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17 March 2015

TIM 125 Final Examination

Problem 1: Planning

Step 1: Intent of the product

Project is to complete an accurate, high-quality final examination for submission on Tuesday 17 March 2015.

Step 2: Determine the subtasks and activities.

1. Complete problem #2
    - 1a: Gather previous work and notes which detail the framework of designing a supply chain.
    - 1b: Clearly present my framework (process) as it would be applied to Plantronics.
    - 1c: Create appropriate diagrams to show the structure of my framework and procedures

2. Complete problem #3
    - 2a: Review Problem 4 from the midterm
    - 2b: Recalculate the optimal lost size and cycle inventory with a new holding cost of 0.15

3. Complete problem #4
    - 3a: complete part A
    - 3b: complete part B
    - 3c: complete part C
    - 3d: complete part D

4. Complete problem #5
    - 4a: read sections 14.1-14.4 in the text
    - 4b: determine which supplier Julie should choose based on minimizing total cost
    - 4c: Create a supplier scorecard for comparing suppliers, use ideas from text

5. Complete problem #6
    - 5a: read section 13.5 in textbook
    - 5b: create a table in Excel for comparing rail vs. truck delivery options.
    - 5c: use table to select the optimal mode of transportation, provide quantitative evidence

6. Complete problem #7
    6a: Analyze how well my plan was executed
    6b: Draw conclusions

7. Complete extra credit
    7a: Use project software to solve all quantitative problems from midterm and final examinations.
    7b: Explain how our group's company could use this software to manage its supply chain
    7c: Develop an IT architecture to manage the information driver for our supply chain.

