10 Steps to become a Lean Enterprise

Lean Expert Training Course

Step 10
Lean Supply Chain
Part 1

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Welcome

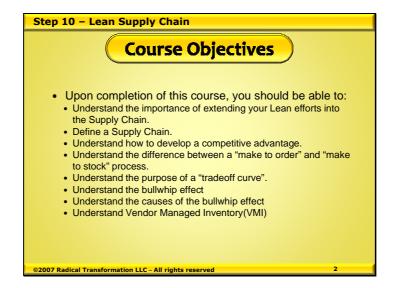
We would like to welcome you back to our next module in this online training course.

This training module is called "Step 10- Lean Supply Chain Part 1."

This module is a continuation of our Lean Expert online course series called "10 steps to become a Lean Enterprise."

This program has been specifically designed to demonstrate our step by step methodology that will allow any organization to become a Lean Enterprise.

Let's continue your lean journey!



Course Objectives

Here are the course objectives for Step 10 – Lean Supply Chain.

We specially designed this course to give the information you need to get a full understanding of each step required to become a Lean Enterprise.

Upon completion of this course, you should be able to:

- Understand the importance of extending your Lean efforts into the Supply Chain.
- Define a Supply Chain.
- Understand how to develop a competitive advantage.
- Understand the difference between a "Make to Order" and "Make to Stock" process.
- Understand the purpose of a "tradeoff curve".
- Understand the bullwhip effect.
- Understand the causes of the bullwhip effect.
- Understand Vendor Managed Inventory (VMI).

Now we are going to work through each course objective.



Extending Lean into the Supply Chain

During the initial stages of their Lean implementation, an organization is internally focused on improving their own processes.

They would do this to improve the quality of their products and to deliver them faster, on time, every time.

The organization will be focused on improving all of their systems to increase value for their customers

The next critical step is to for them to start to extend their focus and their Lean efforts externally into the supply chain.

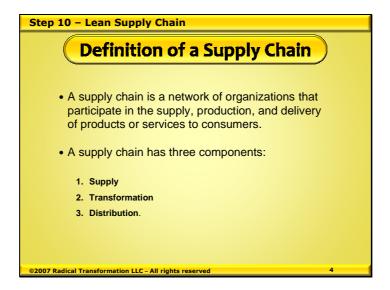
The success of doing this will depend upon the size of the organization and how much sway it has with its customers and suppliers.

In other words a large organization with the financial ability to influence its suppliers will be more successful than a small company with little to no influence.

However, even a small business can collaborate with some of their suppliers, if not all of them.

Large organizations have access to different tiers or levels of suppliers.

They can demand what their first, second and sometimes the third tier suppliers need to do to replenish their needs.

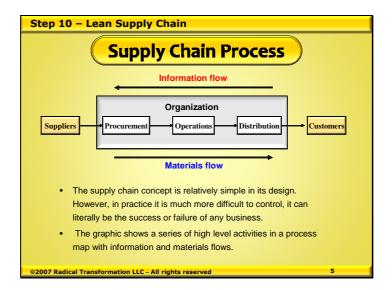


Definition of a Supply Chain.

A supply chain is a network of organizations that participate in the supply, production, and delivery of products or services to consumers.

A supply chain has three components:

- 1. **Supply:** is the replenishment of materials or information, including the logistics of who needs what, when do they need it, and where do they need it and how are we going to get it there?
- 2. **Transformation:** is where basic raw materials or information are transformed into finished products or services.
- 3. **Distribution:** is ensuring these products or services reach consumers through an organized network of producers, distributors, and retailers.



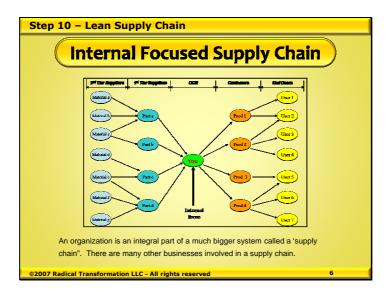
Supply Chain Process

There are many examples of where logistics are used in our lives: Here are a few:

- **Business**: maintaining the ability to manufacture your products, organizing material deliveries.
- Work: leaving the house to get to work on time, maintaining your car to ensure it gets you to work.
- Home: organizing school and household activities, paying bills, feeding the family.

