KANBAN DESIGN AND IMPLEMENTATION OVERVIEW

THE KANBAN VISION

When touring a plant that has a highly effective kanban system, the system appears simplistic and self-perpetuating. Employees are not running around with hot lists, the production process is efficient, and the plant seems almost void of material. When the host is questioned concerning the kanban system the response reinforce what the visiting team has already read concerning kanban. A predetermined quantity is kept on hand, consumption triggers replenishment, suppliers respond to the plant replenishment needs, and the benefits are enormous. When the tour is concluded the team is excited about applying kanban to their plant. The vision is quite clear.

However, what typically is not available from the tour, most publication, or oversimplified kanban seminars is that no two-kanban systems are identical and what was seen cannot in its entirety be emulated. More importantly, what was not seen or explained is quite extensive. In other words, the key to having an effective kanban system begins with understanding the needs of your specific environment and then applying the appropriate kanban techniques to satisfy those needs. Equally as important is how kanban is implemented. Regardless how effective the kanban system is designed, an improperly implemented kanban system can create immediate issues. Some aspects of an improperly implemented kanban system can keep the system ineffective long after the implementation has taken place.

Typical Outcome of a Proper Kanban Design

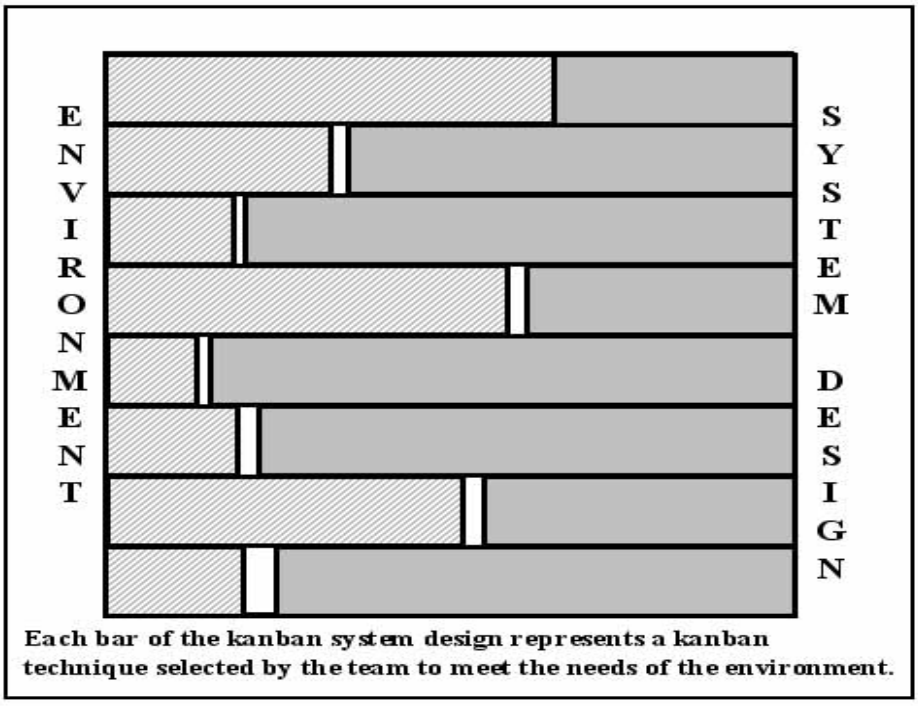
A properly designed kanban system will be tailored to fit the needs of the environment and will encounter minimal issues on a day-to-day basis. **See Figure 0-1**. The rewards for properly designing and implementing a kanban system are enormous. A well-designed kanban system can provide what is needed, when needed, in appropriate quantities while significantly lowering inventory, shortages, non-value added activities, and total overall costs. Customer on-time deliveries are dramatically improved while the overall quality of life for the organization is enhanced immensely permitting concentration on strategic matters versus continuously compensating for an ineffective replenishment system. With a proper kanban design and implementation the system will at a minimum match any competitor and in application appear to perpetuate itself without effort.