Step 3: Create a design/development activity matrix

Design and Development Activity Matrix

	1	1a	1b	1c	2	2a	2b	3	3a	3b	3c	3d	4	4a	4b	4c	5	5a	5b	5c	6	6a	6b	7	7a	7b	7c
1	1																										
1a		1a																									
1b		x	1b																								
1c		x	x	1c																							
2					2																						
2a						2a																					
2b						x	2b																				
3								3																			
3a					x				3a																		
3b									x	3b																	
3c									x	x	3c																
3d									x	x	x	3d															
4					x								4														
4a														4a													
4b														x	4b												
4c														x	x	4c											
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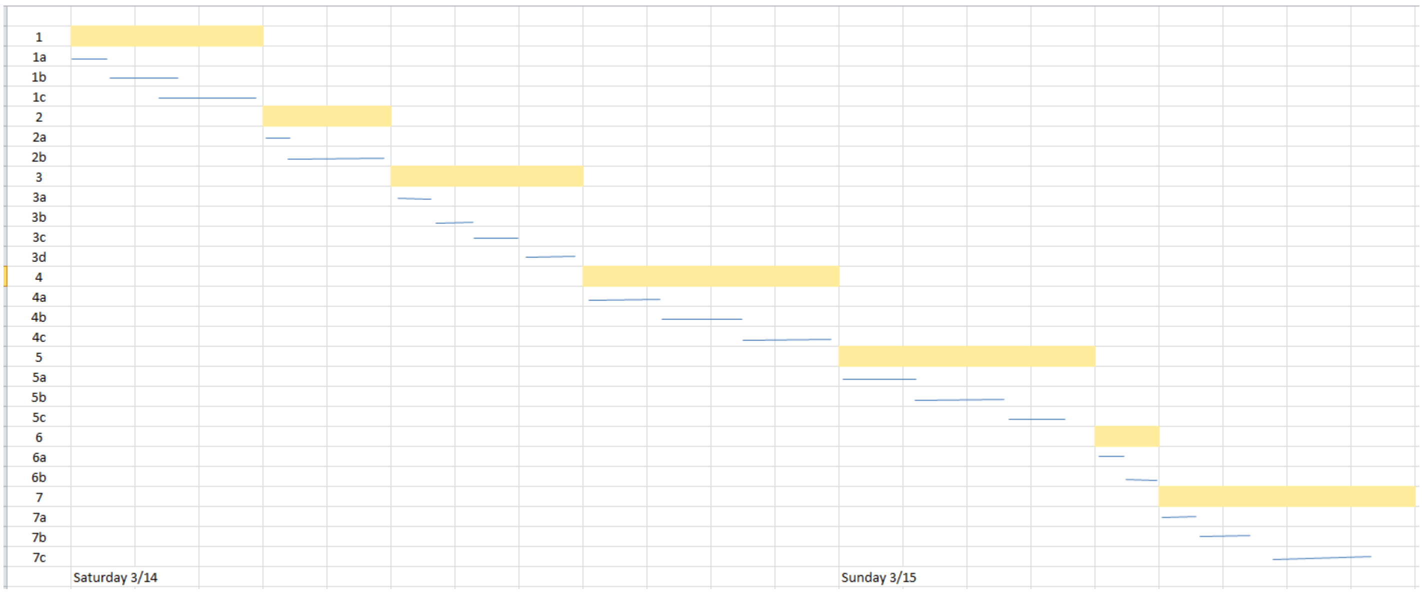
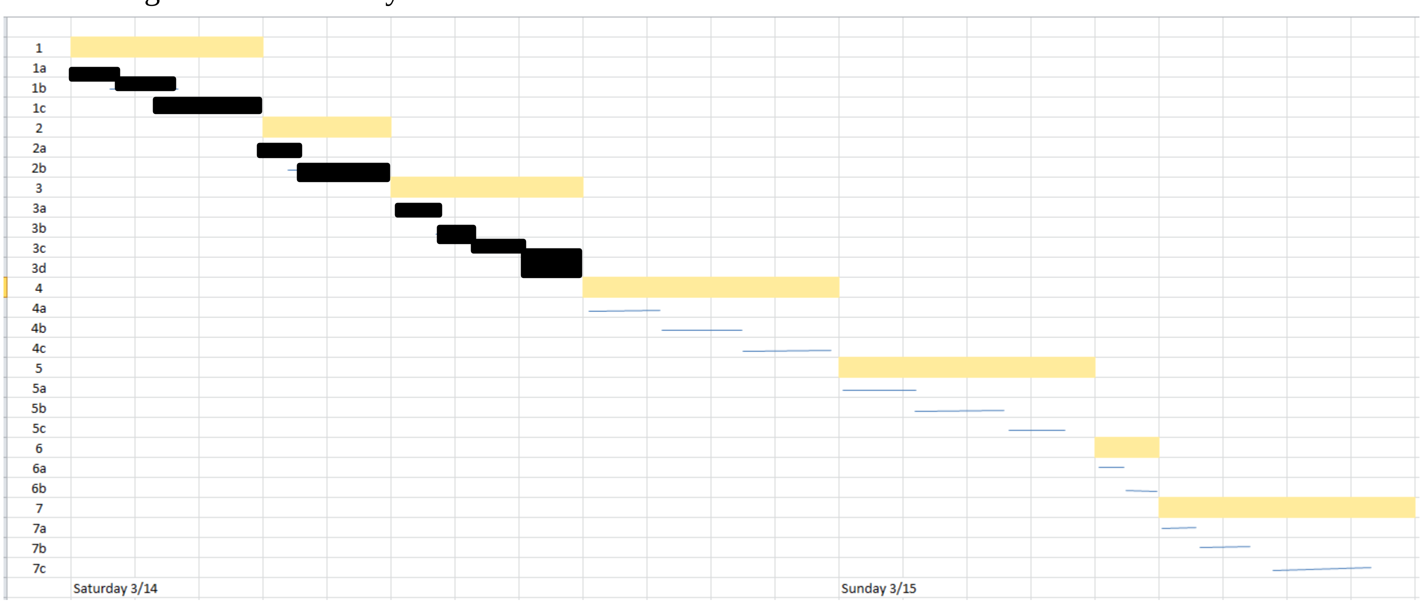
5c																		x	x	5c							
6																					6						
6a	x				x			x					x				x					6a					
6b																						x	6b				
7																								7			
7a																									7a		
7b																									x	7b	
7c																											7c

