Building a Lean House without Waste from the Ground Up: HID Connecticut’s Approach to Lean Culture Change

Leadership, people, and culture are keys to lean implementation.

Jeff Schaller, PhD

A recent AME workshop at HID Corporation in North Haven, CT started with the following exercise: Teams of 11 or 12 participants were formed. Each participant was handed a number from one to 12 and was then blindfolded. Each team was asked to sequence themselves by number without talking to each other. At first there was very little activity. Then individuals within the teams began to develop ways to communicate with each other that did not involve sight or spoken communication. Participants within each group started to line up, but the process was very awkward with people bumping into each other. Slowly, the teams found ways to accomplish their objective.

The exercise is an example of the exercises used by HID in their North Haven facility to help associates develop skills needed for a lean transformation. Obstacles faced by the participants in the exercise are similar to those that an organization faces when attempting a transformation to a lean enterprise.

Usually an organization starts a lean implementation because competitive pressures necessitate improvements in performance that seem daunting, if not impossible. The organization may lack direction and not be able to get started. A program may be developed but some employees resist changes and cause the program to be ineffective. Other organizations are successful in implementing some of the lean tools and obtain limited improvement, but then progress is stalled. In order to truly transform into a lean enterprise and sustain it,

In Brief

Keys to success in a lean transformation and lessons learned along the way are shared in this article about HID Connecticut in North Haven, CT. Their step-by-step lean implementation approach has resulted in significant performance improvements such as shorter leadtimes and better on-time delivery, and higher inventory turns. Their progress reflects an understanding that, to truly transform into a lean enterprise and sustain it, a comprehensive approach is required that addresses three key elements: leadership, people, and culture.
a comprehensive approach is required that addresses three key elements: leadership, people, and culture. The 50 executives from across the United States who attended the one-day AME “kick the tires” workshop held at HID Global’s plant in North Haven (HID-CT) learned about HID’s approach for culture change to enable a lean transformation.

**About HID Corporation**

HID corporation is the premier manufacturer of contactless access control cards and readers for the security industry and has shipped over 200 million credentials to customers worldwide. Most security badges and cards around the world bear the HID logo. HID’s customers include businesses and organizations in virtually all industry sectors including healthcare, retail, industrial, commercial, government, and educational institutions with a need to protect or control information or people.

HID is a subsidiary of ASSA ABLOY within the Global Technology Division’s (GTD) Information Technology Group (ITG). HID’s world headquarters is located in Irvine, CA and HID has 11 facilities (located in North and South America, Europe, and Asia) and approximately 400 associates to serve its worldwide market.

HID-CT is one of the company’s two manufacturing facilities. The facility ships about 11 million custom cards per year and has approximately 100 full- and part-time associates. The facility is 50,000 square feet and houses operations consisting of graphics, document control, a print shop, warehousing, wire processing and grading, card lamination and cutting, card programming, Wiegand strip manufacturing, as well as shipping/receiving, accounting, customer service, information technology, engineering (software, process, manufacturing), customer service, purchasing and planning, human resources, facility maintenance, external sales, and product management.

**Recognition of the Need for Lean and Formation of the Lean Leadership Team**

Several factors convinced HID that “something” had to change. The security industry experienced rapid growth after 9/11. HID’s operations could not sustain the growth and meet customer expectations. The traditional batch and queue approach to business used by HID resulted in high inventories, poor on-time delivery, low customer satisfaction, and long leadtimes. Employee morale was also low. Several key operational metrics were heading in the wrong direction and needed to be reversed. Examples were on-time delivery at 55 percent, scrap had reached record highs of over $100,000 per month, there were high material shortages, overtime was over 15 percent, and leadtimes were in excess of 25 days.

Steve Wagner, HID's chief operating officer, heard about lean and decided to give it a try. He brought Brian Montanari on board, first on a consulting basis and then as plant manager of HID-CT, to implement lean. Montanari, currently the director of global operations at HID, had previously been involved in several successful lean implementations and convinced two former colleagues of those implementations (Paul Murphy and John Uliano) to join HID-CT as plant manager and supply chain manager, respectively. Together, these three individuals formed the lean leadership team at HID-CT and developed the approach for the continued implementation of lean.

