Mountain Plains Journal of Business and Technology

Volume 21
Issue 1 *Highlighting Leadership*

Article 8

Date Published: June 2020

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Cover Page Footnote

This case is developed solely as a basis for class discussions. Names and some data have been modified or disguised to protect the privacy of the protagonists. The case is not intended to serve as endorsements or illustrations of effective or ineffective management.

LEADERSHIP AFTER A TORNADO STRIKE: SUPPLY CHAIN MANAGEMENT TRIAGE

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ABSTRACT

An F2 tornado had tracked less than 100 feet from the Caldwin manufacturing plant, the largest producer of an essential engine value train component in the United States. Bob, Materials Manager at the plant and a member of the senior management team, was at home when the evening storm hit. Bob immediately headed to the plant when he received word of the emergency situation. On his way to the factory a rush of questions nearly overwhelmed him. How bad was the situation? How prepared was his team of employees to handle the situation? What should customers and suppliers be told about the situation? How could Bob best provide the leadership needed in this situation?

Keywords: supply chain management, logistics, disaster recovery, emergency response, risk assessment, leadership

INTRODUCTION[2]

As he cautiously drove to the Caldwin plant, Bob swerved his pickup to avoid downed trees and other wreckage on the streets. He dreaded what he might discover upon his arrival. Just minutes earlier, a series of tornadoes had swept through the area and demolished hundreds of trees and buildings, tossed empty grain bins as if they were toys, and knocked down power lines throughout the region. The tornado that hit the plant facility was rated a high-end EF-2, with winds estimated at up to 135 miles per hour. Bob had been home when the storm hit and was relieved to learn that all employees at the plant had been safely evacuated before the worst of the tornadoes reached the plant. However, Bob grew increasingly worried as he drove by the fairgrounds that had been reduced to rubble, and saw that the airplanes and hanger at the regional airport, which was less than a mile from the Caldwin plant, were demolished. At that point, the road became impassable and Bob parked his pickup and walked the remaining distance to the plant. This was not Bob's first experience with natural disasters, but when he saw the power lines draped over Caldwin's perimeter chain-link security fence, and the gaping holes left where loading dock doors had been sucked out by the winds, he knew this was the most complicated leadership challenge he had ever faced.

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[2] This case is developed solely as a basis for class discussions. Names and some data have been modified or disguised to protect the privacy of the protagonists. The case is not intended to serve as endorsements or illustrations of effective or ineffective management.
[3] Submitted: 26 Feb 2020; Revised: 19 May 2020; Accepted: 21 May 2020

Bob's mind raced as he considered what actions needed to be taken. As Materials Manager for Caldwin, Bob was on the plant's senior management team and a member of the plant's Emergency Response Team (EMT). The EMT's role was to provide leadership during times of plant emergency. This was definitely an emergency. Bob was responsible for leading the efforts of his team as they carried out their duties associated with shipping, receiving, purchasing, production scheduling, inventory management, off-site warehouse storage, and the plant's maintenance, repair, and operations (MRO) stockroom. Bob and his team of 24 employees had the immediate responsibility of figuring out answers to a myriad of questions, such as:

- How quickly and effectively could power be restored to the plant?
- When and how could plant operations get back online?
- How could the plant place orders and receive needed raw materials and MRO supplies?
- How could the plant ship finished products to their customers?
- How and what should customers and suppliers be told about the situation?

Bob also knew that his team would be looking to him to provide direction and a sense of order amidst the chaos.

CALDWIN: BEFORE THE TORNADO

When the tornado hit, Caldwin was the largest manufacturer of an essential engine value train component (referred hereafter as "component") in the United States. These components were used in the automotive, trucking, and agriculture industries.

The Caldwin plant operated 24 hours a day, six days per week, and produced over 60 unique component designs during the course of a month. The plant had four component production lines, and each line produced an average of 45,000 components per eight-hour shift unless there was a product changeover. A changeover (changing from the current component design being made to a different component design) typically took two to four hours from the time it began until the new component design came off the production line and was ready to be packaged for shipment. The Caldwin plant typically had five to seven days of finished goods inventory on hand (in total inventory dollars), but that did not mean there were five to seven days of inventory available to ship for each of the 60 different types of components produced. Each unique component produced was typically scheduled to be made every two weeks, with a typical manufacturing production run size between 100,000 to 300,000 components.

Seven truckloads of steel bars were delivered to the plant every day, Monday through Friday. Steel deliveries were not made on weekends unless some type of supply emergency existed. The steel receiving area at the plant used an electric overhead crane to unload the flatbed trucks used to deliver the bundles of bar-steel to the plant. Arriving trucks drove through a 24-foot overhead door into the receiving area. Each steel truck carried approximately 44,000 pounds of steel bars, packaged in bundles, with each bundle weighing nearly 1,500 pounds.

