

The Dynamical Organizations Theory: Openness, Synthesis, and Emergence

A Retrospective Case Study

Stories of Change

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ABSTRACT

Organizations are complex, adapting, self-organizing networks of people that change one conversation at a time. Open, recursive conversations among all the people provide energy to the system enabling everyone to learn and grow. New opportunities are considered and synthesized. Decisions emerge and are acted upon, building a more sustainable future for the people and their organization. This is the Dynamical Organizations Theory.

Keywords: dynamical organizations theory; self-organizing networks; adaptation; sustainable future

La Teoría de las Organizaciones Dinámicas: Apertura, Síntesis y Emergencia

Un Estudio de Caso Retrospectivo: Historias de Cambio

RESUMEN

Las organizaciones son redes complejas, adaptables y autoorganizadas de personas que cambian una conversación a la vez. Las conversaciones abiertas y recursivas entre todas las personas proporcionan energía al sistema para que todos puedan aprender y crecer. Nuevas oportunidades son consideradas y sintetizadas. Las decisiones surgen y se ponen en práctica, construyendo un futuro más sostenible para las personas y su organización. Esta es la Teoría de las Organizaciones Dinámicas.

Palabras clave: teoría de las organizaciones dinámicas, redes de autoorganización, adaptación, futuro sostenible

动态组织理论：开放性、综合性与突现性 关于变化的回顾性案例分析故事

命题

组织是自我管理的复杂适应性人际网络。组织一次只改变一次沟通。所有人之间开放的递归沟通为组织提供了能量，使每个人都能学习和成长。新的机会得以考虑与综合。决策得以产生并付诸行动，从而为所有人及其组织建设一个更可持续的未来。这便是动态组织理论。

关键词：动力组织理论;自组织网络;适应;可持续未来

Introduction

This is a retrospective, 8-year case study of the Dynamical Organizations Theory. This study reveals how the work of all of us at the DuPont Belle, WV Plant accomplished the extraordinary changes that we made together. The stories of change are considered in light of Dynamical Organizations Theory which I gradually developed over many years of study, practical application, and reflection. All of these stories were reviewed and confirmed by a number of former Belle Plant people who shared this exciting time with me.

A Brief Overview of the Theory

Dynamical Organizations Theory: Openness, Synthesis, and Emergence

Significant, sustainable organizational change is achieved through ongoing, focused, disciplined, honest conversa-

tions among all the stakeholders about overcoming the issues and challenges facing them, opening up new possibilities, and acting on them. This requires courage, care, concern, and commitment by the leaders who fully share the organization's vision and mission, then invite and engage with the people to help to co-create their shared future,

- by honestly and openly talking about how to improve, modify, and overcome their issues and challenges,
- by synthesizing new possibilities and prospects, and
- by coalescing around an emergent pathway to a new culture and acting to build a new future.

The people and the organization are in a reciprocal relationship with the whole and the parts as they co-create their future (Bortoft, 1996).

Basic Conditions

- Organizations are complex, adapting, self-organizing networks of people.
- Freely flowing of information is critical. Anything that inhibits the free flow of information reduces the people's ability and will to grow, learn, and become the best they can be. Dysfunctional behaviors like sexual harassment and bullying are hugely destructive because people pull back and stop sharing information. They are diminished, and great potential for both the individuals and the organization is lost.
- Self-organizing criticality (SOC), a fundamental process of change, was developed by Bak, Tang, and Wiesenfeld (1987) studying sand falling slowly onto a sand pile, building potential energy, self-organizing, and then reaching the point where a slip in the pile occurred releasing potential energy.
 - Most of the slips were small.
 - Less often, there were middle-sized slips.
 - Very infrequently, there were few big slips.
 - You can't predict when the next grain of sand will cause a slip in the pile, nor how large the slip will be.
- Focused, disciplined conversations are like the grains of sand falling onto a sand pile.
- As people openly address their opportunities and challenges, the potential energy for change increases. Trust, interdependence, and confidence build, ideas are synthesized and change emerges.
- The leaders must develop a compelling vision and mission using a complexity tool like the Process Enneagram© (McCarter & White, 2013), engage in authentic, respectful conversations, constantly walking among the people, creating the space where it is safe to have open, honest conversations about things of importance. The changes build on themselves, everyone learns and grows, and the rate of change gradually increases. They co-create their future.
- No one knows when the next conversation will result in a release of potential energy and create a change.
- Most of the changes are small, some are middle-sized, and a few are quite big just as Bak et. al. (1987) observed in their Self-Organizing Criticality Theory.
- Small changes provide the opportunity for all the people to learn to work together in a new way. Little mistakes are easily corrected.