**Building a Lean House**

Figure 1 depicts HID-CT’s strategy for implementing lean. This visual represents a “Lean House Without Waste.” Montanari explained that this visual model is similar to those used by others, mainly Chrysler, but also represents aspects that they have incorporated into previous lean implementations. This visual is used to teach and help implement lean. It also represents an analogy that building a lean organization follows the same steps and principles as building a house. These steps are: 1) building a strong foundation, 2) floor, 3) pillars or enablers, 4) lean cycle or recipe for success, 5) core beliefs and values, and 6) the roof or the results.

The foundation consists of 25 essential lean tools. At HID training is interactive and hands-on. Initially employees are taught to identify the “Eight Wastes” (transportation, waiting, overproduction, motion, unused creativity, defects, processes, and inventory) and how to eliminate them. Interactive simulations such as the Airplane game (Swank, 2003, Schaller, 2005) are used to show the associates how to identify and eliminate waste. Montanari stated, “The order in which the tools are introduced can vary from organization to organization and should be based on the ‘burning bridges’ that need to be addressed.” Murphy explained, “It is important to take a ‘just do it’ approach, because by practicing and obtaining feedback the tools are learned.”
The floor of the Lean House is waste elimination through continuous improvement or kaizen. HID’s approach to kaizen is different from most companies. Kaizen is not viewed as an activity or an event, but is viewed and taught as an overall philosophy. HID’s kaizen philosophy is a team-based approach, but not through “blitz” projects. When a problem is identified, sign-up sheets are posted for volunteers to participate on the team. A key aspect of HID’s philosophy is that continuous improvement changes do not get postponed due to the demands of production. Murphy used the phrase, “The important things need to be done, not just the urgent things,” to describe this philosophy. Management separates the urgent from the important to assure that a portion of each day is spent on the important items that will make HID a stronger supplier tomorrow. Regardless of what “orders” are on the books and what “short-term” problems may be on the company’s plate, the teams always kick off and the necessary time and resources are provided. This is an important commitment that is required for culture change. HID’s management feels that many short-term “hits” are needed to achieve long-term gains, and the tyranny of production must always be fought.

Above the kaizen floor are the five pillars of lean. The pillars are taken from the Toyota Production
System and are Just in Time, Total Quality Management (TQM), Employee Involvement, Value-Added Management, and Time-Based Competition. The management team at HID feels that the employee involvement pillar is the most important and therefore is placed in the middle of HID’s Lean House. The reason for this is that employee involvement is essential to the other four pillars. The HID philosophy is that active participation of all employees is critical to achieving sustainable results. Their management also feels that having all five pillars in place along with a strong foundation and floor will not allow the house to crumble or tip.

On top of the five pillars are the enablers: human resources, management behavior, communication, and training. In order to enable a lean organization, it is extremely important to hire and retain the best associates, and use incentives that move the organization in the proper direction to become world class. The way management acts and reacts (management behavior) is a direct reflection as to how the organization will act on a daily basis. At HID, communication is defined as having direct channels of open communication from the top down and from the bottom up as well as horizontally across the organization. HID’s management felt that communication is something that can be improved upon in every organization so HID set up formal daily, weekly, and monthly meetings to strengthen communication as part of the culture, with every associate feeling involved and informed. The fourth enabler is training. At HID training encompasses not only on-the-job training, but also lean training, supervisory training, and other soft skills. This training is separate from the initial orientation on lean and is a detailed, in-depth training on the basic elements of lean.

On top of the enablers is a level that is referred to as the “Lean Cycle.” It is based on Goldratt’s 2004 book, The Goal. There are three elements in the Lean Cycle: Reduce inventory, increase throughput, and reduce operating expense. These three elements are a recipe for success for any organization. The goal of any company is to make money and the way to do that is to reduce inventory while simultaneously increasing throughput and reducing operating expenses. This is the litmus test to determine whether or not projects or teams are succeeding.

The next level on the house represents HID’s core beliefs and values. These core beliefs and values are reflected in HID-CT’s mission statement: “Our mission is to provide our customers with the highest quality product, on time, every time, through our pursuit of world-class practices.” HID’s core beliefs and values are to be customer-focused (hence the focus of the mission), to have inspired people, to have a good reputation (pursuit of world-class practices), and to attain financial success.

