

Practice Policy and Quality Initiatives

Daily Management Systems in Medicine¹

Lane F. Donnelly, MD

Abbreviations: DMS = daily management system, MESA = methods, equipment, supplies, and associates

RadioGraphics 2014; 34:549–555

Published online 10.1148/rg.342130035

Content Codes: LM QA

¹From the Department of Radiology, Nemours Children's Hospital, 13535 Nemours Pkwy, Orlando, FL 32827. Received August 1, 2013; revision requested November 1 and received November 8; accepted November 15. For this journal-based SA-CME activity, the author has no financial relationships to disclose. **Address correspondence** to the author (e-mail: lane.donnelly@nemours.org).

ONLINE-ONLY SA-CME LEARNING OBJECTIVES

After completing this journal-based SA-CME activity, participants will be able to:

- Describe a daily management system.
- List the components of an effective daily readiness assessment.
- Discuss an accountability cycle for problem escalation and resolution.

See www.rsna.org/education/search/RG.

TEACHING POINTS

See last page

“Lean” (continuous improvement) organizations make use of daily management systems (DMS) that are designed so that problems can be quickly identified, front-line staff are empowered to fix the problems that they can, and problems that the front-line staff cannot fix are escalated and countermeasures created quickly. Key components of a DMS include leadership standard work, visual controls, and a daily accountability process, as well as discipline involving each of these three components. The author's organization recently had the opportunity to open a new, nonreplacement hospital, allowing the incorporation of continuous improvement principles into the hospital's design and operations. One high-priority task was the creation of a DMS, which was structured as a tiered “huddle” system. All of the front-line clinical areas, as well as all clinical and nonclinical ancillary support areas, conduct morning huddles. Problems identified at these huddles and needing escalation are then brought to a patient flow huddle and an integrated huddle. All of these huddles occur daily and have a standard format with three clearly defined components: metrics-goal review, daily readiness assessment, and problem accountability reporting. The huddles also provide a daily opportunity to see and converse with the people with whom one needs to discuss certain issues. The process of bringing people together for these huddles can contribute significantly to team formation, coordination of efforts, and development of a culture of trust.

©RSNA, 2014 • radiographics.rsna.org

Introduction

In recent years, leaders in the field of medicine have looked to other industries for better ways of managing hospitals and the delivery of medicine. Much has been learned from studying approaches such as those used in high-reliability industries (eg, aviation and nuclear power), as well as “lean” (continuous improvement) approaches perfected in certain manufacturing sectors (1–6). Many of the changes in management style have emerged from a push to move leadership out of their offices to the place in which care is delivered (1–6). Emphasis has been placed on engaging leadership in the workplace with tools such as operational or executive walk rounds (7–11) and data tools such as balanced scorecards (12–16). Lean systems can be very reliable and efficient, but these characteristics rely on standard work and efficient delivery with low inventories (1–6). Both the laws of entropy and the nature of human behavior cause deviation from the standard over time, with the result that lean systems must rely heavily on daily management systems (DMS) (2).

Figure 1. Photograph shows the integration huddle, which is attended by representatives from all front-line huddles as well as from huddles of support areas. It is conducted with participants standing in front of visibility boards. There are boards for metrics-goal review (left), daily readiness assessment with MESA (*m*ethods, *e*quipment, *s*upplies, and *a*ssociates) and “quick hits” (simple problems that are likely to be resolved that same day) (center), and problem accountability reporting for more complex problems (right).



In the “improvement” world, great emphasis is placed on improving the culture—that is, moving toward a culture of improvement, safety, and reliability. Culture can be defined as the sum of peoples’ habits in terms of how they get their work done (1). Most people would agree that a healthy work culture is essential for success. Paradoxically, however, to create a culture conducive to improvement and implementation, one should not focus on the culture itself, but on the management system (1). Culture is the result of and is heavily influenced by the choice of a management system (1). Focusing directly on improving the culture is like focusing on the nature of water when learning to swim, rather than on developing one’s stroke. To change the culture, one needs to change the DMS—that is, the expectations of how leaders lead and how daily escalation and solving of problems occurs (1).