Step 4: Create a time-phased schedule of tasks

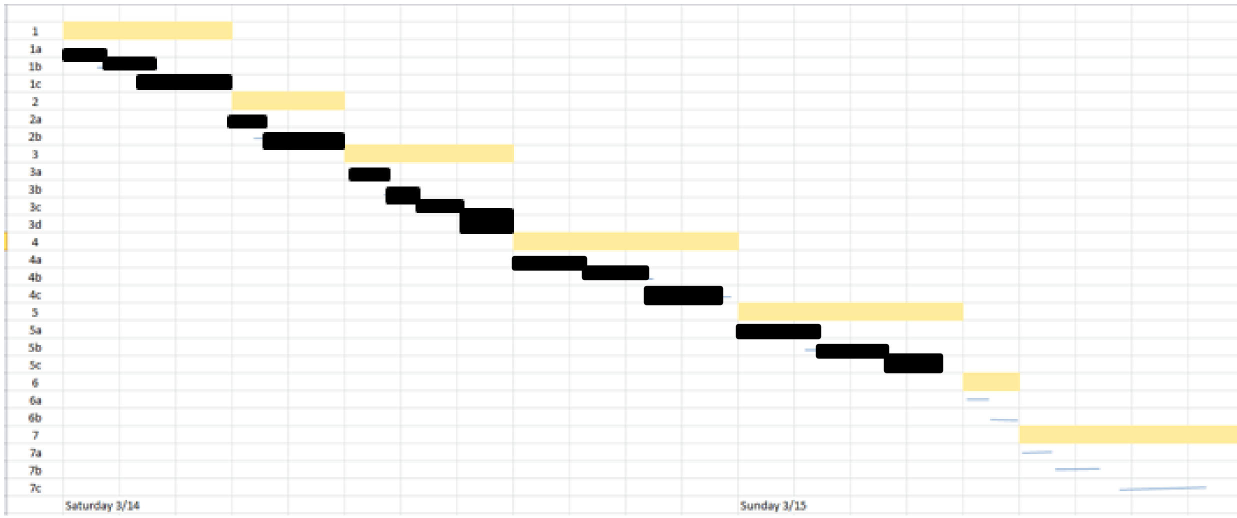


Step 5: Tracking Progress with Project Plan

Progress as of Saturday



Progress as of Sunday



All other tasks completed my Monday afternoon.

Problem 2: SCM Design/Analysis Framework

Structured Problem Solving

Step 1: Define the problem

I have been asked to show my framework/process for designing the supply chain for Plantronics. Need to describe the framework that would be used to solve supply chain management/design problems and create appropriate diagrams to show the structure of my framework.

Step 2: Plan

- Gather previous work and notes which detail the framework of designing a supply chain.
- Clearly present my framework (process) as it would be applied to Plantronics.
- Create appropriate diagrams to show the structure of my framework and procedures