The mission of logistics management is to:

- Plan and co-ordinate all of the activities necessary to achieve desired levels of service and quality at the lowest cost.
- Logistics view the whole system as a direct link between the demand and the supply.
 Therefore the needs of the customer are satisfied through the co-ordination of the
 material and information flows between the marketplace and the supplier through the
 manufacturer or service provider.
- Responsibility to succeed in delivering a product to a customer is placed squarely onto the manufacturer alone, no-one else.



Internally Focused Supply Chain

In this screen, is a diagram demonstrating a typical supply chain process that is internally focused.

An organization exists in a world where they are surrounded by upstream suppliers and downstream customers.

This organization is dealing with their internal supply and delivery issues on a daily basis.

The belief is that there are many suppliers and an organization can get them all to play the supply chain game.

An organization wins the supply chain game by getting all its potential suppliers to compete for their business as a means of achieving the lowest costs.

This method was a typical win-lose for all parties in the long term.

This kind of cut-throat business process has led to the demise of many supply companies who could not meet the ever changing demands of the market place.

Many suppliers suffered at the hands of their key customers who could drop them at a moment's notice for reasons ranging from the failure to deliver on time to choosing another supplier based on them being willing to negotiate a lower cost.

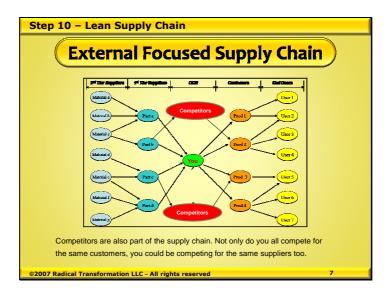
Suppliers fiercely fought for business to the point of losing money in order to keep key accounts on their books.

Competing for business sometimes backfired because in the past the impact of losing an order led to the closure of many manufacturing facilities.

Any organization that embarks on the journey towards becoming a Lean Enterprise will have to start by getting their house in order.

This means dealing with the way they schedule their work processes to service their customers.

This internal focus on their processes will test the capabilities of their suppliers and how they can or cannot maintain a consistent supply of components, materials, etc.



Externally Focused Supply Chain

In this screen, the diagram is similar to the one in the previous screen.

The difference with this one is that it is demonstrating an organization's placement in a typical supply chain.

They exist in a supply chain that has many different levels or tiers of suppliers and customers.

Competitors are also part of the same supply chain.

Not only do several companies compete for the same customers, they are often competing for the same suppliers too.

The automotive industry is a good example of how several manufacturers use the same suppliers such as those who manufacture windshields, side view mirrors, seats, etc.

Why is this?

The main reason is the internal capabilities of an organization that produces a similar product for several customers throughout the supply chain.

These organizations have the expertise and knowledge to produce a better quality product on a consistent basis and at a lower cost.

So, Quality, Cost and Delivery (QCD) are the key drivers and this explains why automotive companies use the same suppliers.

They all understand that they cannot make the products themselves as efficiently or cost effectively as their shared supplier.

They also understand that their collaboration with their shared supplier is essential for their own success.

This same supply chain rule applies to all other business fields too.



Competitive Advantage

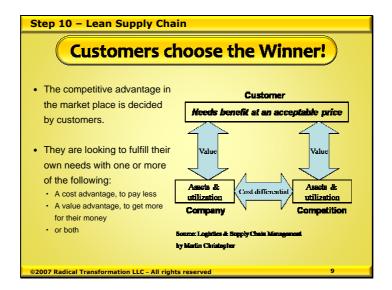
So, the next question to ask is: If several companies are using the same suppliers and paying a similar price for parts and materials, how can any business improve and achieve a competitive advantage?

One method for any company to achieve a competitive advantage is to extend their Lean efforts out into the supply chain.

Doing this can provide any organization with an advantage that will set it apart from its competitors to achieve greater success in the marketplace.

This is how a Lean Enterprise creates a successful advantage for themselves, their employees and their customers.

A Lean Enterprise has a clear focus, and that is to deliver a quality product at a comparable cost, faster than its competitors do and to continue to increase value for its customers



Customers choose the Winner!

The people who decide if an organization will win or lose its competitive advantage in the market place are their customers.

This is why the customer is the most important element in the supply chain, without them there is no one driving the economic engine, which is based on supply and demand.