DMS are designed so that problems can be quickly identified, front-line staff are empowered to fix these problems as they are able, and problems that the front-line staff cannot fix are escalated and countermeasures created quickly. An optimal DMS is designed to identify problems and bring them to the surface (3). Key components of a DMS include leadership standard work, visual controls, and a daily accountability process, as well as discipline involving each of these three components (1). Our organization recently had the opportunity to open a new, nonreplacement hospital, allowing us to incorporate continuous improvement principles into the hospital’s design and operations. We chose to focus on creation of a DMS, process flow mapping and creation of standard work for as many of our processes as possible, and creation of a lean supply chain system. In this article, I describe our organization’s DMS in terms of its tiered “huddle” structure, its key components, and the lessons we have learned from its design and implementation.

Teaching
Point

Daily Management System

Our DMS is structured as a tiered huddle system. All of the front-line clinical areas (inpatient, outpatient, critical care, perioperative, and emergency), as well as clinical (radiology, laboratory, pathology, and rehabilitation) and nonclinical (eg, facilities, information technology, human resources, supply chain, and communications) ancillary areas, have morning huddles. Problems identified at each of these huddles and needing escalation are then brought to a patient flow huddle and an integrated huddle. **All of these huddles occur daily and have a standard format with three clearly defined components: metrics-goal review, daily readiness assessment, and problem accountability reporting** (Fig 1).

Teaching
Point

Daily Huddles

Front-line huddles are conducted in a standard fashion across the enterprise (1). These huddles are brief (usually ≤ 15 minutes) and are attended by all available front-line associates and local leaders. For clinical huddles, physicians are an important component because their perspectives and insights are crucial to optimal operations. Huddles are typically overseen by the local leader but are often run, on a rotating basis, by front-line associates. We have designed scripts to help those running the huddles. Questions are standardized so that they are consistent, clearly understood, and reliably cover important topics.

Huddles are typically conducted with all attendees standing (Fig 1), as opposed to sitting around a table as at most meetings. This arrangement helps keep the meetings brief. A huddle is conducted in or near the unit’s work area, allowing both more participation by front-line associates and easy access to the work area. Conducting a huddle near the work area allows inspection of the workplace and staff members’ work habits as part of the huddle, so that any issues that are

Teaching
Point

identified can be quickly evaluated. Visiting the actual workplace is always enlightening: There will be tasks that leaders assumed were being performed routinely when in fact they are not, as well as tasks that *are* being performed routinely that leaders were not aware of (3).

At our institution, each front-line huddle occurs daily at the time chosen by that particular area, but always between 6 AM and 9 AM. The patient flow huddle occurs at 9:15 AM, and the integration huddle at 9:30 AM. Daily huddles for use in medicine have been described in the literature (17,18).

Component 1: Metrics and Goals.—The importance of data and the transparent display of those data in driving high performance has been stressed (12–18). Often, the data are displayed in a balanced scorecard format. Balanced scorecards have been used in industry and, to a lesser extent, in medicine to align performance measures with strategy (12–18). In healthcare, such scorecards reflect institutional strategic areas such as customer satisfaction, quality and safety, finance, research, education, and people (14). The transparent display of data is perhaps the strongest motivational tool for hospital leaders: One tends to get what one measures (14). We have incorporated certain aspects of a balanced scorecard into our huddle process.

The first portion of the huddle process is dedicated to the evaluation of metrics and goals for that particular area. The metrics correspond to our institutional priorities and are categorized as follows: quality and safety, patient/family experience, delivery, cost, and engaged associates. For each category, several goals are chosen. These goals are in line with goals chosen by the organization. Examples of goals used at the level of our integration huddle include days since the last sentinel event (quality and safety), percentage of patients and families who award us a perfect score (5 out of 5) for likelihood of recommending based on survey results (patient/family experience), metrics germane to patient access or supply chain fill rate (delivery), operational profit or loss (cost), and data from an associate satisfaction pulse survey (engaged associates). Each metric in an area is reviewed, and any relevant questions and issues are elicited.

Data regarding these metrics are updated daily, weekly, or monthly. We continue to experiment as to the optimal frequency with which to review these data. Too-frequent review can result in significant redundancy, whereas too-infrequent review can result in a delayed response. We are currently conducting this portion of the huddles in its entirety only on Mondays and calling out significant updates as they occur throughout the week.