Each day fifteen to eighteen truckloads of components were shipped from the Caldwin plant to their original equipment manufacturer (OEM) customers across the United States and around the world. Each truck was loaded with twenty-four to thirty pallets of components, depending on

the pallet size required by the customer. Each shipment required the printing of all necessary paperwork, such as the bill of lading (BOL) and packing slip before the shipment could be loaded on a truck for shipment. An advanced shipping notice (ASN) had to be transmitted to the customer as the truck left the dock.

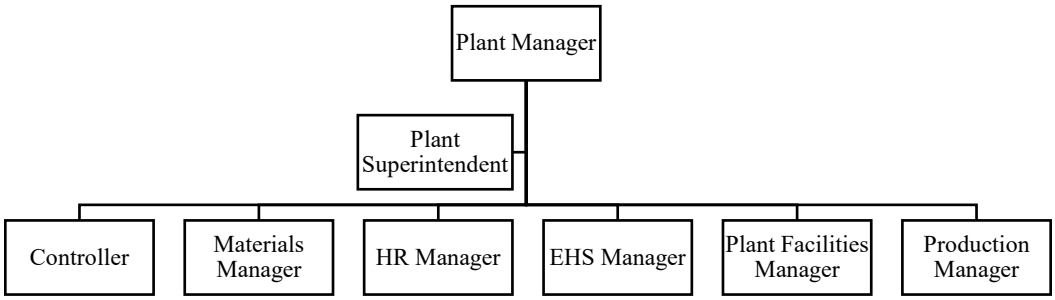
There were three primary customers for Caldwin components. Customers' plant locations that used Caldwin components are as follows:

- TCB Corporation (three locations: Mobile, AL; Austin, TX; Portland, OR)
- AML Inc. (four locations: Brookings, SD; Grand Rapids, MI; Columbus, OH; Ashville, NC)
- MLW Company (three locations: Cheyenne, WY; Boise, ID; Fargo, ND)

Nearly 100% of all components used in TCB's operations came from Caldwin; AML relied on Caldwin for about 65% of all their components; and MLW purchased approximately 30% of their components from Caldwin. Each of these primary customers had agreements with Caldwin that included a penalty clause associated with any late product shipment that resulted in an assembly plant shutdown. The penalty would be payable by Caldwin and averaged $75,000 per hour for each hour that a component assembly line at TCB, AML, or MLW was shut down due to Caldwin's failure to ship product on time.

As one of the largest employers in the region, the Caldwin plant at Plainville had 900 full-time employees who earned an average hourly wage rate of twenty dollars per hour plus generous benefits. The plant's seven senior managers (of which Bob was one) reported directly to the plant manager (See Figure 1). The Caldwin's plant's Emergency Management Team (EMT) consisted of the plant manager and the plant manager's seven direct reports.

Figure 1. Caldwin Plant Senior Management Team Organizational Chart



The Caldwin plant was located on the outskirts of Plainville, a Midwestern town with a population of approximately 40,000 people located near a heavily traveled interstate highway. As shown in Exhibit A, the facility included the primary manufacturing building, along with receiving and shipping docks and an employee parking lot surrounded by a security fence. Access to the plant was provided by four gates via Industrial Avenue on the west side of the plant. A single gate on the south side of the Caldwin property provided access to a busy, four-lane public highway. This south gate was usually closed, but it could be used in the event of an emergency. An electric motor opened the south gate, but the gate could also be manually opened. Once through the south

gate, a car could turn onto a one-lane service road that led to the main parking lot on the west side of the property, but anything larger than a pickup truck was unable to make the tight turn needed to access the shipping and receiving dock areas.

The shipping area of the plant had two electric overhead doors. The 24-foot overhead door faced the south, and when opened, allowed a truck to back up to the plant's single truck loading dock located inside the building. The second overhead door faced the west; it was eight feet high and was typically used only by forktrucks to go outside and retrieve wooden pallets as needed from the pallet storage area. The MRO receiving dock area was separate from the shipping dock area. The MRO receiving dock also had a 24-foot electric overhead door that when opened, allowed a truck to back into the receiving dock located inside the building. Forktrucks used in the shipping and MRO receiving areas had lights on the "fork side" of the forktruck that allowed the driver to see what they were doing when loading or unloading pallets inside a truck.

A small emergency generator for the Caldwin plant provided power to items connected to the emergency power circuit, such as emergency lighting that enabled employees to safely exit the manufacturing area, and it powered the mainframe computer located in the accounting office. The overhead doors in the shipping and receiving areas were not connected to the plant's emergency power circuit, nor were the shipping and receiving areas lighting systems that were needed to safely carry out shipping or receiving activities.