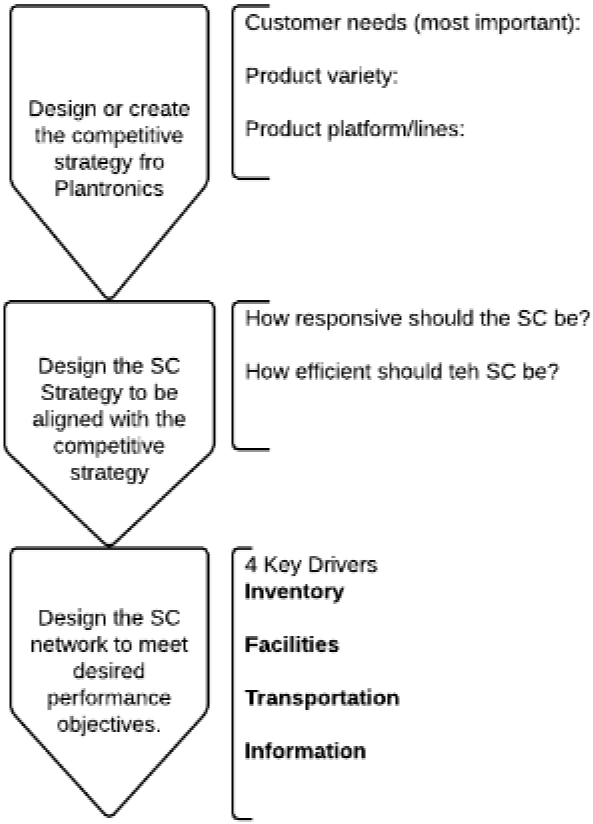
Step 3: Execute

The first step in designing the supply chain for Plantronics is the design of the Supply Chain Network. To do this, we must first determine the competitive strategy for the company, design the Supply Chain Strategy to align with the competitive strategy, and finally design the Supply Chain Network to meet desired performance objectives. The model for implementing these strategy decisions can be seen in Figure 2.1 on the following page.

In Figure 2.1, we see that to create the competitive strategy, we must determine the most important customer needs, the level of product variety which is desired, and define the product platform and product lines. The Supply Chain Strategy is determined by the tradeoff of responsiveness to efficiency which is desired by the company. Note that the balance of these two qualities can change over the course of a product's life cycle. Finally we design the Supply Chain Strategy by designing the four key drivers. This step is so big that we break it down into four distinct processes.

Before we continue with designing the supply chain drivers, the next step is to determine Plantronics' role in the supply chain. It can be quickly determined from understanding the company that it is the manufacturer. Its specific role as manufacturer however is in the design of the product. Should the company decide to sell products through its own web-site then it can be considered a retailer as well.

Figure 2.1: Design of Supply Chain Network



Step 3 is the design of the high-level structure (drivers) of the supply chain (Note that this is high-level and does not yet include precise numbers):

Inventory:

Determine the level of cycle inventory

Determine the amount of safety inventory that is required (align with level of responsiveness and efficiency)

Facilities:

Determine the number (or approximate number) of warehouses

Determine number of manufacturing plants

Determine number of assembly plants

Identify different distributors.

Transportation:

Identify transportation modes as various options

Determine the various transportation stages between facilities

Information:

Connect suppliers and distributors with Plantronics to efficiently exchange information and yield a more profitable supply chain.

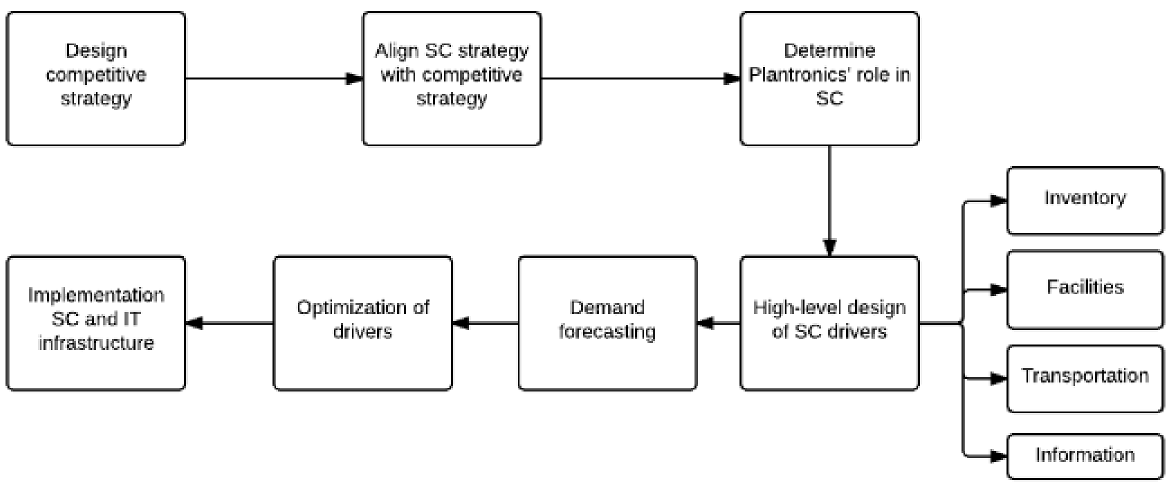
Step 4 is to perform demand forecasting in order to understand the exact quantities of product to produce and also perform error analysis.