Component 2: Daily Readiness Assessment.—

At the core of the activities of each huddle is the daily readiness assessment. This assessment is used to determine which patients we either know or anticipate that we will be serving that day, and whether we are prepared to care for them in a high-quality, safe, and efficient manner. **We use the acronym MESA**, discussing in detail each of its four components. *Methods* has to do with whether we have the proper protocols and standard work in place to meet anticipated patient needs. Are there any patients with atypical needs or a diagnosis that will challenge our standard work and protocols? Do staff members have any questions about their assignments, and are they clear on the protocols that they are to use? *Equipment* concerns whether we have the proper equipment. Is any atypical equipment required based on unique patient needs? Is the equipment operational? Does everyone have the appropriate training to operate the equipment that will be needed? *Supplies* has to do with whether we have the right supplies. Are any atypical supplies required based on the needs of scheduled patients? Are there patient needs that may require more than the typical amount of a standard supply? Do we have any issues with recalls, “stock outs,” or expired supplies? *Associates* concerns whether we have the right associates in place to meet anticipated patient needs. Has anyone called in sick? On the basis of patient volumes in specific areas, are we going to have staffing shortages anywhere?

Component 3: Problem Management–Accountability Cycle.—

The third component of the huddle revolves around identifying the problem, assigning ownership of the problem, and establishing expectations concerning follow-up and implementation of a countermeasure. With the MESA assessment, problems are often identified. We classify these problems as either quick hits or more complex issues (likely requiring more time, effort, and coordination). Quick hits are kept on the daily readiness assessment visibility board under the applicable component of MESA. Examples of quick hits include a piece of equipment that needs repair, a supply that is out of stock in a particular area, or a shortage of associates in an area on a particular shift.

A problem that is thought to be complex or initially was thought to be a quick hit but is not being resolved in a timely fashion is transferred to the “complex issues” board. For each issue on the complex issues board, the following parameters are defined: nature of the issue, defined owner of the issue, type of issue based on our institutional priorities, date the issue was first



Figure 2. Photograph obtained immediately following the formal portion of the integration huddle demonstrates the value of the informal portion of the huddle, where administrators and physicians can connect and communicate.

identified, and date on which the owner is to make a progress report. Issues on the complex issues board may include those that involve (a) changes to the information technology infrastructure, (b) changes to the physical layout, or (c) implications for multiple areas or groups—for example, changes that need to be made to the admission or discharge process or a change in use of space to expedite patient flow. Clear communication and shared expectations are key components of the accountability cycle for problem solving (1,5).

Tiered Huddle Structure

DMS are sometimes designed as a tiered huddle system (1). The first tier consists of the front-line areas. Emphasizing first-tier huddles helps give the associates and local leaders in the front line accountability for and oversight of front-line problems. The goal is to enable front-line staff to solve their own problems whenever possible and to be empowered by that ownership. This empowerment is essential in creating a culture conducive to continuous improvement (1–6). Higher-level tiers are established so that problems identified in the front-line huddles that cannot be solved there or that may have multiarea implications are escalated to a higher level and countermeasures created. The number of tiers in a medical system depends on the size and nature of that system. The other important component of a tiered system is communication of solutions and countermeasures back to the front-line huddles.

At our hospital, we have two higher-tier huddles relative to the front-line huddles: the patient flow huddle and the integration huddle. These two huddles are held one after the other in the same space, located centrally in the hospital.

As mentioned earlier, the patient flow huddle is held at 9:15 AM each day. Attendees from various front-line huddles have a discussion that primarily

concerns current inpatient census, outpatient clinic load, and anticipated admissions and discharges. The daily readiness assessment performed with MESA at the patient flow huddle populates the data board for the integration huddle and generates many of the issues identified as quick hits.

The integration huddle immediately follows the patient flow huddle and includes representatives from all of the front-line areas as well as representatives from support areas such as human resources, marketing and communications, finance, and information technology (Figs 1–3). There are often about 40 attendees. The same format of metrics-goal review, daily readiness assessment, and problem accountability reporting is followed. Issues that have arisen from the front-line huddles and for which a countermeasure has been identified are noted on the visibility boards with a symbol indicating that it is important for the attendees of the integration huddle to communicate these countermeasures back to the front-line huddles. Although this seems like a simple concept, in our experience it has been one of the bigger challenges. In addition, an attendee from marketing and communications is always present to help with any issues that are discussed at the integration huddle and that need to be communicated to associates in general.

Visibility Boards

One of the primary elements of a lean system is visibility, the achievement of which includes keeping the workplace orderly so that abnormalities are easily identified (1–6) as well as the use of visibility boards in DMS. Holding DMS huddles in front of visibility boards helps expose situations in which expectations differ from reality (1). All three components of our huddles (described earlier) are much more easily discussed and implemented when they are addressed in front of dedicated boards (Fig 1).

