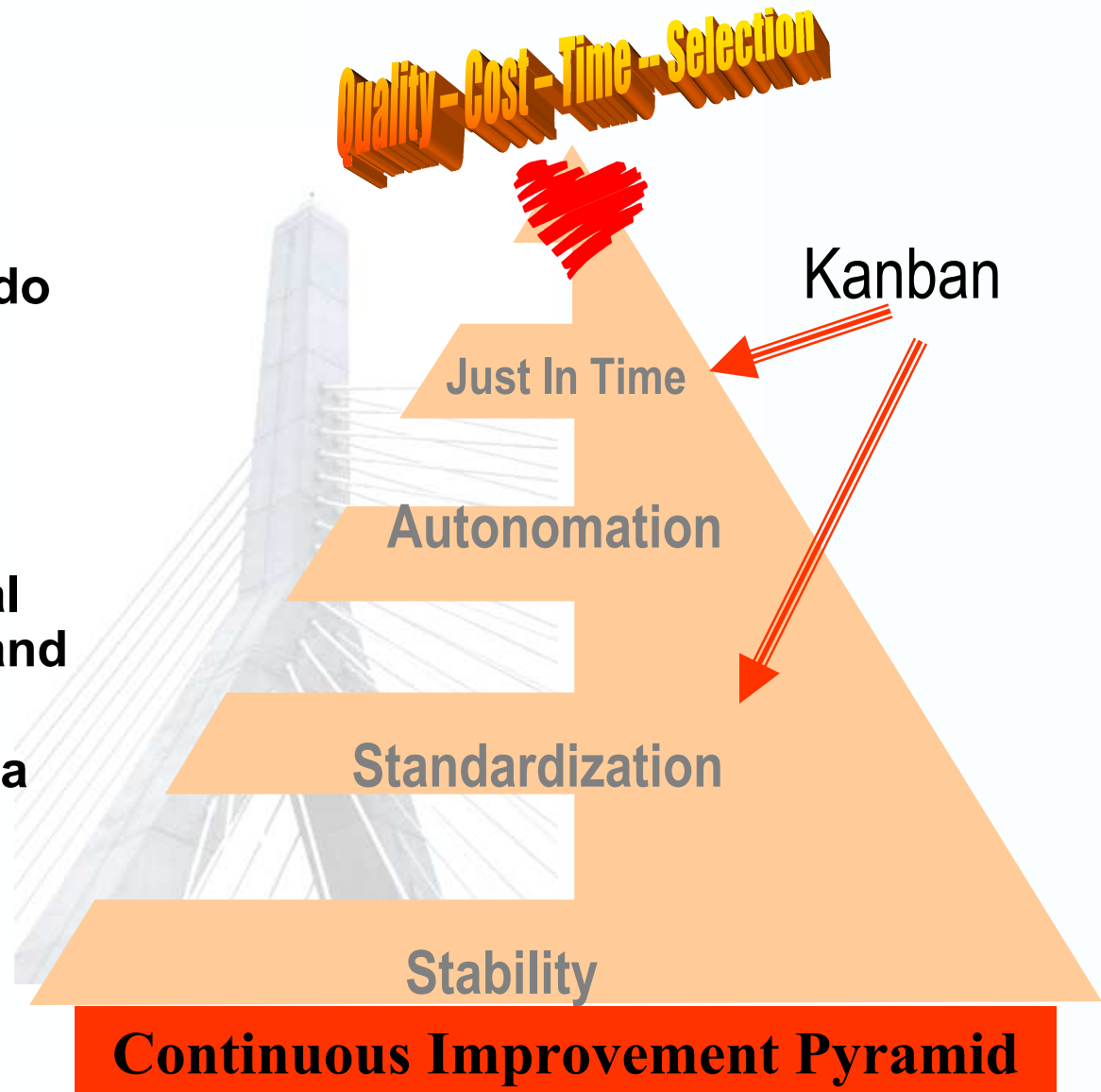# Kanban Across The Extended Supply Chain