In his book "Logistics and Supply Chain Management", Martin Christopher explains the forces that influence customers towards choosing a supplier.

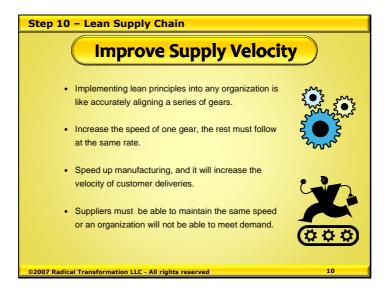
In a supply chain two or more competing companies may utilize their assets in a similar way but the consumers are looking for specific traits.

Customers are looking to fulfill their own needs with one or more of the following:

- a) A cost advantage, which is to pay less.
- b) A value advantage, which is to get more for their money.
- c) Or both a) and b) together.

A competitive advantage is based on the customer's perception of how successful a company can present the cost vs. value benefits of its products or services.

An organization that can achieve this on a consistent basis for all their customers will have a loyal customer base.



Improve Supply Chain Velocity.

Implementing lean into any organization is like accurately aligning a series of gears.

A gear train works in such a way that when one gear turns, the rest of the gear train will turn at a relative speed.

If the speed of one gear is increased, the rest must follow at the same relative speed.

If the speed of one gear is reduced, the other gears will slow down to the same relative speed.

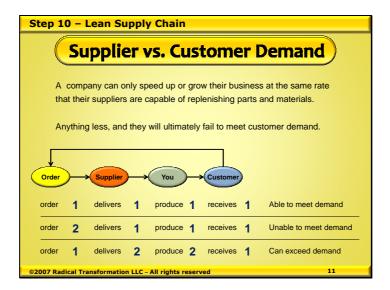
So, when an organization decides to implement Lean principles they will speed up their ability to manufacture their products, and deliver them to their customers at a faster pace.

At the same time a business must speed up the rate that their suppliers will replenish their materials or parts.

Their suppliers must be able to perform at the same pace in order for their customer to maintain their own ability to meet their own customer demand.

Just like the gear train, if one gear fails, the rest fail to achieve their goal.

The supply chain is the same, if one supplier fails, the rest of the supply chain is affected.



Supplier Capability vs. Customer Demand

What the gear analogy demonstrates is that a company can only speed up or grow their business at the same rate that their suppliers are capable of meeting their demand to replenish parts and materials on a consistent basis.

Anything less and they will ultimately fail to meet demand of the supply chain.

In this screen, there is an animation that demonstrates the difference between a balanced supply chain versus an uncontrolled and unbalanced one.

If your supply and demand capabilities are balanced, then your supply chain is working and can operate efficiently.



Lean Supply Chain

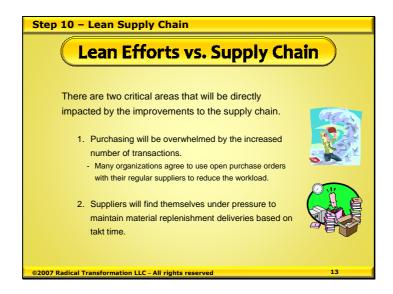
When an organization starts extending their Lean efforts out into their supply chain it clearly demonstrates that its business processes have begun to improve.

This also leads to a company starting to develop a stronger relationship with its suppliers to serve their mutual customers.

However, no matter what it tried at any time or place in the supply chain, it all comes down to a single realization.

A company can only be successful, when its supply chain is successful too.

They can only win when their suppliers win too. This is a real win-win for everyone in the supply chain.



Lean Efforts vs. Supply Chain.

There are two critical areas that will be directly impacted by the improvements to the supply chain velocity.

These are Purchasing and Suppliers.

The number of purchasing transactions will dramatically increase to the point where the purchasing department personnel will find themselves overwhelmed with the increased workload.

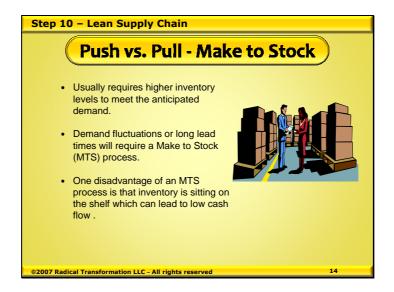
This will occur because of the production department placing orders for smaller lots or batches of parts and materials on a daily or weekly basis.