The Story

These stories of change and the creation of a new order occurred from April 1987 to February 1996 at the DuPont Belle, West Virginia Plant where I was

the Plant Manager working with the Belle Plant Leadership Team (BPLT) and all the Belle people. We transformed this large chemical plant from one of the poorest performing into one of the best performing plants in the entire DuPont Company. Reflecting on these stories, studying John Bennett's Systematics, chaos, and complexity theory and consulting with and observing organizations extensively in many countries led me to developing the Dynamical Organizations Theory in 2017 (Knowles, 2017).

We saved the Belle Plant from being shut down by helping the people build respect, to solve compelling, complex problems together, to improve performance, and increase earnings. Extensive, sustainable change was an outcome of this work.

The Belle Plant Context

The DuPont Belle Plant was started in 1927 to produce organic chemicals from the plentiful, local sources of coal, water, and air. The people in West Virginia are a strong, reliable work force. For years, the Belle Plant was a high-quality supplier of a variety of organic chemicals like the chemical building blocks used to make nylon during the Second World War. It was one of the key plants in the growing DuPont Company.

My Arrival

However, when I arrived in April 1987, the Plant's performance had deteriorated to the point where the Plant's survival was in question. The entire work force of 1,300 people was frustrated, cynical,

and stuck. Resistance to change was deeply rooted. The safety performance, a core DuPont value at this time, was dreadful. The Plant was losing money.

I was transferred from the DuPont Plant in Niagara Falls, NY, where I had been the Plant Manager, and, as an outsider, was not welcomed by anyone including the superintendents, supervisors, clerical, and hourly people. They had become so isolated that they thought they were doing just fine. Dysfunctional behaviors were rampant throughout all the levels and groups; trust levels were awful and productivity was low. In fighting to overcome this, my own behavior became very harsh and demanding. While there was a union representing the control laboratory people, most of the Plant was non-union. However, the strong union culture in West Virginia greatly influenced the way the people thought and worked so, for example, there were fixed craft lines and many difficult, restrictive work rules.

The process of transformation began immediately. I met with all 1,300 people in the first six weeks, either individually or in small groups, day and night, to introduce myself and talk about our shared future of becoming one of DuPont's top performers again.

I focused on re-establishing the safety standards, building honesty, respect, and trust. I helped the people to see that everyone had to significantly improve their own performance. Eliminating dysfunctional behaviors and improving the safety performance were key pieces of this work. I walked the

Plant for hours every day talking with and listening to the people at all levels and all shifts; we operated 24/7.

At first, getting to know the people was awkward, but as I kept at this, the personal interactions got easier. I had to show the people that I was genuinely interested in their success. Over time, my management approach opened up and became more approachable; trust built; effectiveness; and the total plant performance improved. In the first couple of years, the flow of information opened up creating an environment where it was safe to talk and share, enabling information to flow more freely throughout the organization, up, down, and across all levels and silos. People could share their ideas and insights without fear of criticism or being put down. As the energy built, many good things began to happen.

Here are some of the things I did:

- I walked around the plant, greeting and talking with people about how they were individually doing, how the plant was doing on our safety and environmental performance and sharing the latest business news. I insisted on achieving high standards, so the Plant could compete in the global markets, survive, and prosper.
- Sometimes, I would walk around just looking at the good things people were doing. Other times, when I could, I would sit down with the people in their work area and have a cup of coffee. I spent a lot of time listening, but did not make decisions

there with them since that would undermine the line organization.