Considerations For Developing Pull Systems With Supply Partners

Presenter: Pat Wardwell, Continuous Improvement Manager

Greater Boston Manufacturing Partnership (GBMP)

www.gbmp.org

Agenda

- **Introductions**
- **What is a pull system and why do we need it?**
- **Benefits**
- **Components of a kanban system**
- **Pull Systems: real world examples and considerations**
- **Prerequisites for a successful pull system**
- **Questions**

Quality – Cost – Time – Selection

Kanban

Just In Time

Autonomation

Standardization

Stability

Continuous Improvement Pyramid

Trainers from the Toyota Supplier Support Center conduct a CI class locally for GBMP

Meet GBMP

www.gbmp.org

Our Mission is simple: *to help companies to become more productive and competitive through continuous improvement education and shop-floor implementation.*

- **A non-profit , member-based organization**

- **Trainers/Consultants with over 125 combined years in manufacturing**

- **Experienced managers and CI implementers in a variety of companies and processes**

- **Shingo Prize winners, examiners, and board of governors**

- **Creating learning and sharing opportunities for area companies through:**

  - Manufacturing Roundtable

  - Public Classes

  - Plant Tours

  - Northeast Shingo Prize

  - Eastec and other local speaking engagements

  - Membership programs

  - Partnership with other CI resources such as AME, Shingo Prize, LEI

3

What Is A Pull System?

- **A way to achieve Just-in-Time**

- **Kanban is a powerful method for linking customers and suppliers in the value chain**

- **A tool for synchronizing and connecting disconnected portions of the value stream**

- **"*Tool* created to manage the workplace effectively. "** *Kanban, JIT at Toyota*

