

# Chapter 16

## Material Handling in an Assembly Plant



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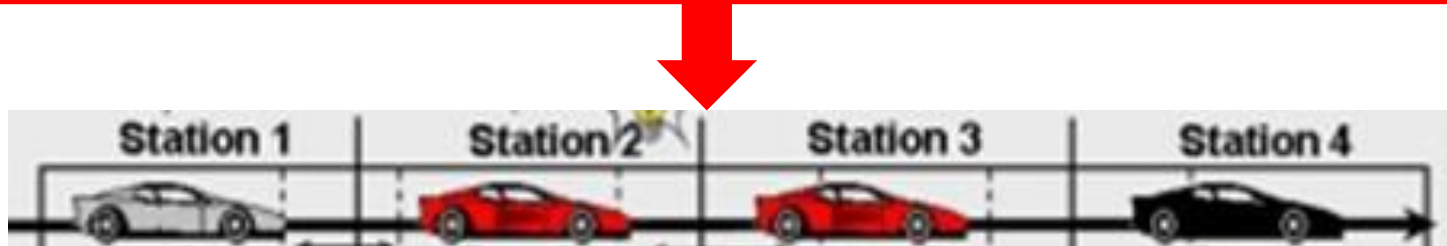
16.1 The parts supply system in an assembly plant

16.2 A system for supplying parts in sets (the SPS, or set parts)

16.3 “Empty-handed” transportation

# 16.1 THE PARTS SUPPLY SYSTEM IN AN ASSEMBLY PLANT

- ❖ In a mixed-model automobile production plant, the number of parts supplied to the final assembly line is huge.



# 16.1 THE PARTS SUPPLY SYSTEM IN AN ASSEMBLY PLANT

- ❖ It is difficult to keep stocks of a great variety of parts beside the line.

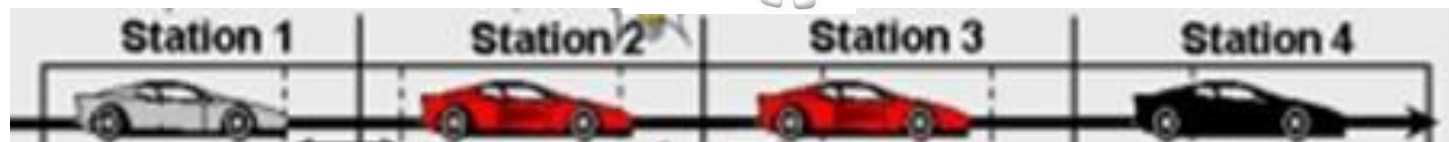


Not much room for stock



# 16.1 THE PARTS SUPPLY SYSTEM IN AN ASSEMBLY PLANT

- ❖ It is a heavy burden for workers to select the required parts from a wide array of parts racks.



# 16.1 THE PARTS SUPPLY SYSTEM IN AN ASSEMBLY PLANT

- ❖ How to move the parts efficiently onto the line?
- ❖ How to supply a large variety of parts to the sides of the cells in a cell production system?



# 16.2 A SYSTEM FOR SUPPLYING PARTS IN SETS

- ❖ The set parts system (SPS) has been adopted at Toyota to supply parts to the final assembly line.