By building the house from the foundation up, the roof is automatically put on the house. The roof houses the results that HID seeks: increased profits, lower cost, increased flexibility, better quality, better safety, higher morale, better service, and providing customers with timely information and deliveries. Many organizations focus on results and develop programs to “fix” a problem. This approach is reaction-based. HID-CT uses a proactive approach by building the house from the bottom up, focusing on using the tools with an understanding that positive results will be a byproduct.

Leadership Sets Direction

Having effective leadership is a key factor in successful lean implementations. An important function of an organization’s leadership is to set the direction for the organization. One tool that John Uliano brought to HID-CT was the use of policy deployment. Through Uliano’s facilitation, HID-CT now uses a policy deployment planning process to align the organization with its vision and mission, as well as proper alignment to Assa Abloy’s 2010 vision. Figure 2 shows a visual that depicts the policy deployment plan for 2006. An important element used in the yearly policy deployment planning process is the HID Compass. Murphy explained “The compass is a visual display of HID-CT’s key goals in terms of operational metrics. A compass is a tool that allows individuals to know the direction they are traveling so that the intended destination is reached. The HID Compass lets all associates know the direction or path to travel in order to fulfill the company’s mission.” When HID-CT first started to implement lean during the latter part of 2004, the HID Compass was developed for 2005 (see Figure 3). Montanari chose four key metrics and developed goals for the compass: 100 percent of the employees trained, 100 percent employee participation, 95 percent on-time delivery, and leadtimes of ten days. Montanari explained why these metrics were chosen: “Long leadtimes and poor delivery were the burning bridges when we started. HID’s sales force was telling customers not to order from HID-CT, it would be faster to print their cards themselves. To meet the on-time delivery and leadtime goals would require extensive participation from the employees (hence the 100 percent employee participation goal).
HID CT 2006 POLICY DEPLOYMENT PLAN

Our Mission is to provide our customers with the highest quality product on time, every time, through our pursuit of world class practices.

ASSA ABLOY 2010 VISION

INNOVATION  |  CUSTOMER RELEVANCE  |  COST EFFICIENCY

HID CT 2007 VISION

Grow Business to $24 Million through
- Technical Superiority
- Superior Service
- Manufacturing Excellence

To be recognized as the clear leader of
- Custom Design
- Corporate Personalization
- Lean Innovation

HID CT 2006 COMPASS

- Lead Time
- Quality
- On Time Delivery

Empowerment & Innovation

KNOWLEDGE BASED ORGANIZATION THROUGH RAPID LEARNING

Lean Systems
Engineering
Human Resources
Supply Chain Management
Systems Management
Quality
Manufacturing Processes
Plant/Safety

EFFORTLESS COMMUNICATION

KBO IS PRODUCT KNOWLEDGE, PROCESS (BUS/MFG) KNOWLEDGE & LEAN KNOWLEDGE

Figure 2.
For employees to participate and contribute on teams, they first had to be trained (hence the 100 percent employee training goal). At the beginning of 2005, HID-CT had zero percent of the employees trained, ten percent of the employees participating, 55 percent on-time delivery, and 25-day leadtimes. Montanari was asked to define how to determine if an employee was trained and participating. Montanari replied, “An employee needed to receive the basic training in lean including the identification of the eight wastes in order to count toward the employees-trained goal and an employee had to participate on at least one team to count toward the employee participation goal.” By the end of 2005, 99 percent of HID-CT’s employees had been trained and participated on at least one team. On-time delivery rose to 76 percent and leadtimes fell to 8.9 days. The laying of the foundation of training and the floor of continuous improvement through team participation during 2005 enabled a HID Compass to be developed for 2006 by the management team with suggestions from some of the associates. Figure 4 shows the compass for 2006. The four goals chosen for 2006 were five-day leadtimes, 99.9 percent external and 99 percent internal quality, on-time delivery of 95 percent with a misery index of 200, and to have implemented 30 innovative ideas from associates.

Murphy explained the misery index: “The misery index is a measure to be used in conjunction with on-time delivery. On-time delivery treats an order the same whether it is one day late or ten days late. The misery index is calculated by multiplying the number of late orders by the number of days late. The intent of this index is to measure the misery caused to customers and to ensure the focus is put on shipping
the oldest orders first as opposed to shipping products just to improve the on-time delivery calculation.”