- **"Automatic directional device" which gives information concerning;**

  - What to provide
  - When to provide it
  - In what quantity
  - By what means
  - How to transport

```
|||||||||||||  Supply Location
               C257F
Kanban# 10678
SD6225-140
3/4 LOC WELL S/S S1B 300
         PRODUCTION KANBAN
Std Qty: 1              Cons/Loc
From Inv: Per Bom $6.400
To Inv: FG        Std Cost

Product Code: SERV
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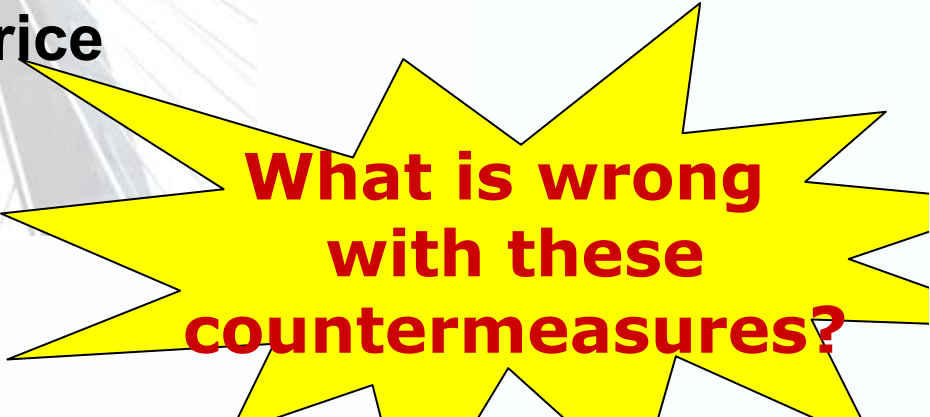
Kanban = Pull System

- **Traditional manufacturing characterized by push**
  - E.g. material arrives based on a forecast or MRP, not necessarily because it is needed or when it is needed
- **Lean manufacturing characterized by pull**
  - the conventional system in reverse
- **Kanban is Japanese word for "sign"**
- **A signal to produce based upon customer withdrawal**
- **Based on supermarket. Customer withdraws what's needed using withdrawal kanban as authorization**
- **Supplier replenishes according to production kanban passed back by customer**
- **Withdraw required quantity to satisfy downstream production requirements**
- **Withdrawal becomes the signal to replenish parts**
- **Order of withdrawal becomes order of replenishment**
- **Self regulating system**

Conventional Responses To Supply Chain Issues

- **Look for someone to blame (internally or externally)**
- **Bring it in "RED"**
- **Increase Safety Stock, second guess forecast**
- **Run more reports and models**
- **Source parts in several places, add suppliers**
- **Make extra inspections, rework, cannabalize**
- **Require stock on hand at supplier**
- **Buy ahead and buy bigger quantity**
- **Focus on reducing piece price**
- **Hoard parts**
- **Beat up the suppliers**
- **Expedite**

What is wrong with these countermeasures?

The Realities…….

- **None of these responses solves the problem, addresses the root cause**
- **We are often a "bad" customer to our suppliers**
- **Traditional supply chain relationships often don't suggest a "win-win" scenario to either supplier or buying organization**
- **The concept of "total cost" is often lost or forgotten in the midst of the daily sourcing and stocking activities**
- **An inordinate amount of time and effort is expended to keep the value stream moving and under control**

How Can Supplier Kanban Help?

- **Links suppliers directly to customer need—no more guessing!**
- **Kanban eliminates overstocking (the worst waste of all) and shortages**
  - Rules-based system (warning: it will fail if the rules are not followed!)
  - Number of kanban controls level of inventory and reduces waves
  - Kanban is like money, always try for less money in system
- **Kanban re-integrates inventory data with material (visual control), makes it easier to develop accountablity across the supply chain**
- **Provides frequent, accurate updates on material usage and gives suppliers clearer understanding of customer needs**
- **Kanban is a means to surfacing problems within the supply system**
- **Allows organizations to understand and optimize total material costs**
- **Eliminates significant amounts of non-value-added activity**
- **Frees time for procurement specialists and provides career growth opportunities**
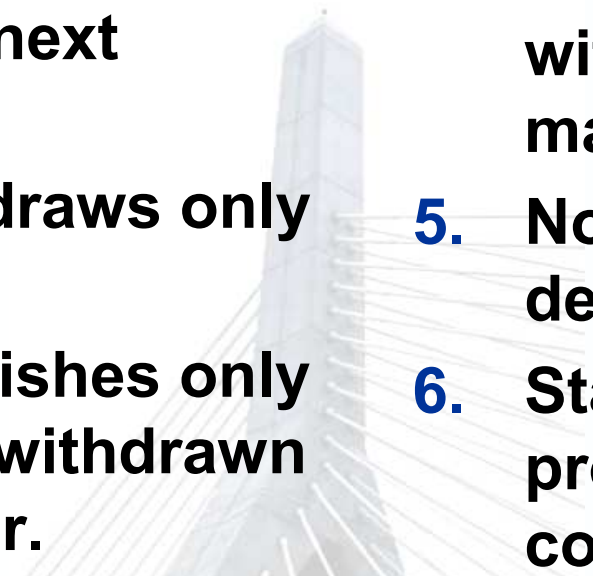
Expected Benefits

- Better synchronization between the links in the Just-in-Time value chain
- Smooth, self-managing procurement and production system
- Regulates and caps the amount of inventory
- Insures scarce resources (people, machines, material) being used to provide only what customers want
- Increased flexibility internally and at suppliers
- Reduced total material costs
- Increased inventory turns
- Improvements in cash flow
- Long term partnerships and simple, mutually beneficial relationships with suppliers