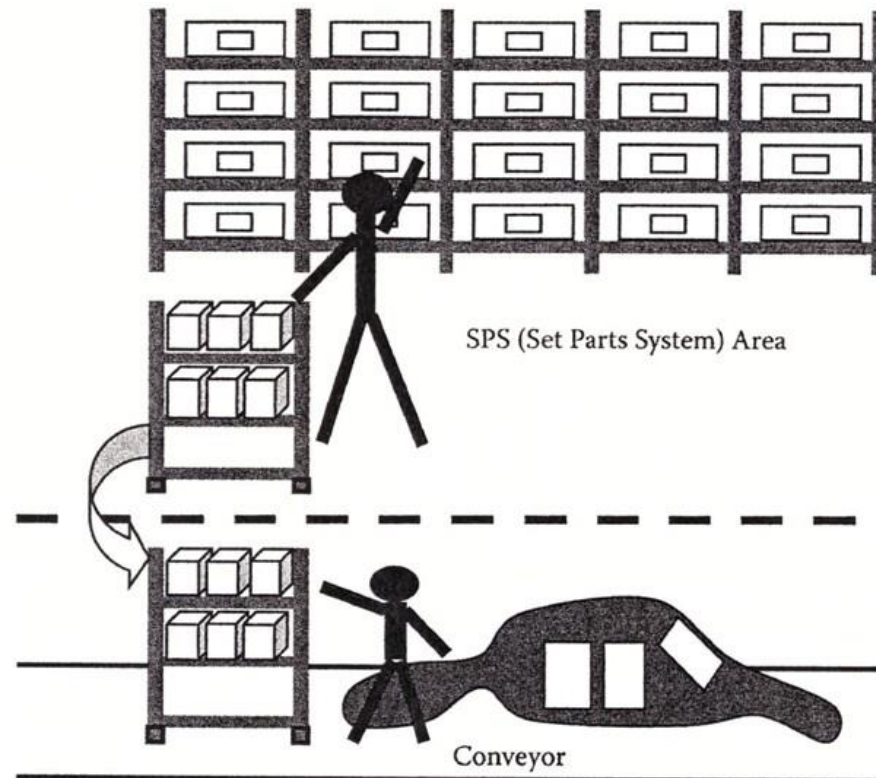


FIGURE 16.1  
Set Parts System (SPS).

# 16.2 A SYSTEM FOR SUPPLYING PARTS IN SETS

## ❖ Step 1

- In the SPS area, sets of all the parts needed for each vehicle are placed in set boxes in advance.
- These set boxes are placed on wagons that move along with the flow of the assembly line.

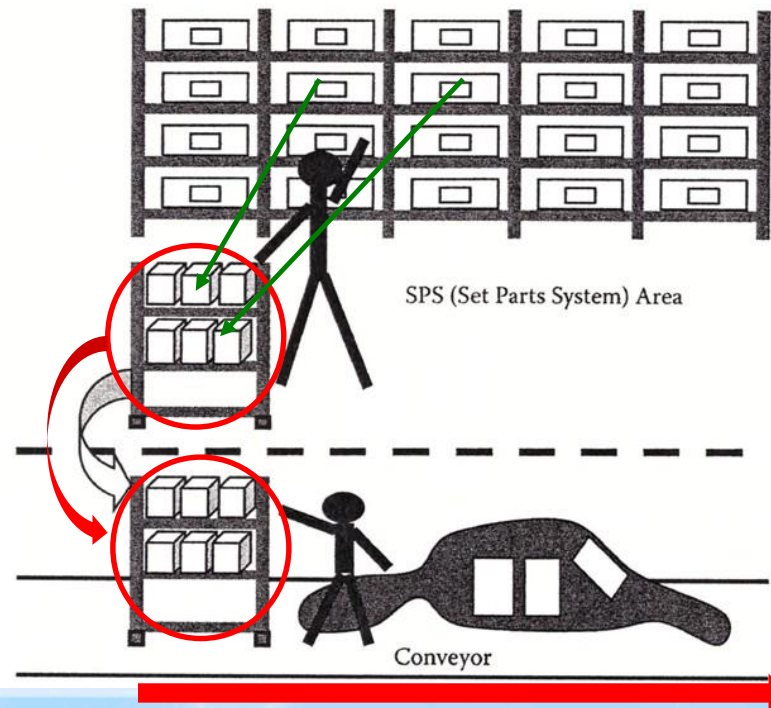


FIGURE 16.1  
Set Parts System (SPS).