To reduce the workload many organizations agree to use open purchase orders with their regular suppliers, who have a proven track record in delivering on time.

Suppliers will find themselves under pressure to maintain material replenishment deliveries based on an increased pace driven by takt time, replenishment cycle times, etc.

One of the major changes for suppliers will be a requirement to increase their schedule to deliver smaller quantities more often.

They must be capable of meeting the increased demand on their resources such as people, delivery trucks, etc.



Push vs. Pull - Make to Stock (MTS).

"Make to Stock" can be done by any organization.

In fact, it is the traditional way a business maintains inventory levels to supply customers on an "as needed" basis.

An organization achieves this by creating a finished goods inventory buffer.

They meet the demand based on a sales forecast using historical sales and material usage to determine a production schedule.

A business that uses a "Make to Stock" process is usually attributed with high levels of inventory to meet anticipated demand.

If you consider for a moment the total financial value of all inventories in the supply chain, you will realize why it is important to reduce inventory to free up cash.

Many organizations adopt a "Make to Stock" process simply because it is the only way they know how to meet demand.

However, with a few improvements they could become a "Make to Order" company.



Push vs. Pull - Make to Order (MTO)

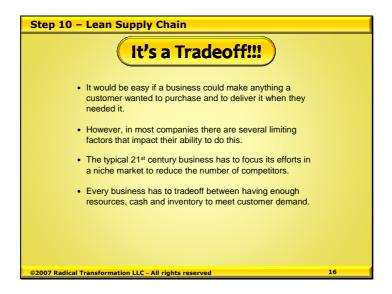
Make to Order processes are usually associated with small job shops that produce small quantities of unique products or services.

The principle can be applied to any business in that it should only make what the customer wants, when they need it.

It is a system that is focused on reducing inventory levels and improving cash flow.

Here is a list of factors to be considered when evaluating a make-to-order system:

- Is your manufacturing process capable of fulfilling orders on demand?
- Manufacturing lead time: A long lead time will render a make-to-order system infeasible if the customers are not willing to wait.
- Manufacturing set-up times: If set-up times are long, they will create a bottleneck which will not allow a make to order process. A lean manufacturing program will help to reduce set-up costs.
- Value of a custom product: Are customers willing to pay more for customization?
- Customer patience: Are customers willing to wait for a product to be manufactured and delivered?
- Cost of stock outs: Is the customer patient enough to wait until the specified delivery time, then make-to-order eliminates the problem of stock-outs.
- Inventory holding costs: Make-to-order becomes more attractive because inventory holding costs decrease.



It's a Tradeoff!

It would be nice to be able to make anything the customer wanted to purchase and to deliver it when they needed it.

However, even the most efficient companies have to trade off some things, some of the time.

There are several limiting factors that impact an organizations ability to deliver anything to any customer, at any time. These factors are:

- · Customers.
- Resources.
- Finances.
- Materials/Inventory.

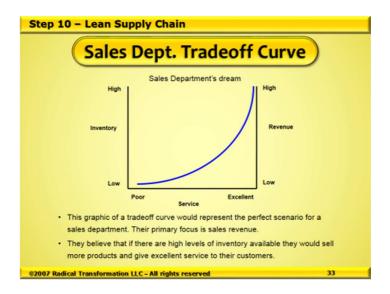
The typical 21st century business has to focus its efforts in a niche market to reduce the number of competitors.

If it cannot do this then it must compete with the best in its field and become the best at what it does.

However, most companies need to take into account their core skills and capabilities by focusing in areas where they are able to be successful.

Every business will have to tradeoff between having enough resources, cash and inventory to meet customer demand.

These tradeoffs will limit their choices as to what they can produce in any moment.



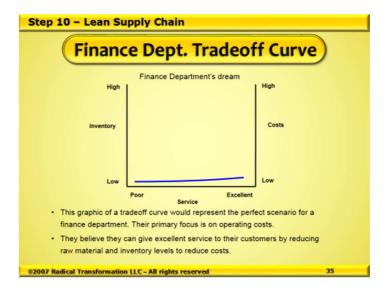
Sales Department Tradeoff Curve

In this screen, there is a diagram of a tradeoff curve for a sales department.

It is demonstrating the sales person's perfect scenario.

They believe that if there are high levels of inventory for all products available they would be able to sell more and give excellent service to their customers.

