Eastman Chemical's Success Story

by Gary Hallen and Robert J. Latino

By the river: *Eastman Chemical's sprawling facilities along the Holston River in Kingsport, TN.*

During 1997, senior management at Eastman Chemical Co. realized the level of customer complaints had not shown significant reduction during the previous few years.

This was troubling, particularly given the company's strong history of continually improving performance in its processes. Furthermore, one of the key objectives of Eastman's customer complaint handling process was to investigate and identify the cause of complaints. Evidently the complaint investigations were not as effective as expected.

This was disturbing. The cost of customer complaints can be significant and manifests itself in:

- Lost business when customers switch to other suppliers.
- Costs associated with investigating and responding to complaints. Eastman has saved about $2 million from reducing its complaint handling costs and cutting expenses associated with problems such as waste and rework caused by off quality product or incorrect paperwork.
- Claims paid and credits given to compensate customers for added costs caused by Eastman's off quality product or paperwork.

A team was appointed to study the complaint investigations occurring at Eastman, which is headquartered in Kingsport, TN. The team discovered most complaint investigations were not getting to the root (organizational) causes. Rather, most had stopped after learning who caused the problem. Consequently, the corrective action plans typically were written along the lines of, "We'll pay more attention in the future, we'll be more careful, and we'll try harder."

Customer complaint advocates and complaint investigators at company sites worldwide recognized they clearly needed appropriate methodology to more thoroughly identify the root causes of complaints. Only

In 50 Words Or Less

- **Customer complaint investigations weren't getting to root causes.**
- **Logic trees proved more effective than fault trees in determining what actually went wrong.**
- **After root cause analysis, complaint numbers dropped by half.**
- **That and indirect benefits led to bottom-line results.**

Teamwork: *An Eastman team in a classroom setting.*

then could appropriate actions be taken to eliminate the causes of recurring problems.

First Steps

Eastman turned to the Reliability Center Inc., Hopewell, VA, to help develop a root causes analysis (RCA) training course for its employees worldwide.

One of this article's authors, Gary Hallen, was Eastman's customer complaint manager at the time. He received the train-the-trainer instruction in Hopewell in February 1998. During the remainder of 1998, he trained more than 300 people collectively representing every Eastman site worldwide.

Additionally, complaint reduction through defect prevention was made a corporate initiative involving considerable management support throughout the entire organization. This support, of course, provided needed focus to the effort.

Extensive measurement was the basis of this corporate initiative and allowed progress to be studied in terms of the number of complaints per million shipments (parts per million shipments or ppm). Each plant site adopted this measurement.

The established goal was to achieve half the level of 1997 complaints through defect prevention over a three-year timeframe. There was a lot of monitoring, and positive reinforcement was provided where appropriate.

Training covered three key concepts associated with RCA methodology:[1]

1. RCA uses a structured logic tree process to identify and verify hypotheses with data and uses a diagram approach as much as possible. A logic tree is the graphical expression of cause and effect relationships that lead to an undesirable outcome. Unlike a fault tree, which is traditionally used for mapping out what *could* go wrong, a logic tree helps determine what *did* go wrong. Patience and discipline are stressed. (See "Logic Tree Basics.")
2. It goes beyond the human cause and identifies the process, system, latent or organizational causes. Only by eliminating these root causes can the probability of recurrence be significantly reduced or eliminated.

Logic Tree Basics

Logic tree development starts with the known facts about the event (top block) and then works back to identify the cause and effect relationships that lead to the occurrence.

Each level, top to bottom, in a logic tree depicts a cause and effect relationship by asking, "how can?" The Baytank events described later in this article utilized the experience of Baytank team members trained in root cause analysis to provide the expertise to answer the questions (form hypotheses).

Once the hypotheses are developed, each must be supported by hard data, not hearsay. Using this approach, you drill down each leg until you find errors in decision making that are based on flawed organizational systems or latent roots.

3. It doesn't stop at the first root cause found, but keeps digging deeper to identify and eliminate the multiple causes. Problems are typically the result of multiple causes, rather than a single one.

This training typically took about four hours and was followed by coaching and reinforcement to help institutionalize the learning and application of the RCA concepts.

Logic trees for recurring, significant problems at Eastman were then developed. These applications began in 1998 with complaint investigations, but they rapidly spread to numerous areas such as safety, health, environment, equipment reliability, organizational effectiveness and paperwork errors.