# 16.2 A SYSTEM FOR SUPPLYING PARTS IN SETS

## ❖ Step 2

- The assembly workers take the parts from the set boxes and install them based on the assembly sequence.

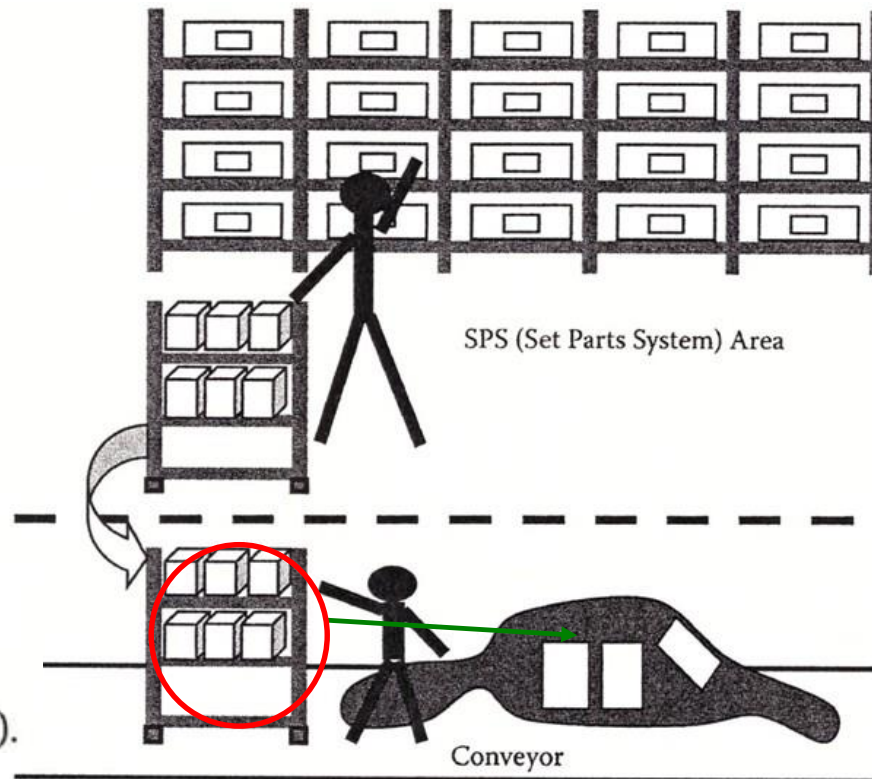


FIGURE 16.1  
Set Parts System (SPS).

# 16.2 A SYSTEM FOR SUPPLYING PARTS IN SETS

- ❖ By using this system, the line side parts racks were eliminated.



- ❖ The automated guided vehicles (AGVs) were also unnecessary.



## 16.2 A SYSTEM FOR SUPPLYING PARTS IN SETS

- ❖ Approximately 350 parts are needed for one vehicle.
- ❖ These parts are supplied in 10 boxes.
- ❖ Various parts used *at each workstation* are placed in one set boxes.

# 16.2 A SYSTEM FOR SUPPLYING PARTS IN SETS

## ❖ Why do we need SPS?

Reason 1:

- ❖ The number of different models being passed down the same assembly line is increased.
- More parts are required for the mixed-model line.
- Workers' memories are overloaded with the selection and installation of parts.

# 16.2 A SYSTEM FOR SUPPLYING PARTS IN SETS

Reason 2:

- ❖ The average age of the shop-floor workers is increasing.
- Old workers should not be overstrained.
- Old workers select the parts.
- Younger workers install the parts.

# 16.2 A SYSTEM FOR SUPPLYING PARTS IN SETS

Reason 3:

- ❖ Allow workers to do the job easily.
- Completing both the selection and installation is a very complicated job.
- Splitting up the two tasks and giving them to different workers make the assembly task much easier.
- Supervisors can monitor the line easily.