- Together, we continued to look for better ways to do things. Sometimes, I talked with just one person and other times I talked with groups.
- As ideas began to emerge, I encouraged the people to follow up, talk with their teammates and others who could help. I would offer to run interference for them if they wanted that sort of help. I encouraged them to talk with whoever they thought could contribute to making things better and build on their ideas.
- I always picked up any trash. Sometimes, I shoveled snow with them.
- I would ask for their input on how they thought I was doing, and would talk about that. This feedback often helped me to do a better job.
- Sometimes, there were strong differences, but we focused on the issues and did not make it personal. When I did not know the answers to their questions, I would tell them I didn't know and promise to get back with them when I found the answer; I always got back to them.

I was dedicated and persistent in walking around the plant engaging with everyone. This required courage, care, concern, and commitment; some days were pretty rough. It took courage because I never knew just what would happen and how critical the people would be. It took caring because I had

to show the people I cared by taking the time to sit with them, listen, and to ask how I could be of help. It took concern because I had to show the people that I really cared about rebuilding the strength of the Plant. It took commitment because I dedicated hours and hours to walking around, listening, and learning. After the first 2 years when I realized the importance of these continuous, focused conversations, I dedicated myself to doing this for about 5 hours a day, and kept at it for 5 years. I kept a daily log of his time in the field to maintain the discipline for myself. (Yes, I worked long hours.)

Many, many changes occurred as we learned and grew together. The Plant became one of the best performing plants in the DuPont Company. The Leadership Team and I kept a constant focus on talking together with the people about improving all aspects of our performance including the safety performance, eliminating dysfunctional behaviors, opening up the flow of information, building on our skills and knowledge and creating a better future, listening, learning, and asking for their help.

For example, we on the Leadership Team decided that we needed to take a stand about improving the climate for change, so we developed a set of guiding principles about how we, on the Leadership Team, wanted to treat everyone. These are the Belle Treatment of People Principles shown here (Knowles, 2002, Foreward, LVIII).

THE BELLE TREATMENT OF PEOPLE PRINCIPLES:

1. People want interesting work—work that makes good use of their abilities. Boring jobs de-motivate and alienate.
2. They want opportunity for learning and growth and opportunity to apply the skills.
3. They can be trained (that is, they are able and willing) to do several different jobs.
4. They want equal opportunity to advance and try different work.
5. They want responsibility in their work, some degree of decision making.
6. They “want in” on decisions that affect them.
7. People expect management to lead, not abdicate. People look to management to make its contribution in those critical areas where employees do not have the requisite orientation, knowledge, or resources.
8. They expect a leadership team to be consistent and predictable.
9. People want to be part of a winning team.
10. People want to know what’s going on at Belle, in the department, and in the Company.
11. People want to be informed about the business and get early feedback

on the performance of their part of the operation.

12. They want fair pay and knowledge about how the pay system works.
13. They have a need to relate to others on the job.
14. They want rational rules and a minimum of regimentation. People want a say in the rules.
15. They want to be treated like people—people have ego needs.

We distributed these around the Plant and asked people to hold us accountable for living up to them. At first, people did not believe that we really wanted to do this, but after talking about them for about two months, they began to challenge us when we did not live up to them. We continually improved with their help. We used these consciously when we were discussing performance or discipline problems. As people challenged us, they began to accept these Treatment of People Principles for themselves and more significant changes happened.

A significant learning for us on the Leadership Team was experiencing the power of taking a stand, putting ourselves into the system and becoming a part of it. These Treatment of People Principles became the solid base on which we could stand when everything else was changing. While we couldn't control much that was happening to us and the business, we could control how we treated each other.

Another stand that I took this was about improving our safety (oc-

cupational safety, occupational health, and process safety) and environmental performance. My mantra was "I did not have a right to make my living at a place where it was okay for someone to get hurt or mess up the environment; we also had to improve our earnings so let's do all these things as best we can."