Caldwin rented 50,000 square feet of public warehouse space from GEB. The GEB warehouse was located about a quarter mile west of the Caldwin manufacturing plant (See Appendix A), and the rented storage area (which was on the northwest side of the GEB building) included the use of two loading docks and one entry area with a garage door opening sufficient in size for use of a forktruck. One Caldwin employee (a member of the Materials Department team) worked in GEB warehouse. This employee had an office located at the warehouse equipped with a telephone, computer connected to the Caldwin plant's computer system, and a printer. On the east side of the GEB warehouse building was a large (approximately 14.5 acre) graveled public access parking lot, owned by GEB. The parking lot was seldom used and could be accessed from the highway via a one-lane service road. There was also a fifth wheel flatbed trailer (owned by Caldwin) capable of hauling three pallets of components that was always parked in the evening at the GEB parking lot.

THE AFTERMATH OF THE TORNADO

Once Bob finally reached the Caldwin plant, he took stock of the damage. High voltage electrical power lines were knocked down, leaving the plant without power. In addition, the power lines were draped over the plant's chain-link security fence, as well as the four entrance gates that provided access to the three separate receiving and loading areas located on the west, north, and east sides of the plant. In fact, all power poles along Industrial Avenue had been snapped, causing all four gates to the plant's employee parking lot and truck loading docks coming off Industrial Avenue to be blocked. Until the power poles and power lines were safely removed by the power company, it was evident that no vehicles could travel through the west gates to enter or exit the plant.

Due to the downed power lines, there was no power at the Caldwin plant. Ordinarily, the Caldwin plant had a peak electricity demand of eighteen megawatts (MW) and a monthly electricity consumption load of approximately 8.2 million kilowatt-hours (kWh). Electricity was provided to the Plainville area by ABC Power Company, which had a corporate office located in Hill City, approximately 75 miles from Plainville. Bob had worked previously with the ABC Power Company during power emergency situations, so he knew who he needed to contact to discuss the seriousness of the present situation.

Just eighteen months before the tornado strike, Bob had worked with James Cricket (CEO of ABC Power Company) when Plainville, and the surrounding area, was hit by a winter ice storm that took down all the power transmission lines servicing the area. At that time, ABC informed Caldwin Manufacturing that it could take several months before full, uninterrupted electrical service would be restored to the plant. Bob worked directly with Cricket during that experience to resolve the power supply issues caused by the ice storm, and thankfully, restoration of power only took sixty days.

When dealing with the aftermath of that ice storm, Bob also had worked with AGKO, an emergency power solutions company, to rent generators and other supporting equipment. By renting eighteen 1MW generators, power generation transformers, and additional equipment from AGKO, Caldwin had enough portable electrical power to operate at full capacity within four days of the ice storm damage. At that time, it required twenty-four flatbed trucks to transport all the rented equipment (at an approximate cost of $3,000 per truck) to the plant, and then the same cost was incurred to transport the equipment away from the plant when the crisis ended. The cost to rent all the needed equipment at that time was $175,000 per month. The diesel fuel consumption (burn rate) to operate the generators was nearly 1,200 gallons per hour.

Since the tornado caused a massive power outage at the Caldwin plant, the shipping areas on the west side of the plant, the steel receiving area on the east side of the plant, and the receiving dock for MRO products on the west side of the plant were all without power and dark. There were no windows in any of these areas. There were overhead dock doors in each area typically opened by electrical motorized door openers. These dock doors could be opened manually, but to do so required two people to manually open and close each door. The computers used in the shipping and receiving areas were not on the emergency generator power circuit so they were also rendered inoperable by the power outage. Bob had also been informed by Plainville police that Industrial Avenue was expected to be closed to all traffic except ABC Power Company trucks for at least the next seven days.

THE CHALLENGE FOR BOB AND HIS TEAM

After surveying the obvious visible damage, Bob called a small group of key members of the Materials team to meet him at the GEB warehouse in thirty minutes. While he waited for the group to arrive, Bob recalled a comment that a person he respected once told him many years ago: "Generous leaders have faith in others to succeed. In turn, they receive tenfold loyalty, commitment, and a positive outcome." Bob had not realized the wisdom of the comment until that moment as he waited for the group to arrive so he could give them an update about the current emergency situation. Once the group arrived at the warehouse, Bob explained that he needed them

to quickly come up with a carefully planned course of action to address the SCM-related emergency response needs during the next seventy-two hours. Bob explained that he was going to be tied up for the next couple of hours with the plant's EMT group on a conference call with the Corporate office, but as soon as the call was over, he would be back to meet with the Materials team to go over their plan. Bob provided the group with the following questions to consider as they worked on their response plan:

- Who (Materials team members, raw material suppliers, electricity power providers, etc.) should be involved in the SCM triage effort?
- What are the immediate action steps needed to be taken in this situation?
- What criteria should be used to determine the priority of those actions?
- Who are the key customers affected?
- How and what should customers be told about the situation?
- How should Caldwin respond to those customers' concerns?
- How could the plant place orders and receive needed raw materials and MRO supplies?
- How could the plant ship finished components to their customers?

As Bob left the group, he realized he needed to consider another important question: How can he provide the leadership needed to best support others during this emergency?

Teaching Note for Instructors is available from editor-mpjbt@unk.edu