# 16.2 A SYSTEM FOR SUPPLYING PARTS IN SETS

Reason 4:

- ❖ Workers can devote themselves to building quality into the product.
- ❖ The quality is improved.
- The greatest benefit of SPS

# 16.3

## "EMPTY-HANDED" TRANSPORTATION

Under the “empty-handed” transportation:

❖ Trolleys are used to bring the parts to assembly lines.



❖ A coupling station is set up for the trolleys.

❖ An area for storing each supplier’s empty pallets is set up.





# 16.3

## "EMPTY-HANDED" TRANSPORTATION

Step 1:

Site materials handler piles the parts boxes loaded with parts onto a trolley.

A tractor pulls the trolley to flow racks.

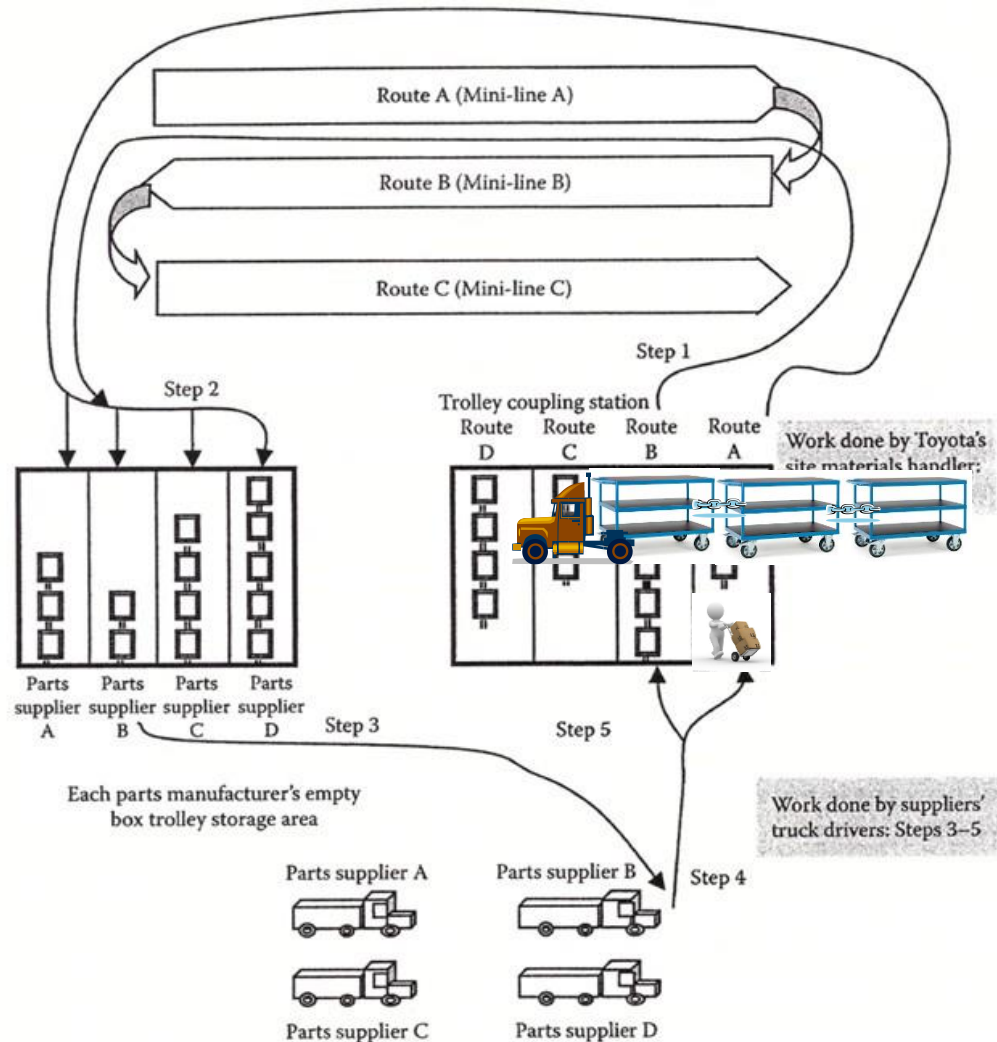


FIGURE 16.2  
"Empty-handed" transportation.