A sales person believes that this scenario would lead to an increase in sales revenue and profits.



Financial Departments Tradeoff Curve

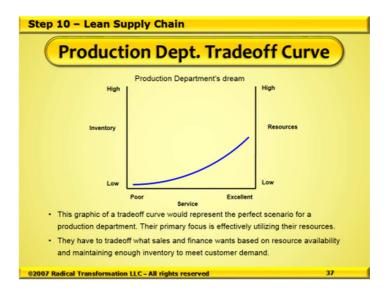
In this screen, there is a diagram of a tradeoff curve for the financial department.

They believe for the business to achieve higher profit an organization should hold inventory levels at a minimum while using the same resources.

This graphic of a tradeoff curve would represent the perfect scenario for a finance department.

Their primary focus is operating costs.

They believe they can give excellent service to their customers by reducing raw material and inventory levels to reduce costs.

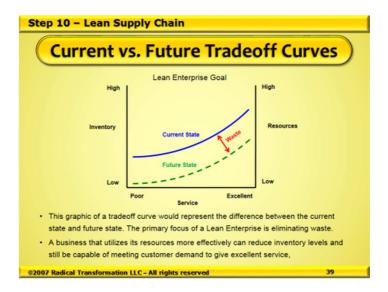


Production Departments Tradeoff Curve

In this screen, is a diagram of a tradeoff curve that represents the perfect scenario for a production department.

Their primary focus is effectively utilizing their resources.

They have to tradeoff what sales and finance wants based on resource availability and maintaining enough inventory to meet customer demand.



Current State vs. Future State Tradeoff Curves

In this screen, is an example of a tradeoff curve showing the current state of an organization's resources, customer service and inventory levels.

The blue line represents the current state, which shows the organization is holding higher levels of inventory to maintain a consistent level of service.

The green dotted line represents the future state, which has a goal to achieve consistent service with lower levels of inventory.

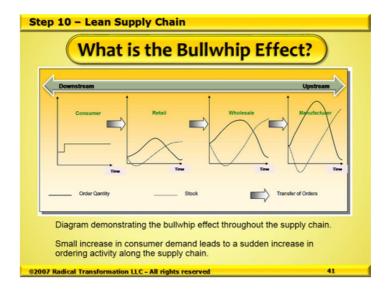
The red arrows identify the gap between the current and future states, which represents the improvement required to realize the gains.

This graphic of a tradeoff curve demonstrates the difference between the current state and future state.

How would this organization achieve their future state?

The primary focus for any organization that wants to become a Lean Enterprise is the identification and elimination of waste.

Any business that eliminates waste and utilizes its resources more effectively can reduce inventory levels and still be capable of meeting customer demand to give excellent customer service.



What is the Bullwhip Effect?

Customer demand fluctuates, so businesses use forecasts, which are often wrong because they are based on historical, not real-time data.

The **Bullwhip Effect** is a phenomenon experienced by organizations who schedule their replenishment orders, resource allocation and inventory levels based on forecasting.

The effect is a magnification in demand variability as orders move upstream through the supply chain.

Procter and Gamble executives coined the term after studying demand for Pampers disposable diapers.

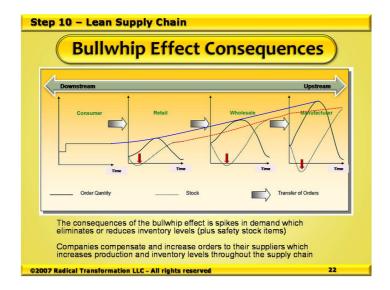
Babies consume diapers at a steady and predictable rate, and retail sales are quite uniform.

Procter and Gamble observed that distributor orders to the factory fluctuated far more than underlying retail demand.

P & G orders to materials suppliers fluctuated even more.

Research conducted at Northwestern and Stanford Universities identified several causes for the bullwhip effect, these include long lead times, the use of various forecasting tools, price fluctuation, and volume and transportation discounts.

The findings from this research has led to the development of techniques allowing manufacturers and suppliers to reduce upstream variability in the supply chain, thereby improving operational efficiency, lowering costs, and increasing service levels.



Consequences of the Bullwhip Effect.

There are serious consequences to the bullwhip effect.

To overcome forecasting errors companies often hold an additional inventory buffer called "safety stock".