Constantly talking and listening together, helping each other, developing ideas, solving problems together led to a shift where the people began to become "leaderful," a term I had heard from Karen Ann Zion in a conference in 1993. Being leaderful meant that anyone who saw a need for some improvement could begin the process on their own initiative without waiting for their supervisor to tell them to do something.

As people helped to solve problems and make improvements, more change happened. People do not resist change when they are creating change. Initially, most of the improvements and changes were small, like in Bak et al.'s 1987 sand pile studies, and could be easily missed. But as I walked around the Plant, talking and listening I did not miss many of these small changes. I constantly reinforced the safety, environmental improvement messages, and the Belle Treatment of People Principles. As people became more and more confident in trusting me, the organization became more leaderful. Sometimes, we made mistakes, but we supported each other and learned from them. We kept moving forward by constantly trying to live up to our safety, environmental, and Treatment of People Principles. People felt more

and more confident about making decisions related to improving their own work. Our core messages created a container, a strange attractor that I call the BOWL (Knowles, 2002), in which people could operate with a high degree of freedom in doing and improving their work. Interest, excitement, and energy built as we all learned. We all derived new meaning in or recursive conversations; this is the Hermeneutic process in action.

Here are some of the changes that were made by the people. None of these changes were very significant in and of themselves. However, the accumulation and buildup of these all together resulted in the Belle Plant's strong improvements and sustainable transformation.

Some Changes

Stories of small changes:

Many of these changes were made in the first 2–3 years that I was at the Plant.

- Morning, production status meetings were moved from the main office conference room to the Shift Supervisors office and became stand-up meetings.
- Two one-hour business review meetings were held each week in shops and control rooms.
- The manager's and general superintendents' offices were moved from a big office building outside the main gate into the Plant to be closer to the people.
- Preferred parking was for Safety Stars only. These were people who had worked injury-free for at least 25 years.
- Bullying was greatly reduced. Some people were terminated. As we shined the light-of-day on bullying behavior, a lot of it stopped.
- When I would occasionally forget my safety glasses, I was sent back to get them by an operator.
- Eddie Long, a mechanic, kicked 4–5 contractors off the plant who were not working safely. He did this on his own.
- Employee-led safety teams strengthened the Central Safety Committee.
- Everyone had email accounts.
- Current safety, environmental, and business information was put onto the login screens every day.
- I had an open-door policy, but not a swinging door policy; people had to work through their supervisors first.
- The Leadership Team held a self-reflections session for 30 minutes at the start of every weekly staff meeting, talking about our performance, and giving ourselves a score on our performance. We used a statistical process control chart on the wall to keep a public record of our performance. This helped us to improve our own performance.
- Everyone insisted on achieving and sustaining high standards in the work.

- We held each other accountable for living up to our responsibilities.
- I walked the coal conveyor and climbed distillation columns, so I could learn about where the people actually worked.
- Keeping Process Safety Management and training up to date was critical and was emphasized this in each Central Safety Committee meeting.
- The safety shoe team was led by an operator.
- Employees volunteered and were loaned to substitute teach for a day or two to help the Kanawha County School Board free up teachers for computer training. This was the Chamber of Commerce Project Teach.
- Teams began to loan special equipment like a pickup truck to other groups in times of need.
- An employee-led program was created to eliminate smoking on the plant.
- An operator, on his own, shut down the amines process to fix a small leak at the top of a distillation column.
- I created a Community Advisory Panel and actively met with them each month.
- Martha Mullins, the science teacher at the Belle Middle School, and three students visited the Plant with Ken Ward, the reporter for the Charleston, Gazette, to learn about how ammonia was handled and processed. This was done to demonstrate my willingness to share information with the media and the public.
- Many open houses were held.
- I tried to learn how to weld and, while failing to weld anything, I showed the welders my respect for their craft.
- I learned to play Appalachian dance tunes on the hammered dulcimer showing my appreciation for this part of their culture.
- Visitors to the Plant were usually escorted by hourly people.