# 16.3

## "EMPTY-HANDED" TRANSPORTATION

### Step 2:

The material handler arranges the empty boxes on the trolleys and drives the trolleys to the empty box (pallet) storage area.

Each supplier's trolleys are connected together as a train.

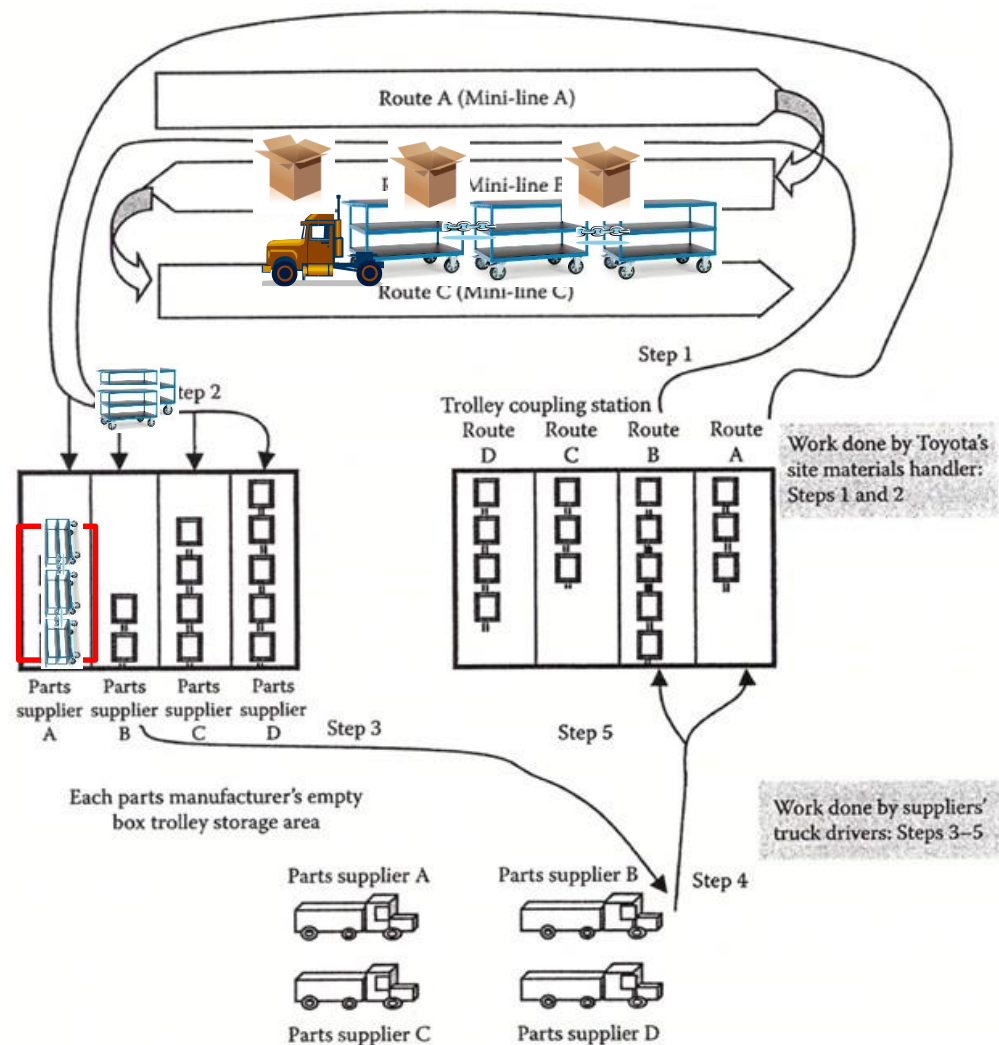


FIGURE 16.2  
"Empty-handed" transportation.