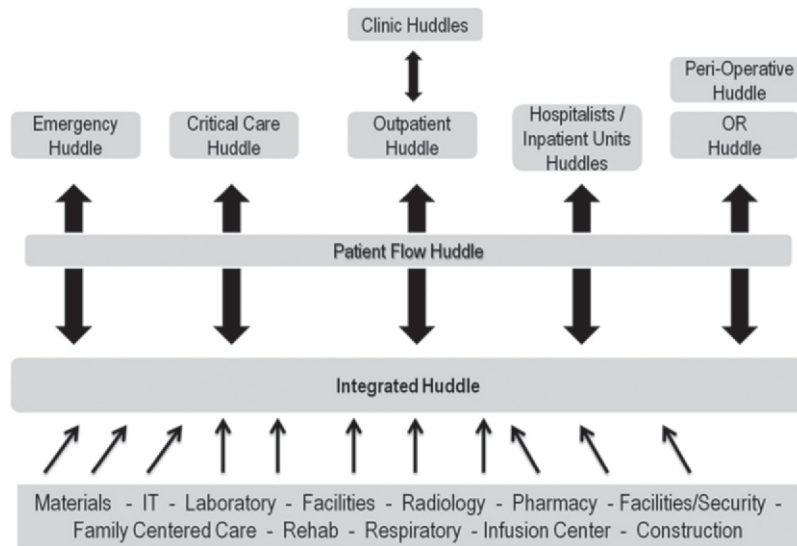


Figure 3. Diagram illustrates the tiered huddle process used at our institution. The process comprises front-line clinical huddles as well as huddles of all support areas, including radiology. Issues are identified and solutions implemented by primary huddles whenever possible. Issues that cannot be resolved by front-line huddles are escalated to the patient flow huddle or integrated huddle. *IT* = information technology, *OR* = operating room.

Leadership Standard Work

Leaders in a lean system have two primary responsibilities: (a) to make sure the system runs as designed, and (b) to ensure continuous improvement of the system (1). *Kaizen* is the Japanese word for “improvement” (1–6). This term is ubiquitously used in lean systems to describe a philosophy that puts a premium on continuous improvement, and it has come to refer to a “kaizen” or improvement event. Lean system leaders can be viewed as “maintenance kaizen” (responsible for keeping the system running as designed) and “improvement kaizen” (responsible for continuously improving the system) (2).

In traditional management, the manner in which oversight is conducted is often closely related to and dependent on the individual leader’s style. In such systems, management style may change significantly with a change in leadership (1) or even with a change in shift. With leadership standard work, DMS are designed to function independently of whether one particular person is leading and are therefore more predictable and reliable over time. I am always struck by leaders whom one sometimes encounters at national meetings who are continually being pulled from the meeting by incoming phone calls from their places of work. It seems that these people cannot be away from their institutions and still have the institution function. I always suspect that these people are not from organizations with a standardized DMS in place; instead, the management system is designed around and dependent upon them. Indeed, sometimes it seems that these leaders like it that way and enjoy being able to complain about their situation. I have been struck by how infrequently I get called about issues when I am away, a fact that I attribute to having a DMS in place.

Leadership standard work relies on checklists and standard processes and should be more standardized the closer the leader is to the front line. People in positions at a greater distance from the front line do not need to devote as much time to standard work and have more time for discretionary work (1).

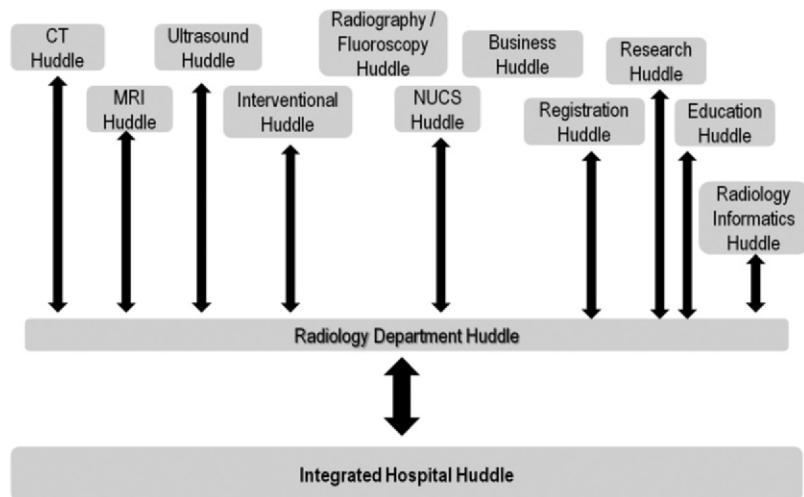
At our institution, we have chosen to focus on several areas of standard work for leaders. First, we established a meeting-free time of day (from the beginning of the day to 10:30 AM), during which time no standard meetings occur and our leadership is expected to attend DMS huddles and spend time in the workplace. We also created scripts for huddle management, consisting of a list of standard questions that allow huddles to be managed by any of our front-line staff members in a consistent and standardized fashion.