- LESS FRUSTRATION!

Understanding Total Cost

"It is estimated that reducing the cost of your supply chain by 1 percent can be the equivalent of increasing revenues from 4 to 12 percent," --Scott Stevens, CTO, Supply Chain Council

- **Total Supply Chain Cost measures <u>all</u> the costs associated with managing a supply chain**
  - It includes the costs associated with acquiring and delivering material, plus planning and material management activities. Included are:
    – Material acquisition costs
    – Order management and carrying costs
    – Costs of defective materials
    – Cost of delivery failures

- **"Lean supply chain management is not about 'fixing' what someone else is doing wrong. It is about identifying and eliminating waste as measured in time, inventory and cost across the complete supply chain. This requires continuous effort and improvement. A lean supply chain can reduce time by 10 to 40%, inventories by 10% to 30% and costs by 10% to 25%. Continuous improvements can take payback to the upper range-and beyond. This is a significant benefit to ROI and to the bottom line. "** *- from Lean Supply Chain Management article July 2004* www.ltdsupplychain.com/mag/july04.htm

Six Rules For Establishing Kanban Systems

1. Do not send defective material to the next process.

2. Customer withdraws only when needed.

3. Supplier replenishes only what has been withdrawn by the customer.

4. Set and even withdrawal of material.

5. No wild swings in demand.

6. Standardize production and conveyance.

Set location, set quantity, set withdrawal.

Components Of A Pull System

1. **Completed parts store**
    1. Supplier agrees to keeps store of finished parts or to fill order for a pre-determined amount in a set time frame
    2. Quantity of completed part store or withdrawal amount based on
        1. how frequently the part is to be withdrawn by you, the customer
        2. lot size considerations for supplier (warning: challenge them to improve these over time!)

2. **Parts material and components**
    1. Consuming area has all materials needed to build
    2. Quantity held is based upon usage and replenishment time from supplier, total cost considerations, among other things

3. **Information: What, When, How many: authorization to withdraw or provide parts**
    1. Pick-up or transport information included
    2. Quantity information is set in advance wherever possible
    3. Sequence of production/procurement defined
    4. Elimination of traditional purchase order, stocking system wherever possible
    5. Pull information goes to predefined location at pre-defined intervals

Considerations For Planning And Establishing Supplier Kanban Programs

- **Understand the total cost of materials and get management buy-in to look beyond piece price in favor of total life cycle material costs**
- **All materials should not be treated equally or necessarily procured/managed in the same manner**
    - The 80/20 rule can be applied in several ways
        - Critical parts
        - Expensive/Inexpensive parts, parts that don't warrant handling costs
        - Parts that are most predictable
        - Commodities that are "easiest" to kanban
        - Supplier's experience with kanban
        - Supplier's willingness to partner, levels of quality and reliability
        - Logistical issues/tradeoffs **(warning: be careful to test your total cost assumptions regarding logistics!)**
- **Be prepared to make tradeoffs as you examine the components of total cost!**
- **Start with a team-based 'pilot' approach and learn from it**
    - Stack the decks for success with your initial kanbans
    - Quantity should err on the high side – you can always lower levels but it is hard to 'recover' from a failed initial supplier kanban program