# 16.3

## "EMPTY-HANDED" TRANSPORTATION

### Step 3:

The supplier's driver drives a tractor to his company's empty pallet storage area.

He uses the tractor to pull the train of trolleys with his company's empty boxes back to his truck.

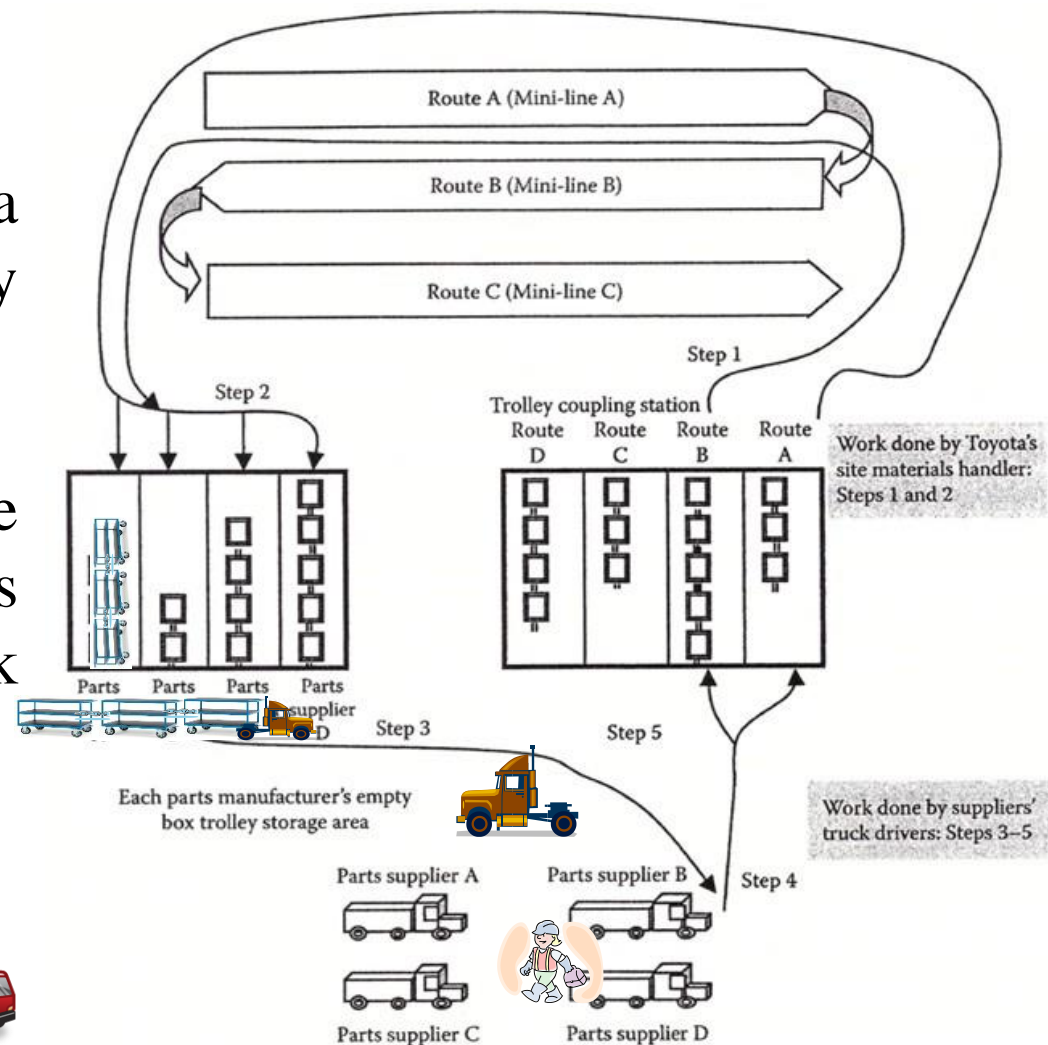


FIGURE 16.2  
"Empty-handed" transportation.