Stories of Middle-Sized Changes

- Demurrage costs (fees that we paid vendors when we did not return their tank trucks quickly enough) were cut from \$800,000/year to \$100,000/year by a team of operators in just six months.
- Becky Dixon, an operator, invited radio talk show hosts into the plant to show them the good things the people were doing to improve the Plant's environmental performance. She initiated, organized, and led the entire visit which was a great success. With her guidance, I did my part.
- Site-wide, multi-level teams were formed to work on special projects like environmental stewardship.

- Site training for teams was done by site hourly people.
- Steve Wilson, an insulator and Asbestos Team Chairman, on his own initiative, called to the EPA to learn more about how to handle asbestos.
- The Plant moved to teams and became involved with the Association for Quality and Participation. The Plant obtained the only (AQP) Site Chapter.
- National recognition was received from AQP for a Site Team of the Year.
- I strongly supported the Fire Brigades, the Belle Activities Committee, the annual Plant picnic, and the 25 Year Club.
- I constantly supported the shift supervisors and their emergency response and fire-fighting teams.
- The Shift Supervisors Team was moved to report directly to the me which opened the flow of information, coordination, and effectiveness.
- Safety audits and plant visits were conducted with Claire Knowles, my wife from Niagara Falls, NY, when she was visiting on week-ends.
- The Belle Plant Treatment of People Principles were established.
- Quality control lab tests were moved to the production operators from the control lab. technicians.
- People filled out their own time cards—openly available for all to see.
- The main exit valve on the refrigerated, 110-foot-tall, ammonia storage tank was changed from 24 inches to 10 inches to reduce the likelihood of a major spill. This was accomplished without warming and completely emptying the tank. This saved us a lot of money and time.

Stories of Large Changes

- The Belle Vision (People, Safety, Environment, Quality, Cost, Customer) was developed.
- I discovered that I was the biggest barrier to the Plant's success and had to change my own behavior from my domineering, harsh approach to becoming a better listener and start to partner with the people. As small part of this work, I changed my seat at the Leadership Team meetings from the head of the table to sitting by the wall, stepping into the meeting as I needed to resolve an issue. This was a difficult shift for me, but had a very positive impact on the leadership Team's performance and influenced the entire Plant.
- Worst-Case Scenarios were successfully shared with the Greater Charleston, WV, community of 300,000 people in our national, ground-breaking, 2-year project called Safety Street. Community leaders like Mildred Holt, a teacher, and Nikki Smith (Orcutt), a student,

helped the communications effort. This gave us a big boost in our relationships with the community.

- First-line supervisors were removed from shifts.
- The Plant converted to merit shop (the lowest cost, qualified bidder) for construction projects.
- Conversions from pneumatic to electronic controls were successfully made on 16 different production processes without running parallel. This cut the costs and time for the conversions in half.
- Mandatory random drug testing

was begun. Belle was the first chemical plant in DuPont to do this.

More Changes

I decided to look at how the changes impacted the Plant's progress by using the Sustainability Ratios (Knowles, 2002). The BPTL made a qualitative assessment about each change using the six sustainability ratios. In these ratios, the numerator indicates improved sustainability and the denominator indicates the sustainability has been weakened. In Figure 1, the sustainability ratios are displayed around a particular change decision.

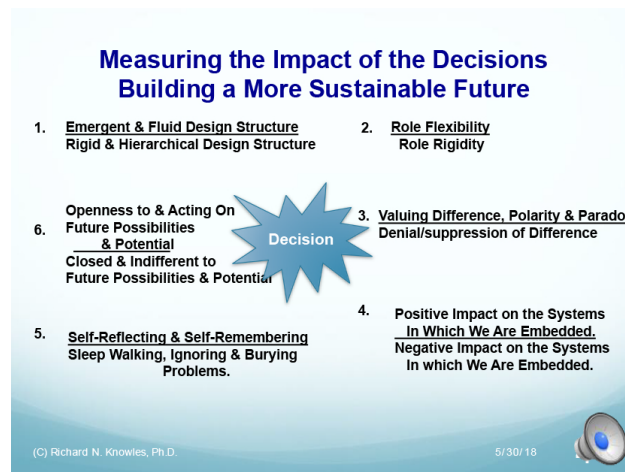


Figure 1. Measuring the impact of the decision building a more sustainable future.