Evolution of Processes

Our DMS has been in a continual state of evolution, and we continue to learn. We had the opportunity to design our DMS around the opening of a new hospital. Almost all of our employees, including physicians (we have a predominantly employed physician model), were new to the system, allowing us to create a DMS from scratch. The DMS actually started as a single integration huddle, evolving into our tiered huddle system by the time the hospital opened about a half year later. We continually change the time and location of our huddles, the structure of our scripts, and our visibility boards. The division of each huddle into the three components described earlier occurred over time.

One question that was continually debated was the degree to which the huddles needed to be standardized across the system and how much individual experimentation should be permitted.

Figure 4. Diagram illustrates a potential huddle structure for a large radiology department. Divisional and radiology support area huddles escalate into a radiology department huddle, and representatives from the department-wide huddle attend the integrated hospital huddle. *CT* = computed tomography, *MRI* = magnetic resonance imaging, *NUCS* = nuclear medicine.



Standardization is generally held to be a good thing, but standardizing before one knows what he or she is doing is probably not optimal (1). Because we were clearly behind on the learning curve for lean management, we allowed experimentation in each of the huddles and learned from each other, then disseminated the characteristics that were successful to other huddles. We would often use one of our more advanced huddles as a “test” huddle to try new approaches for a period of time before deploying a new version of the huddles. Once our system was more stable and we were more confident of what our expected standards should be, we were able to deploy the new changes and perform defined audits of the huddle process, taking advantage of our leadership attendance at huddles. These audits helped us determine where we were in terms of DMS implementation across the organization, and were a constant source of learning. Our process continues to evolve beyond what is described in this article.

Potential DMS Structures in Radiology

Depending on the size and complexity of a radiology department and of the organization it serves, the DMS and tiered huddle structure may vary considerably. In a small hospital with a small radiology department, the entire department may have a single start-up huddle of technologists and radiologists, with a single individual representing the department at higher-tier huddles. This is how the DMS structure is currently implemented for our imaging services. In a larger department with multiple well-defined divisions such as modality-oriented locations (eg, computed tomography, magnetic resonance imaging, ultrasonography, nuclear medicine, radiography, interventional radiology, and fluoroscopy) or organ-based divisions (eg, neuroimaging, body imaging,

musculoskeletal imaging, and pediatric imaging), there may be morning huddles in each of these divisions, with representatives sent to a higher-tier department-wide huddle and representatives from that huddle sent to a yet higher-tier hospital huddle (Fig 4). Likewise, depending on its size, the radiology information technology group may have its own huddle, with representatives sent to the department huddle.

In a radiology system serving multiple locations, there may be huddles at each location, with representatives attending a virtual teleconference or videoconference huddle for the entire imaging system.

The tiering and structure of a huddle can be tailored to fit the system that the huddle is serving.

Our Experience Thus Far

Although we have much to learn, we feel strongly that the use of a defined DMS has served our institution well. Our ability to identify, appropriately escalate, and solve issues has been greatly enhanced. On average, we identify approximately 39 complex issues per month, with a median time to resolution of 5.5 days. More intricate issues (eg, those involving information technology, patient flow, or facility changes) often take longer to solve.

In addition, we have found that the process of bringing groups of people together for these brief huddles has greatly contributed to team formation and fostered a culture of trust. Before our use of a DMS, we were much more prone to discoordination of efforts: Either two groups of people were working on the same issue independently without each other’s knowledge, or no one was working on the issue (each group thinking that another group was working on it). The huddles not only helped us coordinate such efforts, but also helped us minimize the develop-

ment and propagation of false rumors. Both the formal and informal components of the huddles have been beneficial. The huddles now provide a daily opportunity to see and converse with the people with whom one needs to discuss certain issues (Fig 2).