# 16.3

## "EMPTY-HANDED" TRANSPORTATION

Step 4:

With a forklift, the driver takes trolleys with full boxes off this truck and put the trolleys with empty boxes on the truck.

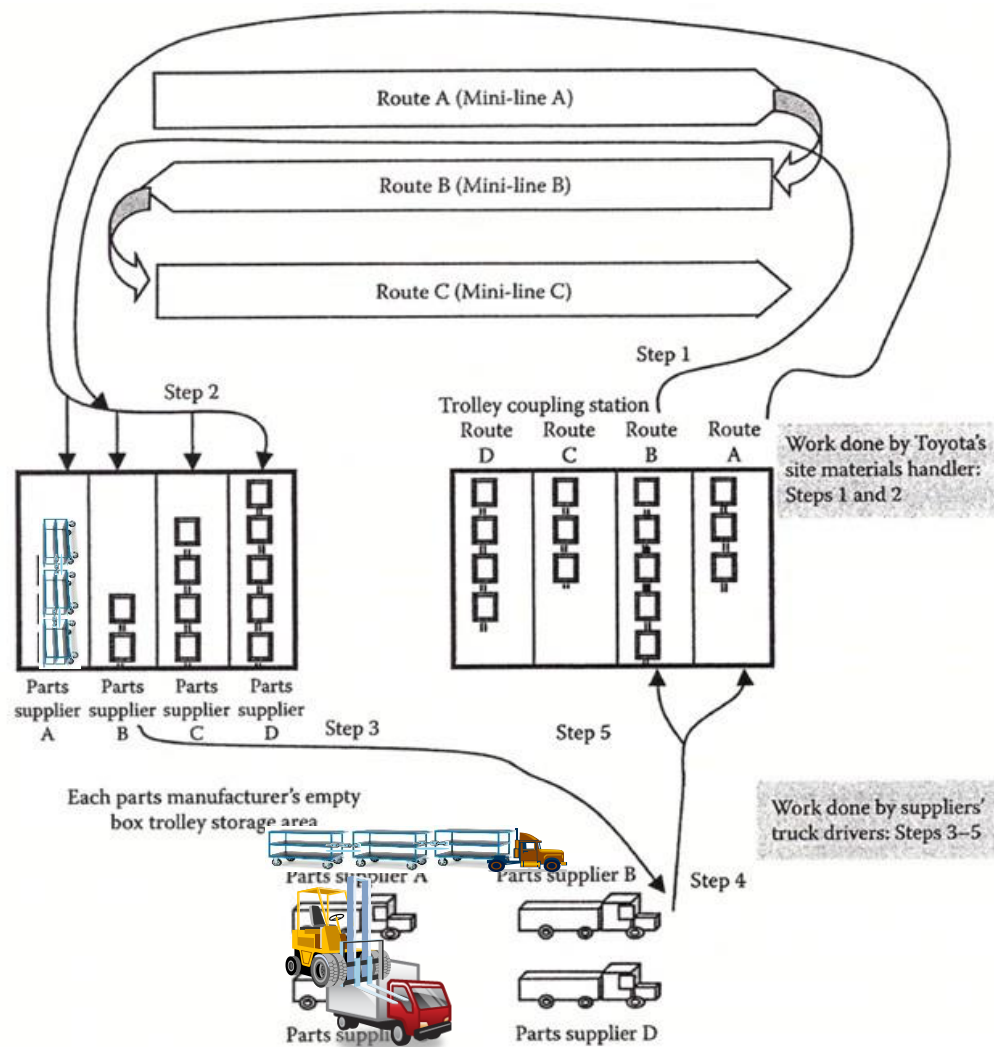
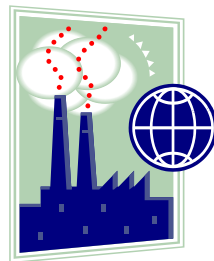


FIGURE 16.2  
"Empty-handed" transportation.