We talked about each change and made a subjective judgment about how the change impacted our three areas of focus.

- Organizational Effectiveness (OE) related to how people were working together.
- Functional Effectiveness (FE) re-

lated to how we were growing our skills and using them.

- Business Effectiveness (BE) related to how the business was impacted.

These ratios are meaningful, leading indicators about making quality of decisions to build better organizational resilience and sustainability.

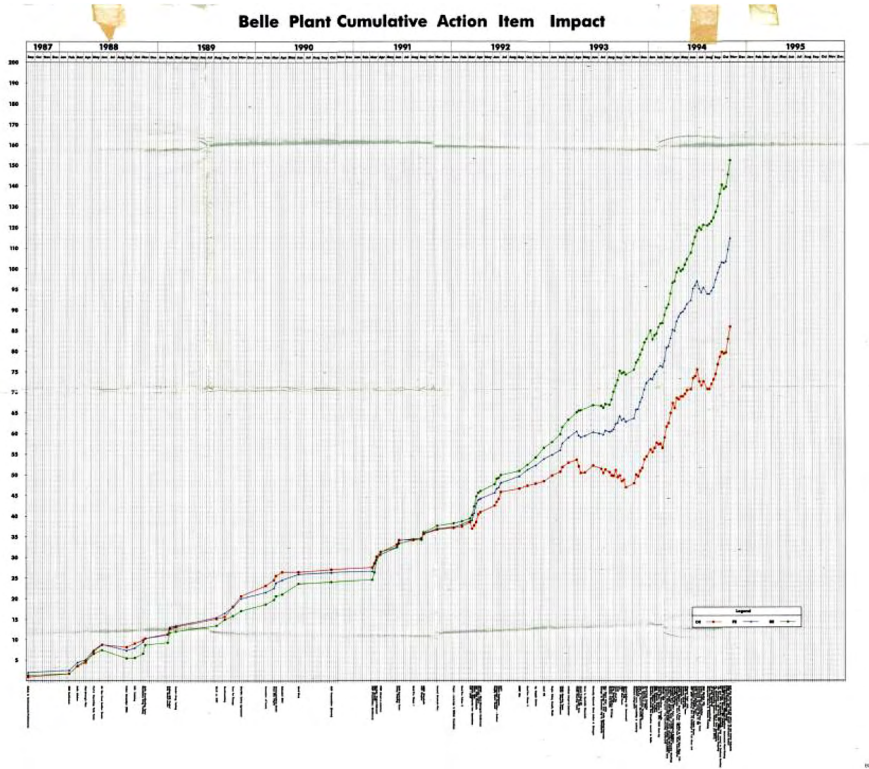


Figure 2. Belle Plant cumulative action item impact.

Progress was seen from the very beginning with most of the improvements developing first in the areas of OE and BE. It was expected that these improvements would happen ahead of the BE which is seen in the figure. The BE curve crossed over the other two in 1991. In 1992, the DuPont Company took away some of the health benefits causing a negative impact on our OE performance. We could see the OE curve drop, so we did some things to improve the OE and the curve turned upward again.

