



A WHITE PAPER BY
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COLLABORATION ONE OF
THE FUNDAMENTAL ENGINES
OF LEAN INITIATIVES –
AVOIDING THE EIGHTH
DEADLY WASTE

VISUAL COMMUNICATION TRANSFORMING
BUSINESS PROCESSES

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& Energy Industries

TANDBERG
See: performance



“Real waste lurks
in places that don’t
look like waste. The
greatest waste is the
waste we don’t see.”

— Shigeo Shingo

Early in my career I had the great opportunity to work directly with Dr. Shigeo Shingo as we worked to transform the plant I was managing. I had discovered some of his initial publications in a small book store in Cambridge MA in the mid 80’s and after reading the few books available I was stunned at the precision and affectivity of the ideas in these books. As others in my company read these books we had the feeling that we discovered a real solution to the problems we were dealing with. We put together a small team and crafted our own training program back at the manufacturing facility and that led to a multi-year journey understanding and implementing the foundations of what is now known as Lean Manufacturing or the Toyota Production System (TPS). We had invited Dr. Shingo to our plant to view our progress after a year or so of implementation and he let us know how far we still had to go, but that is one of the aspects of the TPS; that it is a process not a destination. There is always waste in a system if one prepares themselves to see it then eliminate it.

In these early years of learning and implementing TPS I was focused on how powerful some of the tools were and how effective they were at solving the classic manufacturing problems. Reflecting on this with some more years of experience I have come to understand that one of the foundations of these improvement efforts was the collaboration that was essential between the line worker, engineer and any other persons who were involved in the process that was being analyzed and improved. These structured collaboration sessions lead to small and sometimes great innovations that create increased throughput or reduce the opportunity for errors. This new process capability can lead to increased competitive advantage. In many ways the foundation of the TPS is management’s facilitation and encouragement of collaboration, the constant search for a better method, the general expectation that you will be doing your job a little different tomorrow than you did it today. This methodology can be applied to many other processes other than manufacturing. Many of these processes touch or support the manufacturing system and can be viewed as the “sphere of collaboration” that exists in companies. How well integrated this sphere of activities and the resources management dedicates to its function will be a dominant factor for success in the coming century.

In the 21st century, competitive advantage is created by an organization’s ability to develop innovations that solve problems quicker and create new products or services in less time. Such innovations enable people or organizations to accomplish objectives faster, easier or with fewer resources. Innovations have been the engine for the tremendous advancements in productivity in the recent decades. The challenge now



40% of the maintenance trades people will be retiring in the next 5 years

Source —
Hudson Institute

is that as organizations become more global and many functions are outsourced, the ability to collaborate becomes more difficult since many of the people who touch a process are in different countries or continents. Outsourcing is a successful technique partly because a company can take advantage of their supplier's core competences and consequently focus more of their internal resources on strengthening their own core competencies. The risk with this structure is that often all these competencies are needed during a collaboration session to solve a new problem or develop a new product. When these skills are spread out around the globe the collaboration process can be lengthy and the results anemic. This is one of the reasons that in the early implementation of TPS suppliers were expected to be near the main production facility delivering small lots and being physically available to consult on problems. Technology can now deliver this same customer-supplier intimacy on a global scale. It is the "end of distance" and all the inherent wastes and latencies that geographic barriers can introduce.

I have had the opportunity to work with several organizations as they wrestle with these problems or wastes. Project teams would wait for team meetings to exchange ideas, suppliers would be surprised by recent design changes they would receive, and management would wait for their periodic in-person meeting to redirect a team or project. I often refer to these wastes as the waste of "human latency". The natural tendency to batch ideas until the team gets together or until the supplier is in town or until the next time I see the person I need to see *in person*. There is a methodology of moving ideas in a "unit of one" despite the geographic distances that organizations are facing right now. Visual communication technologies are transforming many key business processes in the manufacturing environment. Supply Chains are compressed, customers are being brought directly into your organizations, field maintenance teams are getting the expert support they need when and where they need expert information and instructions. These technologies are removing the human latency that we have come to accept in global processes. As Dr. Shingo endlessly emphasized; identify waste in your systems and remove the waste to uncover new capabilities.