# 16.3

## "EMPTY-HANDED" TRANSPORTATION

Step 5:

The driver drives the train to the coupling station.

He separates the trolleys for each assembly line and connect them to any trolleys already there.

Kanban tells the information.

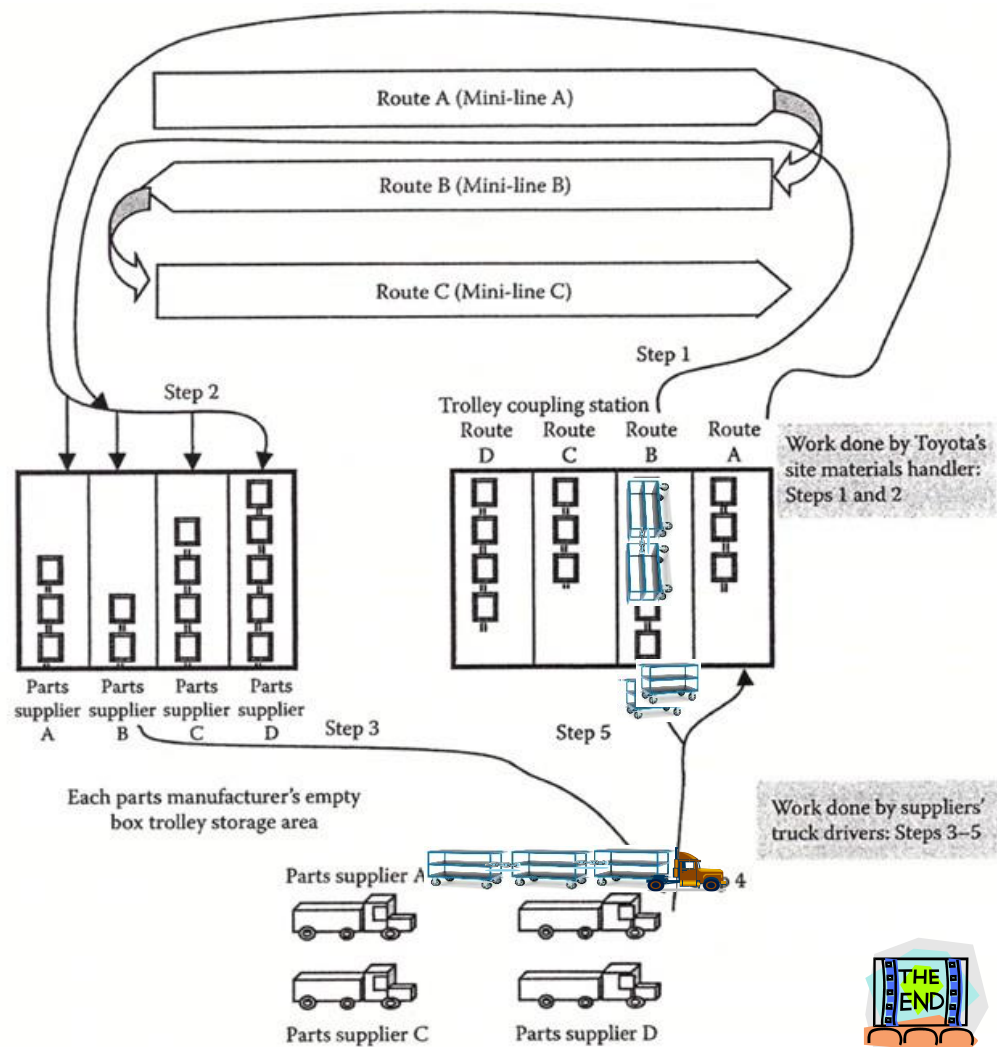


FIGURE 16.2  
"Empty-handed" transportation.