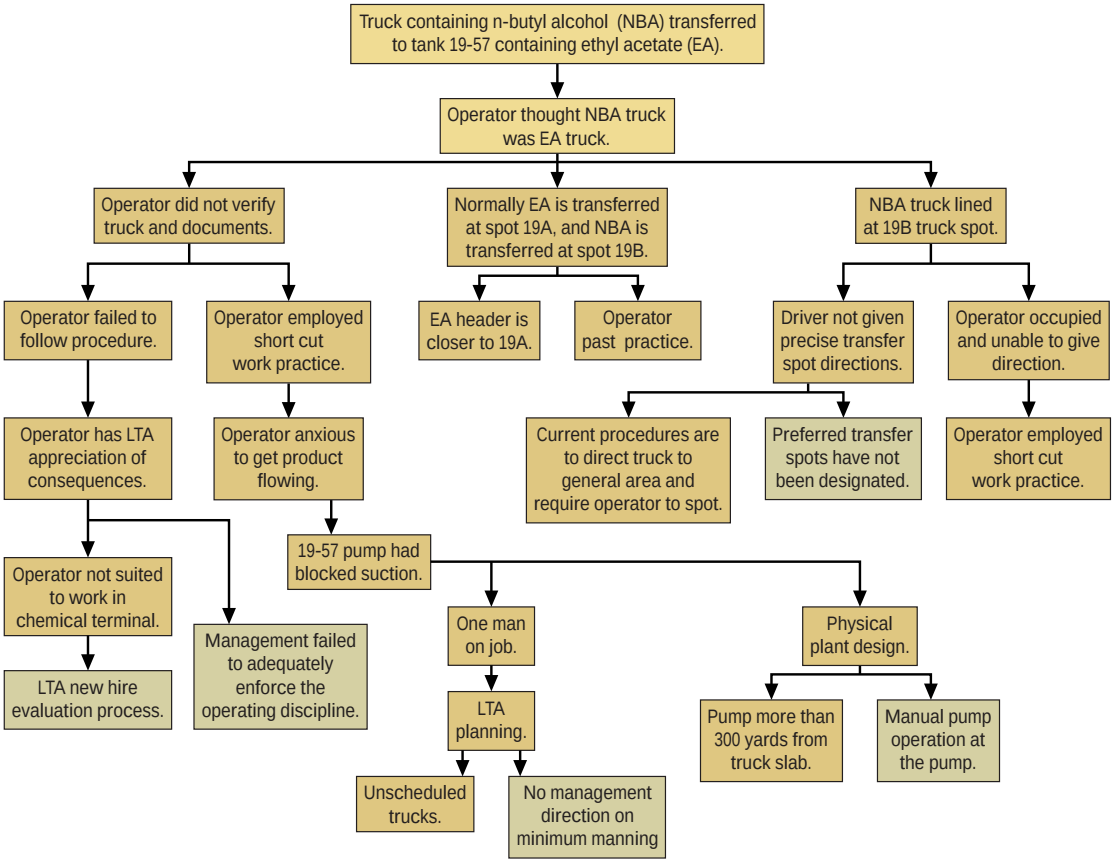
Two Cases

Two examples show how Eastman effectively used RCA to identify root causes and applied that information to greatly improve performance.

During 1998, Eastman's specialty plastics facility experienced nine customer complaints about small black particles in an Eastman material. The product, used in consumer product applications including radios, telephones, toothbrushes and toys, was sold in the form of small plastic pellets.