Murphy was asked for an example of an innovative idea that was implemented. He replied, “Our East/West program is an example of an innovative idea. Our facility in Irvine, CA stocked and shipped white cards with no customization. HID-CT’s business was only custom cards. HID-CT employees came up with the idea that service could be improved to customers if HID-CT stocked and shipped white cards to customers east of the Mississippi (Irvine continues to ship to customers west of the Mississippi). This idea was implemented and resulted in customer freight savings and faster shipments to customers. Also, the Irvine facility would have needed another shift to meet demand. By moving some of the demand to HID-CT, the demand was leveled and resources of both facilities are better utilized.”

Montanari explained that the compass changed from 2005 to reflect the change in emphasis needed in the organization. “We still need training and employee participation but now that we have a base of trained employees that are participating on teams, we needed to set additional objectives for improvement and develop metrics that would reflect an improvement in customer satisfaction if met and therefore allow us to achieve our mission,” he said.

As of July 2006 HID-CT was on track to achieve its goals. Leadtimes were down to 5.7 days, external quality is 99.9 percent, internal quality is 96.5 percent, on-time delivery is 94.7 percent with a misery index of 400, and 17 innovative ideas developed by associates have been implemented.

**Culture Change Activities are the Backbone of the Lean Implementation**

The management team of HID-CT views employee involvement as the most important pillar in the lean house. Therefore a critical component of HID-CT’s lean implementation is the use of various activities that support a culture change to help break down traditional barriers and encourage employee involvement across the organization. Montanari explained, “Understanding that the ‘soft stuff’ is really the hard stuff, we realized early on that in order to be truly successful with the lean implementation, all employees needed to be engaged into working as a team and into ‘trusting’ management.”

Stephanie Blackwell, lean facilitator at HID, led workshop participants in three of the culture games that have been used at HID-CT. The game discussed at the beginning of this article was one of these games. Each of the games helps to develop teamwork but also illustrates lean concepts such as continuous improvement, the importance of having direct communications between customers and suppliers, cell production and single-piece flow, standardized work, and the need to experiment and try new approaches to solving problems. For those interested in using similar exercises to facilitate team-building in their organizations, Blackwell suggested typing the phrase, “Ice breaker games” in Google. “There are many good games on the Web that can be used to illustrate lean concepts. The games usually have instructions for the game as well as a description of the concepts that the game illustrates,” Blackwell stated.

**Chili Cook-off and Tug-of-War: Fostering Teamwork to Support Cultural Change**

HID-CT continually conducts various activities that foster teamwork and support culture change. Two examples are the application for the Shingo Prize and support for the Connecticut Food Bank.

HID-CT decided to apply for the 2005 Connecticut Shingo Prize. Montanari explained why the organization decided to apply. “Since we were just starting to implement lean, winning the prize would have been a ‘stretch,’ We felt that applying for the Shingo Prize would allow us to evaluate ourselves against world-class practices and enable us to develop projects and teams for additional improvement. To start the process, a 2005 Shingo kick-off picnic was held. During the picnic employees were formed into teams and participated in a tug-of-war tournament (see Figure 5), water balloon toss, musical chairs, and speed contests.

HID-CT did not win the 2005 Connecticut Shingo Prize but this was not viewed as a negative. HID-CT decided to celebrate their effort and held an event that turned out to be a great kick-off to generate enthusiasm for their 2006 prize application process. It was a week-long event that was a combination of “Survivor Meets the Apprentice” where employees were formed into teams, chose team names, made team posters, and participated in many “get to know you” games as well as other activities. The event culminated with a chili cook-off where the teams prepared and presented their chili to the rest of the organization (see Figure 6). The teams prepared television commercials, rap songs, poems, and other
unique presentations. Murphy noted, “The chili cook-off was held on a Friday on the last day of the month. This is important because it shows management commitment to culture change and is an example of doing things that are important, not only those that are urgent.”

HID-CT was awarded the first-ever Connecticut Shingo Commendation for Excellence in Leadership Culture and Infrastructure as a result of its initial participation. Governor M. Jodi Rell presented the award November 16, 2005.