Step 5 is optimization of inventory (cycle and safety), facilities (number of plants and their location and capacity) and transportation (transportation mode and frequency).

The final step in the process is implementing an automated IT infrastructure so that Plantronics can share information with every other member of the supply chain. This will boost both efficiency and responsiveness since the sharing of information helps limit the bullwhip effect and will allow Plantronics to better react to changes in customer demand.

A visual summary of our process, showing all steps and their relationships, is illustrated below.

Figure 2.2: Summary of Supply Chain Design Process



Step 4: Check Work

My proposed framework is clearly stated and easy to understand. I have carefully labeled and explained all processes and diagrams. I used the same process as taught in class and implemented in our group project assignment.

Step 5: Learn and Generalize

It is important to detail any design plan for a supply chain network. Strategy is always the driving force behind any supply chain and influences all other decisions in the SC design.

Problem 3: Optimal Lot Size and Cycle Inventory for Specialty Packaging Company (SPC)

Structured Problem Solving

Step 1: Define the problem

If, in Problem 4 of the midterm, the holding cost h = 0.15 (rather than h = 0.12), what is optimal lot size and the required cycle inventory?

Step 2: Plan

- Review Problem 4 from the midterm
- Recalculate the optimal lost size and cycle inventory with a new holding cost of 0.15

Step 3: Execute

First, we review the given data given in Midterm Problem 4:

SPC buys polystyrene resin from a supplier in 1000-pound units, and each unit costs \$50.00, and the percent holding cost is 12%. The fixed shipping cost per order is \$250. We assume that 1000 pounds of resin yields 1000 pounds of clear plastic.

We replace the holding cost, h, of 12% with 15% and calculate the new optimal lot size and cycle inventory. Our calculations are shown below:

% holding cost, h, = 15% per \$ per year

we assume a fast economy → 365 days per year

We need annual demand, D, for clear plastic. From our forecast in Midterm Problem #3 we get: (Note: 1 unit yields 1000 lbs clear plastic)

2007 Demand for Clear Plastic, D = 73,553 units/year

$c = \$50/\text{unit}$

$S = \$250/\text{unit}$

$$Q_L^* = \sqrt{\frac{2DS}{hC}} = \frac{(2)(73{,}553 \text{ units/year})(250 \ \$/\text{ship})}{(.15 \ \$/\text{year})(50 \ \$/\text{unit})}$$

$Q_L^* = 2{,}214$ units/shipment (rounding to nearest unit)

$$\text{Cycle inventory} = \frac{Q_L}{2} = \frac{2{,}214}{2} = 1107 \text{ units}$$

From our calculations above, we arrive at:

Optimal lot size = 2,214 units/shipment

Cycle inventory = 1,107 units.

Step 4: Check work

I have performed my calculations twice and confirmed they are correct. All work is clearly shown.

Step 5: Learn and Generalize

Holding all else constant, an increase in the holding cost will reduce the optimal lot size and thus also reduce the cycle inventory.

Problem 4: Safety Inventory for Polystyrene Resin at SPC

Structured Problem Solving

Step 1: Define the problem

a) Why should SPC have a safety inventory? What is the average weekly demand for black plastic (and therefore polystyrene) for 2007? If the coefficient of variation for black plastic is 0.10, what is the standard deviation in the weekly demand?

b) The polystyrene supplier has a lead-time of 4 weeks. SPC would like its Cycle Service Level (CSL) to be 0.90. Determine the necessary safety inventory level for a continuous replenishment policy. What is the Re-order Point (ROP)? What is the fill rate? What is the average inventory? What is the average flow time?

c) Create a diagram that shows all the relevant quantities from part (b)

d) In general, is the demand during the lead-time greater than or less than the lot size? Explain your answer using the diagram from part (c).

Step 2: Plan

- Determine why SPC should have a safety inventory
- Determine average weekly demand for black plastic for 2007.
- Compute standard deviation in the weekly demand
- Compute safety inventory, ROP, fill rate, average inventory, and average flow time
- Create an appropriate diagram showing these quantities
- Determine if demand during the lead-time is greater than or less than the lot size using my diagram

Step 3: Execute

Part A:

SPC should have a safety inventory because there is always uncertainty in customer demand during the lead time and it is more costly to run a backlog then keep low levels of safety inventory.