- **Plan, Do, Check, Act applies!**
- **Set specific goals, monitor frequently and work toward them**
- **Kanban programs should support the business goals: QCD**

What Kanban Suppliers Should Expect From You

- A collaborative business relationship characterized by long term agreements and shared expectations

- Win-Win means fair financial return for both parties

- Adequate time for planning/fulfillment

- Reasonable adherence to aggregate forecasts and kanban rules—honesty!

- Firm material and product specifications

- Minimum number of expedites/change orders

- A simple, clear communication path to address kanban issues

- Requests to continuously improve the system to reduce total costs at both companies

- New business if they perform well

14

Examples of Supplier Kanban Programs

1. The Chassis Breadman

- Driver goes to customer site daily

- Driver takes away empty chassis racks and leaves full racks at customer's production line

- Driver returns empty racks to production work cell

- Production workers build to replenish empty racks

- Production stops when agreed upon kanban levels are reached

- Customer is billed for racks delivered against a blanket PO

Other local companies have successfully kanbaned PC Boards in a similar manner

2. Lead Wires
A Case Study

Before Kanban	Effect
o **High volume wire machine with long set-ups.**	o **Noise, set-up and maintenance problems.**
o **Large batch production of lead wires (over 100 varieties.)**	o **Long delays to get wires, inflexibility.**
o **One bay of ASR needed to hold wires.**	o **Stock outs of raw wire awaiting MRP.**
o **Stock outs of completed wire assemblies.**	o **Costly storage of over-production.**
	o **Assembly delay and overtime.**

Lead Wires
A Case Study

After Kanban	Result

- o Small flexible "low volume" machine purchased.
- o Small batch lots.
- o Kanban created at work center.
- o Kanban created for wire supplier-operator makes own releases against blanket order
- o Operation completed by one person (50% savings.)

- o Fast set-ups, easy operation.
- o No stock outs.
- o No need for ASR.
- o No stock outs of wire.
- o Costly storage of over-production/raw inventory.
- o Buyer's time saved.
- o No assembly delay.
- o Product cost savings.

Lesson: Get your own house in order first, then work with suppliers!

3. Supplier Managed Hardware Parts

- **Supplier visits once per week to review bins and determine hardware parts that need to be refilled**

- **Supplier scans barcode on bin for parts that have reached kanban re-order point and information is communicated back to trigger ordering at supply site**

- **Next week supplier returns with items ordered the prior week and refills bins**

- **Invoice is sent to customer**

- **No inventory transactions involved**

18

4. Two-Tiered Casting/Painting Kanban

- Casting supplier, painting sub-contractor and customer company establish rules for kanban program
- Customer holds some painted castings and "pulls" more from painter when trigger point reached
- Painting sub-contractor holds painted stock and triggers painting of more raw castings as customer withdraws painted stock
- Use of raw castings causes painting subcontractor to release ('pull') more product from raw casting supplier
- Blanket orders in place with both paint and casting houses
- Painter and customer share in cost of recyclable totes

5. A More Visual Purchase Part Kanban

- **When a shop employee reaches the trigger quantity, the kanban card is given to the purchasing group**
- **Purchasing makes the standard release against a blanket po**
- **The card is placed in a rack in the receiving area until the parts arrive.**
- **The card is then placed with the parts and moved along with them to the point-of-use on the shop floor**