HID-CT is proud of its fund raising activities for the Connecticut Food Bank. To raise money for the food bank, all associates brought in their favorite recipes that were compiled into what has been named the *5S Cookbook* (Sort, Set in Order, Shine, Standardize, and Sustain). The cookbooks were sold to all HID employees worldwide for $3 and proceeds were matched by HID and donated to the food bank. During April of 2006 HID-CT held a food drive. Teams were formed and competed for various prizes such as the “Best Use of Lean” which was won by the Kanban a La Cart team (see Figure 7). Other fund-raising and community involvement activities include the Hurricane Katrina relief fund, Breast Cancer Awareness Walk, and the DeFeet Hunger Walk.

HID has developed an incentive program to reward associates for their involvement in the organization’s improvement. The program has been named the “Points for Progress” program and was designed to tie together all of the activities that help HID to become a world-class company. In the program associates obtain points that can be redeemed for “prizes.” There are five ways that points can be received: 1) Points are awarded by an employee’s manager or supervisor, 2) an employee can nominate another employee for a point, 3) points are awarded to the Employee of the Quarter and nominees, 4) points are awarded to employees in a department based on balanced score card metrics, and 5) voluntary team participation. Points can be redeemed for various types of prizes. The prizes include “HID Gear” (hats, mugs, shirts, etc.), a day at a spa, a trip to Las Vegas, or a cruise.

**Evidence of Lean Transformation Across the Facility**

Many lean tools have been implemented in the facility. The selection of tools for implementation was guided by the compass and policy deployment in order to
support HID-CT’s mission. As shown in the two compasses for 2005 and 2006, the emphasis at HID-CT has been on decreasing delivery leadtimes, building a visual process, and improving product flow. A tour through the facility showed evidence of extensive use of visuals as well as heijunka boards, cellular production, employee run 5S and kanban.

HID-CT’s definition of a visual workplace is “running the floor without saying a word!” Montanari explained, “There are many aspects of this definition in place on the floor. The mantra is that anyone should be able to walk the floor and know exactly what is going on with raw material, finished goods, on-time delivery, productivity, etc. without running reports or talking to a single person.” At each area of the plant there was ample evidence of this philosophy including status boards of where production is in terms of completing orders, balanced scorecard metrics, and scheduling. The use of visuals is also extended to other activities such as the use of training matrices that show each area’s progress in cross-training associates. HID-CT’s 5S program also supports the philosophy as it is clear where each item belongs.

A good example of the lean transformation is the Document and Graphics department. Before lean was implemented, the leadtime for delivering proofs to the customer averaged over 30 hours (about four workdays). The department adopted a “just do it!” attitude towards lean and quickly implemented the following changes that focused on waste elimination and improving flow: 1) 5S implemented, 2) visual boards are used to manage engineering change orders and graphics requests, 3) visual signals are used to identify new requests, 4) cross-training of operators, 5) balanced scorecards were developed to reflect goals based on the “voice of the customer,” 6) graphic editing software that eliminated a number of redundant steps was installed, 7) team-based incentives tied to the balanced scorecard were developed, 8) error-proofing techniques were developed to improve the quality of the proofs, 9) an auditing system for document control integrity was developed, 10) standardized work for all key operations was instituted, and 11) a “pay for skills” program for all key operations was introduced. The processing time for proofs was shortened dramatically and is now an average of two hours with a high of four hours. Gail Pollicita, Document and Graphics department manager at HID-CT, cited the measurement of processing time as a key factor in the reduction. “Just instituting the measurement really motivated us to figure out how to improve the process,” she said. “We started tracking the time it takes to develop graphics in January 2005 and in six months the processing times were reduced from an average of 30 hours to four hours. The Points for Progress program also helped motivate associates.” Pollicita also felt that the management of the plant was an important factor. “I have worked at HID four years. Two years before the lean implementation and two years after and I can really see a huge difference. Under lean I feel much more empowered and motivated. My previous employer also attempted to implement lean but did not have the management capability to be successful.”

An excellent example of con-
Continuous improvement can be found in the Rotary Strip Machine (RSM) room. The RSM room takes raw Wiegand wire and attaches it to an adhesive-backed tape in the form of a binary-coded strip. The biggest issue in the RSM area was that 12 percent of the product was scraped. An improvement team was formed to work on finding the root cause of the high scrap using lean tools. Through root cause analysis, the team determined that too much “dust” was getting on the tape and caused the magnetic bit to not adhere properly, causing the strip not to function. The team decided to change the core of the tape from corrugated to plastic and to change the liner from paper to poly. An associate on the team came up with an idea of running the wire through “ear plugs.” By threading the wire through the earplug, most of the “dust” would be removed (see Figure 8). By implementing these low-cost changes, the team reduced scrap from 12 percent to five percent.

