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The Machine Build Champion

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A LeanSigma Transformation eventually leads every company to identify at least a few needs that are not currently available within its four walls. The most common need is discovered when a kaizen team unlocks their creativity and identifies a special machine that would make a manufacturing cell really flow. This could be anything from a simple hydraulic press to a drilling operation capable of making many different holes within takt time.

It is as this point, when leaders look around the shop at the great ideas and the shop floor associates released from old jobs by new improvements, that many start dreaming of their own machine building team. But how does an organization *know* it is ready to create a Machine Build Group in support of Phase II of the LeanSigma Transformation?

Simply put, a company knows when they are ready when the machines required to create flow and reduce operator cycle time do not involve mainline manufacturing machines like the super-fast monuments or for traditional processes anymore. Instead, the solution calls for simple, custom designed solutions that cannot be solved with just more capital. Or it is when your kaizen teams start observing 30 percent of the operator cycle time is consumed by hand rotating a part for accessibility, or when a small punching operation that requires only 30 tons could accomplish true one-piece flow and eliminate a batching operation across the only 250-ton mechanical press in your department.

Once the commitment is made to create a Machine Build Group, the considerations to weigh include which resources the company is willing to commit, how to leverage the competitive advantages from custom-built machines, and determining your technical competencies in this area.

The first consideration regarding resources should not be driven solely by the number of freed-up operators. First a champion must be chosen to provide guidance from the technical side of the Lean Transformation process. Your Machine Build champion must be someone with a hands-on background in machine tooling or machining that loves to tinker – a person I like to call an *imagineer*. The skill set for your Machine Build champion must include a thorough understanding of how a shop floor kaizen functions. It is impossible for someone to jump into the building of lean processes or simple machines without complete grasp of the principles of the Lean Production System

Case Study

At Hill-Rom we knew that no one could compete with our specialty machines and the custom-built manufacturing processes. Eliminating the waste from the product design and its manufacturing process using 3P/2P and DFLS, made product releases go more smoothly than ever. Our teams had thought through all of the possible production issues concurrent with the product and process design making time to market accomplishments without parallel in the industry. The paced assembly lines, fabrication and welding autonomated cells, and simple manufacturing lines created production launches faster and smoother than any competitor could ever match. As well as making our value-added ratios for those specific lines in the 30 percent range. A finished hospital bed, patient chair, or hospital furniture was taken from raw material and parts to finished product in minutes and hours; not days and weeks.

– most importantly one-piece flow cell layout, production to takt time, and demand-pull from the shop floor.

Keep your eyes open for the innovators from within your maintenance, tooling, or machinist groups for that lean convert who gets a rush from the challenge of lean production. Sign him up and give him the opportunity to excel by building a custom engineered machine or process.

A Machine Build group and its leader must develop expertise in Design for Lean Sigma, also known as 3P/2P or product and process preparation. Converting batch manufacturing processes to the new vision of lean manufacturing takes expertise in shop floor kaizen and firm footing in the principles of just in time, *jidoka* (autonomation) and production smoothing.

Having a dedicated Machine Build group means that lean machines can be developed to meet takt time, flow production, and demand pull, while exemplifying the principles of jidoka. Even before the first part is manufactured, each process can be scrutinized to eliminate ergonomic difficulties and machines built to put all intersections between man and machine in the same horizontal plane, inside the operator's "strike zone." A machine-build champion ensures each process is mistake-proofed and the separation of man from machine has been optimized to reduce operator cycle time and maximize the value-added ratio and productivity.

This tick list should be useful as you build machines to leverage your new competitive advantage, knowing your competitors cannot duplicate your equipment.

- ❑ Be Visual
  a. Allow operators to see the flow and provide mutual assistance
  b. Use highly visible andons that can be clearly seen with obvious meaning.

- ❑ Keep the operator in mind
  a. Minimize transport distances.
  b. Minimize workstation size. Keep it no wider than the operators themselves.
  c. Keep machine interfaces for the operator in front and maintenance interfaces in rear of machines.

- ❑ Purchase the minimum and make it versatile
  a. Buy simple machines and add only those features required to reduce operator cycle time.
  b. Understand feeds and speeds: The machine must only fit takt time, neither too fast nor too slow which keeps costs down.
  c. Capacity and capability must meet takt time and process control requirements.
  d. Use the standard base units of common hydraulic systems, electronics, pneumatics, and controls. Whenever possible use hydraulic machines over pneumatics for their robustness and mobility.
  e. Keep the Machine Build Group's focus on low cost and the profitability of doing internally what others cannot accomplish. Using outside contractors as machine builders means taking a step away from lean methods and the competitive advantage of personalized processes.

- ❑ Moveable equipment
  a. Use modular, self-contained units.
  b. Avoid equipment with roots, such as pits, overhead cranes or permanently attached services.
  c. Always place machines on wheels.
  d. Design equipment for quick disconnects.

- ❑ Quick changeovers
  a. Design for quick set-ups or no set-ups. Remember the fastest changeover is one you never need to do.
  b. Settle for nothing less that "first-part-good" machines.

- ❑ Make processing waste-free
  a. Eliminate "cutting air".
  b. Minimize machine operation steps and movements by closely studying value-added times.
  c. Know the life of every cutting tool and factor it into machine capacity.

- ❑ Equipment Must Accommodate Pull Mechanisms
  a. Link machines to perform as one; create pull cells that accentuate the value-added time ratio of the manufacturing process.
  b. Produce only in response to a demand signal.
  c. Allow for line stop problems.

We often counsel kaizen teams to ignore cost when implementing ideas. Machine Build is exempt from this rule because management will most certainly ask for the cost of a proposed machine or process concept and the group should be prepared to answer. Rough estimates of materials and parts are easy but manpower estimates will always require more seasoned knowledge. If your machine build organization is created from labor that has been freed from manufacturing operations then you could ignore manpower costs since it is already built into the overhead operating costs.

Simple hydraulic presses, ironworkers, drill machines, and one-axis milling machines are easily found on secondary machine markets. Remember that buying these basic machines means you can focus on the value-added component – transforming raw material to finished goods – and enable your organization to use LeanSigma Transformation to its greatest competitive advantage.

Once your company gains expertise in Machine Build and Design for Lean Sigma, you will compress time to market and launch new products of the highest quality. Can you say that about your last new product release?