales process is a weak excuse for failing to use the techniques shown here.

Second, this case contradicts a commonly held belief that the sales process is too unpredictable to study systematically. Such statements are not just wrong—they cut off inquiry. Clearly, the underlying nature of sales is not always and necessarily chaotic, that is, out of control from a statistical point of view. Eriksen operated a sales process whose output met the classic definition of being in a state of statistical process control for a period of 20 years!

Finally, using process behavior charts to plot business data such as annual sales has powerful practical implications. From the point of view of emotional well being, the chart revealed that

Eriksen's high anxiety was *much ado about nothing*. The charts also provided an objective reason to seriously study the special causes present after 1993. If management can find a *positive* special cause and systematically replicate it (perhaps an "emergency" measure *is* working), they may maintain or accelerate Eriksen's growth. Of course, the converse is also true. Though not Eriksen's problem at this time, pinpointing special causes for undesirable results is a matter of business survival. In any of these scenarios, profit and loss—and jobs—hang in the balance.

By whatever name it's called, SPC is a tool whose time has come for improving the sales process. It can help us fulfill the dream of being able to convert bits of often misleading data into focused, actionable insight.

W. Edwards Deming is reputed to have said that the use of process behavior charts should start with management, not on the shop floor. In the case of sales process improvement, management's first step may be easier than we think. In taking those steps, we may not save the world immediately, but we sure can cure a nasty case of heartburn!

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