Results

Earlier in this article, the “Lean Cycle” level of the lean house was described. The three elements of the Lean Cycle are: Increase throughput, reduce inventory, and reduce operating expenses. During the past two years, HID-CT has progressed on all three elements. Throughput has increased. The number of cards shipped per month and the sales revenue has doubled. Now HID-CT ships approximately 1.4 million cards per month. Providing excellent customer service in terms of delivering products is important to maintaining and increasing throughput. During this rapid growth in volume, HID-CT has been able to reduce leadtimes and provide better on-time delivery. Leadtimes have been reduced from 25 days to 5.7 days. On-time delivery increased from 55 percent to 94.7 percent. The misery index described earlier in the article has been reduced by over 50 percent (as of July 2006) since this measurement was started in September 2005. HID-CT has been able to reduce the inventory required to support its business. Inventory turns increased from under seven times per year to over nine times per year. The company also reduced operating expenses. Unit costs decreased over 28 percent. Scrap decreased from over eight percent of sales to about four percent of sales.

Keys to Success and Lessons Learned

Montanari shared several keys to success in implementing lean based on HID-CT’s experience: 1) Mandate without mandating, 2) fight the tyranny of production, 3) focus on the soft stuff, 4) hands-on training, 5) get visual, 6) get out of your comfort zone, 7) remove C.A.V.E. (Citizens against virtually everything) people, 8) always trust/support the rest, 9) an incentive program, and 10) a team-based approach.

Asked about lessons learned or what would have been done differently if he were to do it again, Montanari responded that he would have had less patience with C.A.V.E. people and removed them sooner. “It is difficult to change when there are individuals who are not willing to change,” he said. “This is especially true when they are in management.” Montanari also stressed the importance of policy deployment and the use of the
Update on Excellence

compass as a tool to guide action, adding, “It is important that a clear direction is set so that associates and teams can take action.” (Mandate without mandating). Murphy also felt that it is important to promote an environment that encourages changes. He said, “Analysis paralysis must be avoided. It is critical to overcome inertia with the willingness to try various approaches.” (Get out of the comfort zone).

A recent study (Tracey and Flinchbaugh, 2006) found that there are five key variables that predict successful lean transformation. HID-CT’s approach to lean addresses each of variables. The first variable is development of teams as a supporting structure of lean. HID-CT uses voluntary teams to get employee involvement in continuous improvement. HID-CT also uses culture games and events to develop team skills. The second variable is calculation and communication of metrics. HID-CT has developed key metrics for the organization such as measurement of lead-times, on-time delivery, and the misery index. The goals were initially communicated through policy deployment and the compasses. Each area also has balanced scorecards that are visually displayed for everyone to see. The third variable is communication among organization members, particularly across organizational barriers. At HID-CT cross-functional teams and projects help communication across the organization. They hold monthly “all hands” meetings so everyone knows what is going on. Special events such as the chili cook-off or food bank drives foster communication across the organization. The fourth variable is communication to employees regarding their specific role in lean transformation. HID-CT uses policy deployment to communicate to the employees their roles. Balanced scorecards keep track of important metrics so everyone knows how they are doing. Frequent team meetings are held to communicate each employee’s role on the team. Acknowledgment and celebration of successes toward lean transformation is the fifth variable. HID-CT uses the “Points for Progress” program to acknowledge successes. The Shingo Prize “miss” celebration and the receipt of the Shingo Commendation for Excellence in Leadership Culture and Infrastructure have been cited by Montanari as watershed moments in HID-CT’s lean transformation.

In closing, one may ask how one knows if an organization is undergoing the necessary culture change. Montanari provided four phrases that are representative of the stages of culture evolution in terms of employee involvement needed for a lean transformation: 1) “I have a problem and am waiting for management to solve it;” 2) “I have a problem, please help me;” 3) “I have a problem but I have a solution;” 4) “I had a problem and look what we did!”

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References:

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