The growth of IP networks world wide has facilitated the integration of video into work processes with significant productivity increases. In one case Volkswagen of Mexico Dealership Association connected the dealerships into a center of expertise where training was delivered over video to each of the dealerships as a first step. This eliminated the need for the dealership technicians to travel to the training center for 4 days of training. Another additional benefit is that it allowed more frequent training sessions



on technical updates that come up in-between the main scheduled training events. The second step in Volkswagen's strategy is to combine data and video into the same event to attain new levels of performance. Complex repairs required the dealership to hold the car for 3–5 days until a higher skilled technician could work on the car or for a less skilled technician to work through the troubleshooting process. Over the IP networks the data from the dealership's engine analyzer was transmitted to the center of expertise at the same time a video session was initiated with the technician working on the car. A mobile camera used at the dealerships allowed the engineers at the center to coach the dealership's technician through the intricate troubleshooting process while seeing the data coming from the analyzer at the same time. This real time access to a few experts hundreds of miles away collaborating and coaching technicians in over 200 dealerships has allowed VW to improve turn around on these types of repairs to 1 day, or over a 300% improvement in repair time. First time resolution rates improved through the quick access to remote experts. Customer satisfaction has increased significantly as a result of the repair time improvement performance.



In the Oil & Gas exploration industry visual communications are used to integrate a large collaborative supply chain. Over 160 different companies participate in a data and visual communications network maintained by a service provider OilCamp. This network supports operations on the off-shore oil rigs connecting them to on-shore facilities and then on to the scores of suppliers that support this extensive operation. If the maintenance crew on a rig needs support for a critical repair or preventative maintenance task they have immediate access to experts on-shore. These experts can be engineers at an equipment supplier or members of their own engineering staff. The on-shore experts can see exactly what is going on and immediately understand the context for the problem at hand. In another situation Geologists and other consultants can be linked in visually to help in the analysis of data and samples from the drilling activities. The video link between the off shore rig and on shore facilities is on 24 hours a day 7 days a week, providing the immediacy of working relationship as if the entire on shore team was on the rig all day.

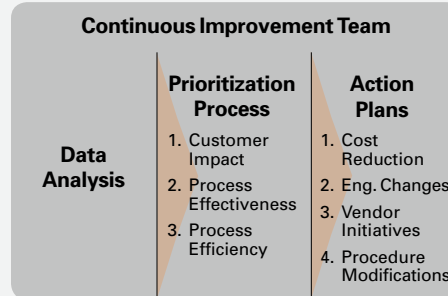
Another capability of visual communication systems is that these events can be recorded. In situations where you have a talented technician that represents the best practice in a particular operation this can be recorded and becomes part of a training video to upgrade the skills of other technicians globally.



SPEEDING THE KAIZEN ADOPTION

Video enabled quality process

- Speed root cause discovery by allowing key members to see the defect.
- Video builds team identity and helps overcome resistances.
- Enables more frequent targeted meetings with distributed members to get at the details of the issues.
- Visual audits for new process to facilitate compliance and training.



VISUALLY ENABLED KAIZEN

A key methodology for team based improvements is the technique of kaizen meetings. These meeting are supported by data that characterize a process or condition that is being investigated. A team associated with the process and possibly some technical experts are assembled to work on improvements. These are structured collaborative events that build on the strengths of the team and their experiences. They start by understanding; what were the forces that created the present condition and brainstorm new ideas to create a new level of performance. These events work

best when the team meets near the process they are studying and can “go see”, as Taiichi Ohno would say, the process for themselves. The other hallmark of good kaizen projects is that they meet for short periods of time — 20–30 minutes and frequently to generate momentum and progress quickly. The ability to tie in a supplier into these improvement efforts with little cost using video there by extending the process improvement capabilities deeper into the supply chain, has powerful benefits.

In a multi-plant environment best practices can be shared across multiple locations much more easily. Operators in one plant can actually see how the other plant has solved a problem or implemented an innovation. This is often done with long travel to each other’s plant that often is costly. As a result of this management is reluctant to support these trips and have key people unavailable for extended periods of time. These trips have very beneficial effects but usually don’t happen very often so the effects are hard to sustain. One of the values of a visually connected supply chain and multi-plant environment is that the teamwork and cooperation is constantly reinforced with frequent targeted meetings and builds on each success the team experiences. Collaboration over distances becomes commonplace, geographic separation becomes a transparent issue as innovation is implemented on a more global scale. To modify and old phrase “think global but act local”, now you can “collaborate and innovate globally while you act and stay local”.