Each vertical line at the bottom of the chart indicates a specific change. The frequency with which changes occurred was slow at the beginning, but as we learned the frequency of changes increased. For the purposes of this paper,

the specific changes listed here along the bottom of the chart are not important. But, the number of changes (126) and the increasing frequency of the changes are important: 1987 (1 Change) April–September, 1988 (9 Changes), 1989 (7 Changes), 1990 (6 Changes), 1991 (10 Changes), 1992 (16 Changes), 1993 (27 Changes), 1994 (50 Changes)

Figure 3 shows the progress using quantitative data in reducing and sustaining the OSHA Total Recordable Injury Frequency Rate, the time between Lost Work Day Injuries, and the changes in earnings, productivity, and emissions. Below the chart, the major things that were happening are listed. In the first phase, we did essentially all the things that Kotter (1996) talks about in his book, *Leading Change*, which was

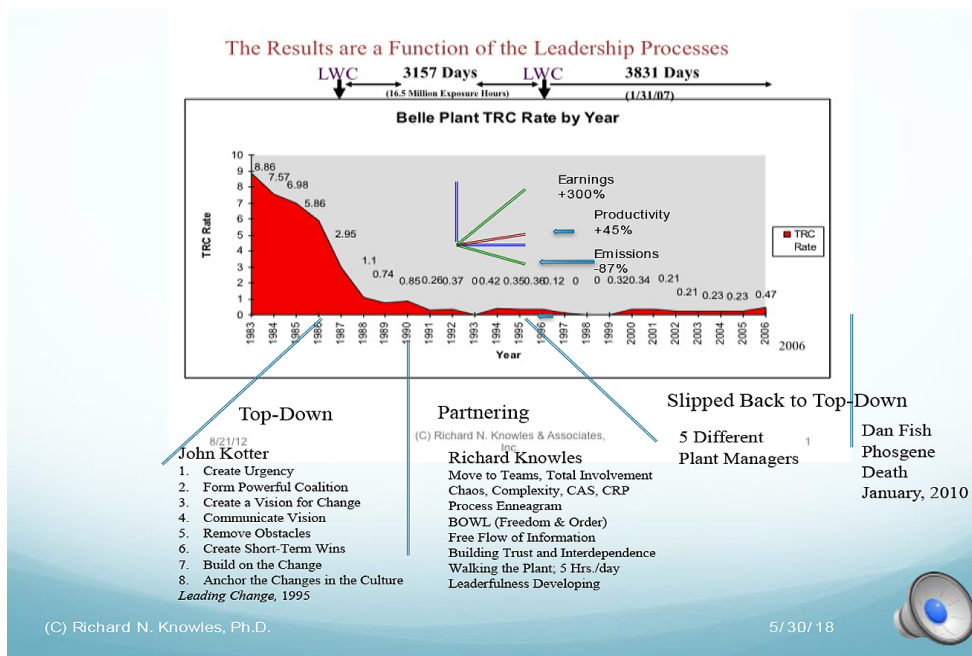


Figure 3. The results are a function of the leadership processes.

published in 1996. These items were listed here as examples of the sorts of things we did, although we did all this in 1987–1989.

- A core competency was the ability to safely use and make highly hazardous chemicals.
- Our Total Recordable Injury Case Rate (TRIR) dropped by 98%.
- The people sustained this level of safety performance for at a TRIR of about 0.3 or less for 17 years, 12 after I had left the Plant in February 1995.
- A carpenter suffered a Lost Work Day Case (LWC) injury when he cut his finger off in a bandsaw accident in April 1987 right after I came to Belle. Then we went 8.6 years before an operator suffered an LWC when he was burned in an accidental

steam release. Then the Plant went 10.5 years until a phosgene release caused a fatality in 2010.

- Emissions went down by 88% from 1988 to 1995.
- Environmental upsets were reduced to almost zero.
- Productivity went up by 45%.
- Earnings up by 300%.
- The change-over cycle time between production campaigns in an operation where various different products were made in the same equipment and required thorough cleanup was cut from 7 weeks to 1 week.
- A permit for new landfill for non-hazardous wastes was obtained without the need for a formal public

hearing because trust had built with the community and the West Virginia Department of Environmental Conservation.

- We created a drug-free workplace.

The pay-off was terrific. When comparing the qualitative performance changes shown in Figure 2 with quantitative performance numbers shown in Figure 3, it can be seen that as the BE curve strengthened in the 1991–1993 period, the quantitative data we had on earnings, reduction in injuries, productivity, and emissions significantly improved. This simple tool of using the sustainability ratios was a strong leading indicator for our total improvement in measuring the Plant's performance.