If a small variation in demand occurs in a customer's business, it will force them to use up all of their safety stock. This is represented by the red downwards arrows.

Now, they will increase their order quantities to replenish their depleted inventory levels. This is represented by the blue line.

The effect becomes amplified as the order moves upstream in the supply chain because the suppliers will see a greater variation in demand.

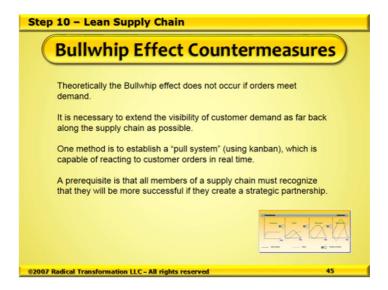
In turn, their inventory levels will start to increase to compensate for the variation.

This is represented by the red dotted line.

The consequence of the bullwhip effect is that once a business realizes that the demand fluctuation is not real it is too late.

They have already increased their safety stock and inventory levels.

These actions will increase the total inventory value throughout the supply chain, which creates cash flow issues for those companies holding the extra items.



Bullwhip Effect Countermeasures.

Theoretically the bullwhip effect does not occur if orders meet demand.

This is consistent with findings of supply chain experts who have recognized that the bullwhip effect is a problem in forecast-driven supply chains.

It is necessary to extend the visibility of customer demand as far back along the supply chain as possible.

One method is to establish a "pull system" (using kanban), which is capable of reacting to customer orders in real time.

See Step 6 – Implement a Pull System for more detailed information about kanban.

A prerequisite is that all members of a supply chain must recognize that they will be more successful if they create a strategic partnership.

This will require each member to overcome trust issues when collaborating and sharing information.



Vendor Managed Inventory

Vendor Managed Inventory (VMI) connects upstream organizations directly to downstream organizations with common lean technologies such as kanban or replenishment management.

Vendor Managed Inventory (VMI) is where a third party provider is contracted to make sure that a business maintains the required level of inventory to meet customer demand.

The third party provider will make regular visits to the buyer's facility or have an employee permanently located in their premises to manage the inventory levels.

In many cases, the inventory may reside at the buyer's premises but it is not paid for until the buyer uses it.

The third party provider would reconcile the total items purchased based on usage over a given period.

VMI has many advantages:

- VMI shortens the supply chain through partnerships with suppliers.
- VMI enables replenishment based on consumption.
- VMI allows an organization to build closer relationship with downstream customers.
- VMI leads to a reduction in inventory levels and stock outs.
- VMI gives a faster response time to shorten supply lead times.



Conclusion

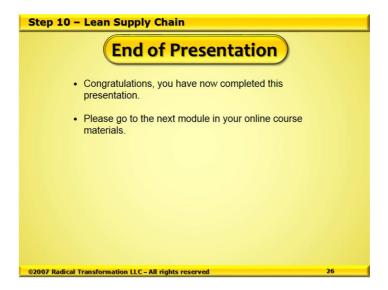
Extending Lean efforts out into the supply chain requires a business to examine their internal processes and their supply chain activities.

It is important for them to identify any areas where they are creating waste by using unnecessary resources, which can be measured in money, time or raw materials.

This will improve a company's competitiveness as well as their overall profitability.

Extending Lean efforts into the Supply Chain can:

- Reduce supply chain inventory levels.
- Reduce customer service issues.
- Increase supply chain productivity.
- Reduce supply chain cycle time.
- Reduce supply chain response time.
- Create a strategic competitive advantage.



End of Presentation.

Congratulations, you have now completed this presentation.

Please go to the next training module in your Lean Expert online course materials.

Reference Materials

1. Lean Supply Chain Management: A Handbook for Strategic Procurement.

By: Jeffery P. Wincel. Published by Productivity Press 2003.

2. Essentials of Supply Chain Management, 2nd Edition:

By Michael H. Hugos. Published by Wiley 206.

3. Supply Chain Management Best Practices:

By David Blanchard. Published by Wiley 2006.

4. Strategic Supply Chain Management:

By Shoshanah Cohen and Joseph Roussel. Published by McGraw-Hill 2004.

5. Logistics and Supply Chain Management: Creating Value-Adding Networks.

By Martin Christopher. Published by FT Press 2005.

Documents List

There are no documents required for this training module.