After having used a defined DMS, we would not even consider going back to not having one. We would highly recommend the implementation of such a system.

References

1. Mann D. Creating a lean culture: tools to sustain lean conversions. 2nd ed. Boca Raton, Fla: CRC, 2010; 3–103.
2. Liker JK, Convis GL. The Toyota way to lean leadership: achieving and sustaining excellence through leadership development. New York, NY: McGraw Hill, 2012; 121–143.
3. Koenigsaecker G. Leading the lean enterprise transformation. Boca Raton, Fla: CRC, 2009; 9–77.
4. Liker JK. The Toyota way: 14 management principles form the world's greatest manufacturer. New York, NY: McGraw Hill, 2004; 1–159.
5. Bussell J. Anatomy of a lean leader as illustrated by 10 modern CEOs and Abraham Lincoln. Northbrook, Ill: UL LLC, 2012; 1–150.
6. Toussaint J, Gerard RA. On the mend: revolutionizing healthcare to save lives and transform the industry. Cambridge, Mass: Lean Enterprise Institute, 2010; 1–138.
7. Donnelly LF, Dickerson JM, Lehkamp TW, Gessner KE, Moskovitz J, Hutchinson S. IRQN award paper. Operational rounds: a practical administrative process to improve safety and clinical services in radiology. *J Am Coll Radiol* 2008;5(11): 1142–1149.
8. Frankel A, Graydon-Baker E, Neppel C, Simmonds T, Gustafson M, Gandhi TK. Patient safety leadership walk rounds. *Jt Comm J Qual Saf* 2003;29(1): 16–26.
9. Campbell DA Jr, Thompson M. Patient safety rounds: description of an inexpensive but important strategy to improve the safety culture. *Am J Med Qual* 2007;22(1):26–33.
10. Thomas EJ, Sexton JB, Neilands TB, Frankel A, Helmreich RL. The effect of executive walk rounds on nurse safety climate attitudes: a randomized trial of clinical units [ISRCTN85147255] [corrected]. *BMC Health Serv Res* 2005;5(1):28–37.
11. Pronovost PJ, Weast B, Bishop K, et al. Senior executive adopt-a-work unit: a model for safety improvement. *Jt Comm J Qual Saf* 2004;30(2):59–68.
12. Kaplan RS, Norton DP. The balanced scorecard: measures that drive performance. *Harv Bus Rev* 1992;70(1):71–79.
13. Zelman WN, Pink GH, Matthias CB. Use of the balanced scorecard in health care. *J Health Care Finance* 2003;29(4):1–16.
14. Donnelly LF, Gessner KE, Dickerson JM, et al. Quality initiatives: department scorecard—a tool to help drive imaging care delivery performance. *RadioGraphics* 2010;30(7):2029–2038.
15. Johnson CD, Krecke KN, Miranda R, Roberts CC, Denham C. Quality initiatives: developing a radiology quality and safety program—a primer. *RadioGraphics* 2009;29(4):951–959.
16. Thrall JH. Quality and safety revolution in health care. *Radiology* 2004;233(1):3–6.
17. Nacht ES. 14 ingredients of “the huddle” in the practice of pediatric dentistry. *J Clin Pediatr Dent* 1993;17(4):211–212.
18. Brita-Rossi P, Adduci D, Kaufman J, Lipson SJ, Totte C, Wasserman K. Improving the process of care: the cost-quality value of interdisciplinary collaboration. *J Nurs Care Qual* 1996;10(2):10–16.

Practice Policy and Quality Initiatives Daily Management Systems in Medicine

Lane F. Donnelly, MD

RadioGraphics 2014; 34:549–555 • Published online 10.1148/rg.342130035 • Content Codes: **LM** **QA**

Page 550

DMS are designed so that problems can be quickly identified, front-line staff are empowered to fix these problems as they are able, and problems that the front-line staff cannot fix are escalated and countermeasures created quickly.

Page 550

All of these huddles occur daily and have a standard format with three clearly defined components: metrics-goal review, daily readiness assessment, and problem accountability reporting.

Page 550

Huddles are typically conducted with all attendees standing, as opposed to sitting around a table as at most meetings. This arrangement helps keep the meetings brief. A huddle is conducted in or near the unit's work area, allowing both more participation by front-line associates and easy access to the work area.

Page 551

We use the acronym MESA.

Page 553

Leaders in a lean system have two primary responsibilities: (a) to make sure the system runs as designed, and (b) to ensure continuous improvement of the system.