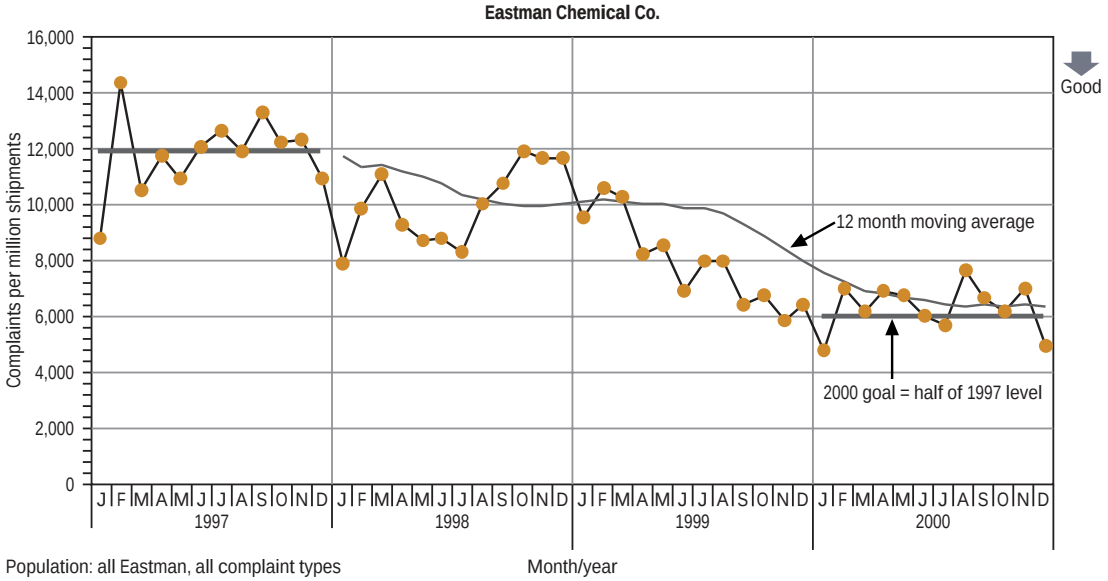
An advocate assigned a team, which did a thorough RCA and identified multiple causes. Actions implemented to correct the situation included process changes and the installation of improved filtration. During the next two to three years, no additional

FIGURE 1 **Baytank Logic Tree Analysis**



LTA = less than acceptable.
Operator = Baytank employee who coordinates the connection and transfer of the chemical from the truck to the storage tank.
Driver = driver of the truck.

FIGURE 2 **Reduction of Worldwide Customer Complaints**



complaints were received for this same problem.

Another customer complaint involved tank truck shipment of n-butyl alcohol to an Eastman customer by an Eastman supplier. The delivery agent, Baytank Inc. of Houston, had transferred the chemical into the wrong tank, one for ethyl acetate.

Baytank took this complaint very seriously and wanted to prevent recurrence. So Baytank personnel, including key management, created a logic tree that initially determined a human cause—an operator who failed to follow procedure.

Reinforced by recently completed RCA training provided by Eastman, Baytank realized it needed to dig deeper to discover the organizational root causes.

Baytank staff did logic tree analysis (see Figure 1) and kept developing hypotheses until the real organizational root causes were discovered:

- A less than acceptable process for evaluating new hires.
- Management's failure to adequately enforce the operating discipline.

Three additional root causes led to other areas that needed attention, and subsequent corrective actions were taken.

Baytank's analysis looked beyond one instance of a procedure's not being followed (what went wrong) and appropriately focused on why it happened.

Bottom-Line Results

Complaint progress at Eastman was, and still is, tracked monthly by measuring the number of complaints per million (ppm) shipments. Figure 2 shows how successful the effective use of RCA has been in reducing the organization's number of worldwide complaints.

By 2000, Eastman had nearly halved the level of customer complaints that had occurred in 1997, when the corporate complaint reduction initiative started. Benefits include improved customer satisfaction, increased sales, reduced waste and lower costs.

In other words, several million dollars in savings have been realized. While the significant reductions in the number of customer complaints and bottom-line benefits were accomplishments in themselves, other invaluable, indirect pluses occurred when the RCA training and processes spread to other functions.

Finally, the value of Eastman Chemical's enhanced reputation has been priceless. Eastman's customers have appreciated being part of the RCA process. They witnessed a disciplined, unbiased approach based on facts, not assumptions.

Because Eastman and its suppliers worked together, there is supplier buy-in, and Eastman's business relationships with its suppliers grew stronger. There is also internal buy-in, which has led to enhanced internal relations, particularly between

the manufacturing and maintenance functions.

In the past, Eastman's goal in dealing with customer complaints was to process the complaint as quickly as possible while providing a satisfactory resolution for the customer. But this did not necessarily reduce the frequency of complaints.

Recurrence of similar complaints can be eliminated only when you uncover the organizational root causes. Once Eastman realized this and took appropriate measures, the company made dramatic improvements in the quality of its products, and these quality efforts helped improve Eastman's profit picture dramatically.

REFERENCE

1. Robert J. Latino and Kenneth C. Latino, *Root Cause Analysis: Improving Performance for Bottom-Line Results*, second edition, CRC Press, 2002.

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