It was a normal spring morning in 1989 at DuPont’s Belle, WV, plant. Author Dick Knowles was the manager at the time; he recalls that most things were running well, minus a few problem areas that needed attention. The level of complaints and human resources issues was about normal. Then about midmorning, the fire whistle on the powerhouse blasted a message: A fire erupted in a unit where a flammable, dry product was made.

The fire brigade, well trained and prepared, jumped into action. The incident commander established his position. The head count indicated that no one was in the building. The fire swept through the product dryer, burning product, the dryer belt, ductwork, instruments and wiring. The fire brigade quickly and safely extinguished the fire, but the damage was severe and the unit was out of commission. Only about 3 weeks of finished inventory remained, so restoring production was imperative. The plant was in crisis.

The first plant walk-through was depressing; the place was a mess. But, the employees acted quickly. Production personnel cleaned the area, and dismantled and repaired the dryer, instruments and wiring. The sales team balanced supplies with customers’ critical needs. Everyone rose to the challenge and made decisions about how to restore and repair, how to keep customers supplied, and how to ensure that business goals were on track. Far more needed to be done than production. People stepped up to work as a high-performance team, made decisions, and quickly and safely accomplished tasks. The various craft groups and operators cooperated seamlessly. Friction between the operators, mechanics, supervisors and management nearly disappeared.

Yet, as the crisis passed and business returned to normal, people drifted back to the same awkward, difficult ways of doing things—behavior that was holding the plant back. People complained, but this way of work was familiar. They did not know how to replicate and sustain the performance level they had experienced during the crisis. The high-performance team behavior was gone. Nearly 6 months after the fire, operators and mechanics in the control room were overheard nostalgically talking about how well everyone had worked together during the crisis. It occurred to all involved that they had to figure out how to be a high-performance team during normal operations.

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Searching Behind the Curtain

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Employees came together to work as a high-performance team, made decisions, and quickly and safely accomplished tasks. The various craft groups and operators cooperated seamlessly. Friction between the operators, mechanics, supervisors and management nearly disappeared. Yet, as the crisis passed and business returned to normal, people drifted back to the same awkward, difficult ways of doing things—behavior that was holding the plant back. People complained, but this way of work was familiar. They did not know how to replicate and sustain the performance level they had experienced during the crisis. The high-performance team behavior was gone.

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By opening up the level and flow of conversations within an organization, leadership can create the optimal environment for self-organizing criticality to occur. Self-Organizing Criticality

In the late 1980s, Danish theoretical physicist Per Bak (1996), together with two postdoctoral fellows, observed a natural phenomenon they called self-organizing criticality. They discovered this while studying the way sand piles change as sand is added one grain at a time. A sand pile gradually self-organizes as it gets higher and builds potential energy. At some unpredictable point the next grain of sand causes the sand on the pile to slip and release some of the potential energy. As more sand is added, the sand in the pile builds up then slips again. Most of the slips are small, some mid-size and some, infrequently, are large. The point of slippage is the point Bak (1996) called self-organizing criticality.

Bak did not make the connection between this natural phenomenon and the way that human groups behave, but the authors recognized that in organizations, each conversation is similar to adding a grain of sand to a pile; the energy in the organization builds as it self-organizes. At the point of self-organizing criticality, energy and creativity reach high levels, people begin to step into things, get more involved and make new things happen.

For example, after the Belle plant fire, ad hoc teams formed, new communication links were made in which anyone could talk to anyone else to get the job done, and operators and mechanics worked together with trust and openness, which resulted in more effective production. People stepped up to what needed to be done. They cooperated and helped each other. The temporary organizational structure flattened as everyone stepped into the work. With everyone involved and communicating, the work was organized and moved smoothly.

These spontaneous activities are similar to the sudden slippage in the sand piles. Organizations can purposefully and consciously move up the path to self-organizing criticality, without depending on a crisis. By opening up the level and flow of conversations within and throughout an organization, leadership can create the optimal environment for self-organizing criticality to occur.
supervisors openly and authentically talk with workers, listen, and share information about current business, safety and environmental performance, and ask for help and ideas about how to improve safety, people realize that management cares and supports their decision making about ideas on how to improve work.

Purposeful conversations are similar to the grains of sand Bak observed falling onto the sand pile. The activity increases, and builds the energy and creativity to the point of self-organizing criticality when things begin to change for the better. Communication and information channels open and improve. The level of cooperation and coordination among employees at all levels grows. Sharing a well-understood, common purpose helps them become high-performance teams. These are the same characteristics seen during and immediately after the Belle fire. This is the time when energy and creativity are highest.

The crisis quickly drove employees to the point of self-organizing criticality, and now it is possible to replicate the antecedents of those characteristics, the circumstances that bring people together in more purposeful ways.

The Process Enneagram

People can cocreate the key behavioral factors (their “attractor”) that move them to the point of self-organizing criticality and hold themselves there so that they do not revert to old habits. This attractor pulls them together and is created using the Process Enneagram (Figure 1), a structured conversational tool that facilitates and reveals who and what the people are as well as how and why things happen as they do (Knowles, 2002).

Using the Process Enneagram, people cocreate a map of their future (Knowles, 2002). They also cocreate ground rules for working together (e.g., honesty, share all information, help each other, listen to each other, provide open feedback, respect each other, say “I’m sorry,” ask for help, work for the good of the whole organization). The attractor is similar to a bowl into which people are drawn as they engage and build together. It helps hold the organization together, provides order and a boundary as well as a space in which people are free to make the best decisions they can for their work, for each other and for themselves.

Employees sustain this work and the strength of the bowl by posting their Process Enneagram map on their office walls, then talking each week about how they are doing relative to their map. Each person reflects on the previous week and comments about his/her learning. Employees revise and change the maps as their world changes around them. The map is their living strategic plan.

The fire at the Belle plant became an inspiration and learning experience, a jumping off point for the discovery of the hidden patterns and processes—such as self-organization and self-organizing criticality—that are embedded in organizations. Unveiling the inner workings of organizations allowed the authors to see the organization as a complex, adapting, self-organizing network of people. In turn, this enabled the authors to identify ways in which organizations actually work and can be improved.

Using these insights, the Process Enneagram brings people together, and allows them to work at their peak, openly, authentically and with trust. When people come together and learn to work this way, energy and creativity are released and huge improvements are made.

Safety & Production Results

As work at the Belle plant progressed after the fire, people continued to contribute their knowledge and skills. Its total injury rate dropped 98% to about 0.3 or better. Emissions dropped 87%, productivity rose 45% and earnings rose 300%. This is remarkable progress for a 75-year-old facility. For almost 17 years, following these changes, the plant sustained this level of safety and production.

References


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