- **Each card includes a picture of the part and all pertinent information needed to action the kanban**
- **Several hundred parts are on this system**
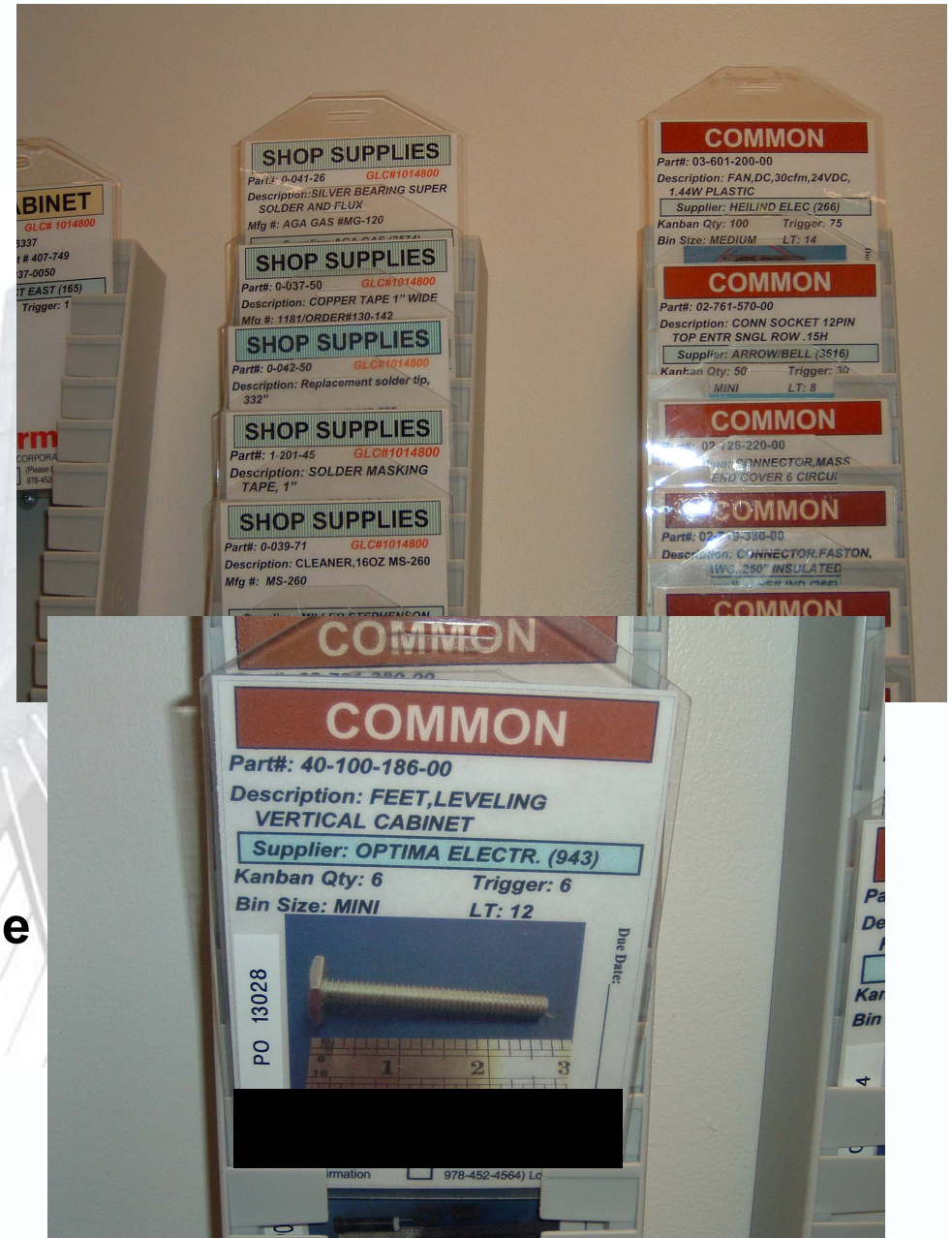
Practical Considerations at the Start Of A Supplier Kanban Program

- What to kanban?
- Negotiate a win-win agreement and establish the 'rules' all parties will follow
    - How much inventory to hold?
    - How many kanbans?
    - Where stored?
    - Signal or lot for lot?
- Developing the discipline of kanban
- Coexistence with MRP
- Coexistence with Quality Systems
- Initial purchase/start-up issues

- Calming Chicken Little
- Cost Accounting Issues
- Conveyance/Pacing issues
- Sizing Containers (ergonomics/transit
- Push and Pull together
- Lot and Serial tracking
- Establishing the Pilot
- Support from other best practices such as 5S, visual systems
- Kanban as waste—work to reduce it!
- Kanban as improvement tool

Think Outside The Box (or at least begin to open it up!)

- Elmination of repeat purchase orders in favor of contracts
- Opportunities to expense parts—no counting or transacting, minimize accounting activities
- Breadman deliveries/Supplier managed inventories
- A 'milk run' truck of your own
- Mixed part types to cover lot charges, transit fees
- Agreements with a small number of transit companies
- Consolidation of the supply base
- Part variety rationalization
- Recyclable containers/standard containers
- Elimination of incoming inspection activities—more dock-to-stock
- Pay on shipment programs
- Consignment inventories
- Shop and office supplies and literature on kanban
- Services on kanban (e.g. PM, subcontracting)
- Order 'call offs' by anyone other than procurement group
- Ongoing training in CI and kanban for the entire supply chain
- Regular joint efforts to improve kanban programs with suppliers (kaizen events, e.g.)
- Elimination of physical inventories
- Creative use of electronic systems such as email, barcoding, supplier portals, RFID
- New and different roles/expectations for commodity specialists
- Year over year improvement goals for inventory turns and reductions[22] in supply chain sourcing/management activities

Prerequisites for Success

1. **Management commitment and support--in a hands-on, active manner**

2. **Understanding the purpose of the pull system**
   1. Train in CI and pull concepts first!!
   2. Begin at the process closest to the customer and work backwards to develop the system
   3. In other words, clean up your own house first!

3. **Production leveling at the downstream processes**
   1. *the greater the fluctuation in withdrawal quantities, the more excess material needed to support the downstream process*

4. **Willingness to create partnerships, establish and follow the rules of kanban**
   1. Use of kanban signals, adhering to set quantities, abiding by negotiated terms

5. **Recognizing kanban is a means to identify waste and take countermeasures**
   1. Commitment to shortening **set-ups** and reducing/eliminating other internal issues that keep kanban quantities high and cause 'noise'
   2. Commitment to not allowing defects to be passed on
   3. Willingness to work with and train employees and suppliers in continuous improvement

Thanks For Inviting GBMP to participate!
Questions?

- **Pat Wardwell, CI Manager**
  - Cell: 781-789-0153
  - Email: pwardwell@gbmp.org
- **Greater Boston Manufacturing Partnership**
  - www.gbmp.org
  - Free operational assessment available to member companies*
- **Massachusetts offers workforce training fund grants that can be used to fund hands-on continuous improvement training and education**
  - Visit www.mass.gov/bizteam Click on "Need to train your current employees?"

* Company may be asked to cover travel costs for assessments outside of Greater Boston area