Impact of an Improper Kanban Design

In designing your kanban system there are twenty-five kanban design points in the design process that need to have the environmental factors evaluated and kanban techniques

selected **("How to Design & Implement Kanban" Methodology is Patent Pending)**. The kanban techniques selected work together in forming an overall kanban system that meets the needs of the environment as demonstrated in **Figure 0-1**. Each bar represents a kanban technique selected. The end result of the kanban technique(s) selected defines your kanban system that is meant to satisfy the needs of your specific environment. The symptoms of an improperly designed kanban system are high inventory levels coupled with shortages, triggered containers not having credibility due to inflated kanban lot sizes, hot lists, increased total costs and late customer orders. This is a direct result of not tailoring the kanban system to meet the needs of the environment it is intended to serve. **See Figure 0-2**. High inventory levels are normally a result of high safety stock settings compensating for the misgivings of the kanban system design. Hot lists emerge due to the lack of credibility of the triggering process; *after all, there is typically plenty of material left in all the other un-triggered containers*. While it may be true that a company can state they are officially on kanban it does not change the fact that the kanban system in question is only a shadow of its overall potential. In remote cases the users may even be better off with the improperly designed kanban system than they were previously. The analogy would be similar to a person crossing the desert bare-footed and now is given to walk on cardboard soles. The cardboard soles may be decried as a literal miracle but it does not lend itself to competing in a Marathon. In this day and time with global competition there is little question that each company is literally in a marathon to become and remain the absolute best in the world.

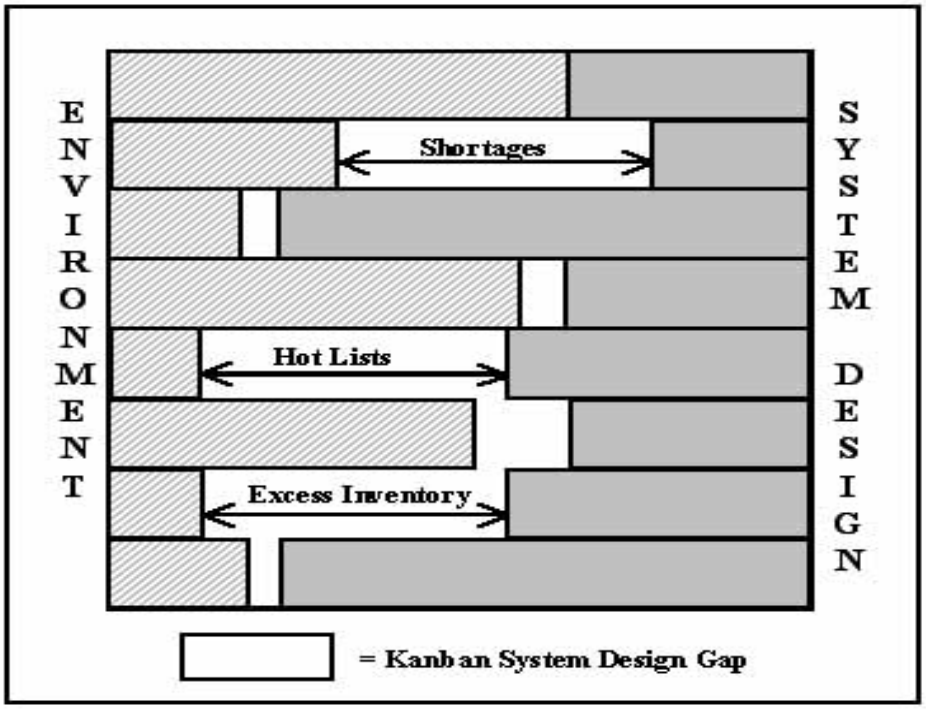
Figure 0-1 Design of the Kanban System That Meets the Needs of the Environment