Years (22) of study, reflection, consulting, and personal growth and understanding

I left the Belle Plant in February 1995, The DuPont Company in September 1996 and moved into consulting around the world on leadership and safety. I continued to explore more deeply how organizations actually worked and changed. Over the years, I created the Dynamical Organizations Theory; Openness, Synthesis and Emergence. The ideas and experiences were constantly explored, processes studied and tested, papers (30) and books (2) written, meetings and conferences (48) attended where debates and dialogue deepened.

Freely flowing information and focused conversations on important issues that faced the organization pro-

vided the energy for the organization to develop and change. The Process Enneagram© (Knowles, 2002), a powerful complexity tool, helped us to focus and keep track of the conversations. The BOWL, the strange attractor, provided the structure to hold and sustain the organization far from equilibrium where the energy and creativity are greatest. McCarter and White (2013, p. 152) suggest that the Process Enneagram is the “missing link between complexity theory and practical application.”

Anything that inhibits the free flow of information hurts the performance of the organization. Leaders must create a safe space for the people to openly share information so they can talk, listen, and learn together, and stamp out disrespectful behaviors like harassment and bullying because they inhibit the free flow of information, keep people apart, and build up like a snowball rolling downhill leading to bigger and bigger problems like injuries and incidents, and, even to suicides and murders. The Bureau of Labor Statistics reported that there were 807 fatal injuries caused by persons or animals (BLS, 2017, p. 2), with 458 homicides and 275 suicides (BLS, 2017, p. 6). These dysfunctional behaviors cost organizations a huge amount in both human suffering and wasted money.

Conclusions

In the years when I was the Plant Manager for the Belle Plant, the changes we made resulted in a sustainable transformation of the total performance (people and facilities).

The use of qualitative and quantitative metrics complimented each other with the qualitative metrics serving as a strong leading indicator of improvement. Building on the combined intuitive leadership experiences of the Belle years with the very diverse consulting years in many different countries and kinds of organizations, the Dynamical Organizations Theory emerged.

Purposeful, focused, continuous, honest, and open conversations and dialogue about issues that are important to the organization are central for the Dynamical Organizations Theory. The leaders need to develop clarity on the

vision and mission, be fully engaged, take a stand, set the conditions for a culture of caring and respect for everyone and insist on the open, free flow of information. Then build the BOWL to hold it all. This requires courage, care, concern, and commitment. The Process Enneagram is a powerful, useful, proven complexity tool that enables this to happen.

This retrospective case study provides strong support for the proposition that change occurs one conversation at a time as well as for the validity of Dynamical Organizations Theory: Openness, Synthesis and Emergence.

References

- Bak, P., Tang, C., & Wiesenfeld, K. (1987). Self-organizing criticality: An explanation of $1/f$ noise. *Physical Review Letters*, 59(4), 381–384.
- BLS (2017). *National census of fatal occupation injuries in 2017*. Bureau of Labor Statistics. Retrieved from <https://www.bls.gov/news.release/pdf/cfoi.pdf>
- Bortoft, H. (1996). *The wholeness of nature: Goethe's way toward a science of conscious participation in nature*. New York, NY: Lindisfarne Books.
- Knowles, R. N. (2002). *The leadership dance: Pathways to extraordinary organizational effectiveness*. Niagara Falls, NY: Center for Self-Organizing Leadership.
- Knowles, R. N. (2017). Dynamical organizations theory: Openness, synthesis and emergence. *Emergence: Complexity and Organization*. Retrieved from <https://journal.emergentpublications.com/article/dynamical-organizations-theory/>
- Kotter, J. P. (1996). *Leading change*. Boston, MA: Harvard Business Review Press.
- McCarter, B. G., & White, B. E. (2013). *Leadership in chaordic organizations: Complex and enterprise systems engineering*. Boca Raton, FL: CRC Press.