MOBILE VIDEO COLLABORATION

Recent innovations in the field of wireless mobile video allow mobile field workers to communicate real time with remote experts. This solution supports a two way voice call simultaneously with a high resolution video stream back to an expert in the home office so that the remote expert can see exactly what the field worker is experiencing and offer guidance to resolve the issue immediately. If there is a technician that represents the best practice in a certain operation their approach to the problem and resolution can be recorded and this material is integrated into training sessions later on. In some situations the capability of an integral touch screen supports live annotation from both ends of the call on the live video stream or on freeze frame jpg files. This greatly aids the real time collaboration value of this technology.

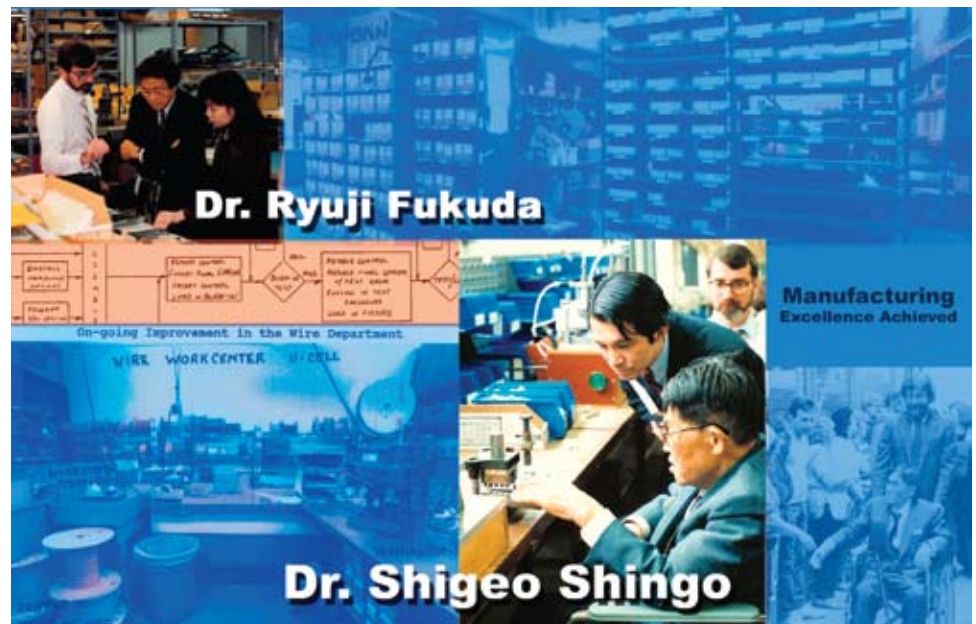
Innovations like these which are enabled by the ever increasing capabilities of the global internet (IP networks) allow new ways to deliver product service, collaborate with suppliers and remote development teams as well as preserve the knowledge of skilled experts in recorded training content.

One foundation of the TPS is to enable a “visual factory”. Let Kanban systems tell a process when to build and when to stop. A clean shop allows oil leaks to be spotted faster and initiate a maintenance activity to prevent down time. Being able to see an operation and all the contributing factors is essential for a successful continuous improvement strategy. When I was working with these methodologies I didn’t truly understand how essential they were in gaining cooperation and understanding for change and improvement. My understanding has grown, having worked with several different companies applying these “visual strategies”. When an effective visual communication strategy is integrated with the work process, enabling collaboration within the work activities, significant process improvements are achieved. The integration of visual communication into a business process enables new level of performance and the process becomes more inclusive despite and geographic barriers. It allows executives, managers and employees to “see” their business well beyond the factory floor, both into the supply chain and into the customer’s applications. It is perhaps the most effective counter measure to the “eight deadly waste” that Taiichi Ohno and Shigeo Shingo alludes to; the untapped creativity of all the employees in your company and in your supply chain. I think I now have a better idea of what they meant by this.

“Bring the problem to the expert rather than asking the expert to travel to the problem”



John Paul Williams, TANDBERG Market Development Manager, Manufacturing, is an experienced global operations executive leading innovations in manufacturing, quality and engineering. He has been a successful senior quality officer implementing Lean Manufacturing & Six Sigma methods, including developing strategic sourcing partnerships that increased competitive advantage. One of the plants he managed was the sole winner of the North American Shingo Prize for Manufacturing Excellence. Please contact John Paul Williams at johnpaul.williams@tandberg.com for more information.



About TANDBERG

TANDBERG is a leading global provider of visual communication products and services. The Company has dual headquarters in New York and Norway. TANDBERG designs, develops and markets systems and software for video, voice and data. The Company provides sales, support and value-added services in more than 90 countries worldwide. TANDBERG is publicly traded on the Oslo Stock Exchange under the ticker TAA.OL. Please visit www.tandberg.com for more information.

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