The real power behind the successful application of kanban is in understanding your environment, choosing the appropriate kanban techniques that are in alignment with your

environment, and implementing it in a correct manner. In over eighteen years of designing and implementing both manual and fully automated kanban for companies ranging in size from $12 Million to $10 Billion, Replenishment Technology Group (RTG) has identified twenty-five different design points. These design points are where decisions are made within the kanban design process where specific kanban techniques are selected based upon the environmental factors of the given company. Replenishment Technology Group has also taught kanban to hundreds of the fortune 500 manufacturing companies and has authored two books: *Kanban for American Industry* and *Integrating Kanban with MRPII,* and a third book *Custom Kanban: Designing the System to Meet the Needs of Your Environment* is slated for publication September 2006, publisher Productivity Press. Replenishment Technology Group is fully aware of the diversity of industry and the distinction in environments that can even exist between competitors building the same type of product. ***Simplicity and success*** of operating a kanban system comes from it being well designed to meet the needs of the environment it is intended to serve and for it to be properly implemented**.** It does not come from replicating what was seen on a plant tour or by following overly simplistic literature or workshop. The analogy would be similar to that of an airplane. It is one thing to understand that an airplane has an engine, wings, and tail rudder, and can stay aloft. Yet, it would be quite a different situation to design, build and fly the airplane.

Figure 0-2 Design of the Kanban System Does Not Meet the Needs of the Environment



The typical teachings of kanban at best demonstrates the final product being load smooth and sequenced, several supporting part numbers hand calculated and placed on a multiple container kanban option, triggered demand being presented to the source of

replenishment in the form of kanban cards, and suppliers performing milk runs. For those who apply this vision as a literal kanban design to their specific environment, the reality is:

- The final product build schedule cannot be load smooth or sequence to its fullest extent in most environments and in a number of applications not at all. This creates non-linear demand patterns that will result in stockouts unless specific kanban techniques are applied.
- Not all part numbers can or should be placed on kanban due to their individual component profile such as; erratic demand patterns, quality issues, phase ins-phase outs, and or supplier unwillingness to participate on kanban. For these and other reasons a parallel alternative replenishment methodology is required for these part numbers and their requirements **must be in sync** with the timing and quantities of kanban when triggered.
- The supply base is typically not located within a short distance from the plant permitting milk runs. In fact, the majority of OEM's have supply bases spanning the North American continent and the globe.
- Other kanban container options other than the Multiple Container are available and may be better suited for your specific component profile or environmental factors permitting a least total cost solution from a transportation / inventory carrying cost standpoint.
- You may have too many part numbers to be effectively recalculated by hand each time the anticipated demand is projected to shift. Many environments have hundreds, thousands, and tens of thousands of part numbers. If the kanban lot sizes are not recalculated and adjusted immediately after demand shifts stockouts will occur as well as inflated inventory. This may require automated kanban calculations.
- The amount of time and effort in many environments to manually adjust the number of kanban cards in process or kanban lot sizes can be an overwhelming task each planning period depending upon the quantity of part numbers and degree of shift in demand. Automated adjustments to the number of kanban cards or kanban lot sizes may be mandatory.
- In the world of collaborative supply chain where the pull methodology is an integral component it is difficult if not impossible to visualize multiple partners hand calculating and phoning in collaborative information such as projected demand or triggered requirements on thousands of part numbers. These systems are more often than not automated.

The impact for mistaking the oversimplification of the vision of a kanban system for a kanban design intended for your specific environment at the very least is a partially functioning kanban system that is expensive from a staffing perspective and highly ineffective from a reactionary standpoint. The most probable impact from a kanban design not suited for your environment is high inventory coupled with shortages, a triggering mechanism that is augmented by hot lists, late customer orders, and high

operating costs from not eliminating the non-value-added activities associated with perpetuating the kanban system. The manner in which your kanban system is implemented also plays a key role. An improperly implemented kanban system can have both immediate and long-term effects. An immediate impact could be as simple as mass shortages from implementing the lower level of components first while still batch building at the final assembly level. An example of a long-term effect of an improperly implemented kanban system is placing items on kanban that are too erratic in demand. These items would create stockouts well beyond the point of implementation and give the impression that safety stock needs to be increased on kanban items across the board when in fact only those items with erratic demand patterns need to be placed on alternative replenishment methodologies.