We now calculate the average weekly demand for black plastic for 2007:

From our demand forecast for black plastic from Midterm Problem #3, we have

2007 Demand for Black Plastic, D = 13,361 + 8,930 + 10,383 + 26,604 = 59,278 units

Average weekly demand, D_w for Black Plastic = 59,278 / 52 = 1,140 units

We now calculate the standard deviation in the weekly demand, σ_w, for black plastic:

The coefficient of variation, CV, for black plastic is 0.10. Since

$$CV = (\sigma_w / D_w) \quad \rightarrow (1)$$

It follows that

$$\sigma_w = (CV) * (D_w)$$

So,

$$\sigma_w = (0.10) * (1{,}140 \text{ units}) = 114 \text{ units}$$

Part B:

Formulas:

We define the needed equations for this problem below:

$$CSL = F\left(z = \frac{ss}{\sigma_{D_L}}\right) \longrightarrow (1)$$

$$\sigma_{D_L} = \sqrt{L} \cdot \sigma_{D_W} \longrightarrow (2)$$

$$(D_L)_m = L \cdot D_W \longrightarrow (3)$$

$$ROP = (D_L)_m + ss \longrightarrow (4)$$

$$f_r = \frac{Q_L - ESC}{Q_L} \longrightarrow (5)$$

$$ESC = -ss\left[1 - F_z\left(z = \frac{ss}{\sigma_L}\right)\right] + \sigma_L f_z\left(z = \frac{ss}{\sigma_L}\right) \longrightarrow (6)$$

$$f_z(z) = \frac{1}{\sqrt{2\pi}}\left(e^{-z^2/2}\right) \longrightarrow (7)$$

Avg. inventory = cycle inventory + ss $\longrightarrow (8)$

$$\text{Avg. flow time} = \frac{\text{avg. inventory}}{\text{avg. flow rate}} \longrightarrow (9)$$

Calculating safety stock:

$L = 4$ weeks

$CSL_{Desired} = 0.90$

$$CSL = 0.90 \underset{(1)}{=} F\left(z = \frac{SS}{\sigma_{D_L}}\right)$$

$$\sigma_{D_L} \underset{(2)}{=} \sqrt{L} \cdot \sigma_{D_W}$$

$$= 2 \cdot 114$$

$$= 228 \text{ units}$$

So,

$$0.90 = F(z = 1.28) = F\left(z = \frac{SS}{\sigma_{D_L}}\right)$$

$$1.28 = \frac{SS}{228}$$

$$\boxed{SS = 292 \text{ units}}$$

Calculating ROP:

$$ROP \underset{(4)}{=} (D_L)_m + SS$$

$$\underset{(5)}{=} (L \cdot D_w) + SS$$

$$= (4 \cdot 1{,}140) + 292$$

$$\boxed{ROP = 4{,}852 \text{ units}}$$

Calculating fill rate, f_r :

$$f_r \underset{(5)}{=} \frac{Q_L - ESC}{Q_L}$$

we know $Q_L = 2{,}214$ units

$$ESC \underset{(6)}{=} -ss\left[1 - F_z\left(z = \frac{ss}{\sigma_L}\right)\right] + \sigma_L f_z\left(z = \frac{ss}{\sigma_L}\right)$$

$$f_z\left(z = \frac{ss}{\sigma_L}\right) = f_z(z = 1.28) \underset{(7)}{=} \frac{1}{\sqrt{2\pi}}\left(e^{-(1.28)^2/2}\right)$$

$$= 0.176$$

$$ESC \underset{(6,7)}{=} -(292)[1 - .90] + (228)(0.176)$$

$$= 11 \text{ units}$$

So,

$$f_r = \frac{Q_L - ESC}{Q_L}$$

$$= \frac{2{,}241 - 11}{2{,}241}$$

$$\boxed{f_r = 0.995}$$

Calculating average inventory

$$\text{Avg. inventory} \underset{(8)}{=} \text{cycle inventory} + SS$$

$$= 1{,}107 + 292$$

$$\boxed{\text{Avg inventory} = 1{,}399 \text{ units}}$$

Calculating average flow time:

$$\text{Avg. flow time} \underset{(9)}{=} \frac{\text{avg. inventory}}{\text{avg. flow rate}}$$

since avg flow rate = demand,

$$\text{Avg. flow time} = \frac{1{,}399}{\text{Daily demand}}$$

$$= \frac{1{,}399}{(D_w / 7)}$$

$$= \frac{1{,}399}{(1{,}140 / 7)}$$

$$= 8.6$$

$$\boxed{\text{Average flow time} \approx 9 \text{ days}}$$

Part C:

Table 4.1: Summary of Relevant Quantities from Part B

Safety Inventory	292 units
ROP	4,852 units
Fill Rate	0.995
Average Inventory	1,399 units
Average Flow Time	9 days
Optimal Lot Size	2,214 units
Cycle Inventory	1,107 units
Demand During Lead Time	228 units
Safety Stock	292 units
ESC	11 units

Part D:

As can be seen by referencing Table 4.1 above, the demand during the lead-time is, in general, less than the lot size. This intuitively makes since because the lot size should sufficiently supply the expected demand for an entire cycle. However, due to uncertainties in demand, the demand during the lead time might be greater than expected, hence the reason of storing safety stock.

Step 4: Check work

I have performed all calculations twice and concluded that my calculations are correct. My Table is labeled and clearly summarizes all relevant quantities and my conclusion in Part D is supported both qualitatively and quantitatively.

Step 5: Learn and Generalize

Safety stock is carried to help ensure a higher CSL by supplying any additional demand during the lead time. This results in a higher fill rate but also a higher level of average inventory.

Problem 5: Sourcing for SPC

Structured Problem Solving

Step 1: Define the problem

a) Which supplier should Julie choose, based on minimizing total cost, if her inventory holding cost h = 0.15 and her desired target CSL = 90%?

b) Create a suppler scorecard that Julie can use to compare different suppliers.

Step 2: Plan

- read sections 14.1-14.4 in the text
- determine which supplier Julie should choose based on minimizing total cost
- Create a supplier scorecard for comparing suppliers, use ideas from text

Step 3: Execute

Part A:

For this problem, we have h = 0.15 and CSL = 0.90. From Problem 4, we have a weekly demand, D_w = 1,140 units and standard deviation of weekly demand, σ_w = 114 units. To calculate the cost of each Supplier, we use the formulas below:

$$\text{Annual material cost} = D_w \times 52 \times C$$

$$\text{Average cycle inventory} = \frac{Q_L}{2}$$

$$\text{Annual cost of holding cycle inventory} = \frac{Q_L}{2} \times hC$$

$$\sigma_{D_L} = \sqrt{L\sigma_D^2 + D_w^2\sigma_L^2}$$

$$CSL = F_Z\left(z = \frac{ss}{\sigma_{D_L}}\right)$$

$$\text{Annual cost of holding ss} = ss \times hC$$

$$\text{Annual cost of Supplier} = (\text{Annual material cost} + \text{cost of cycle inventory} + \text{cost of ss})$$

We now calculate the cost of Supplier 1:

Calculating cost of Supplier 1:

$c = \$10 \quad L = 2 \text{ weeks} \quad \sigma_L = 1 \text{ week} \quad Q_L = 2000$

Annual material cost $= (1140)(52)(\$10) = \$592{,}800$

Average cycle inventory $= \frac{2000}{2} = 1000$ units

Annual cost of holding cycle inventory $= (1000)(.15)(\$10)$
$= \$1{,}500$

$\sigma_{D_L} = \sqrt{(2)(114)^2 + (1140)^2(1)^2} = 1151$ units

$CSL = .90 = F_Z(z = 1.28) = F_Z\left(z = \frac{SS}{\sigma_{D_L}}\right)$

$\longrightarrow 1.28 = \frac{SS}{\sigma_{D_L}}$

$SS = (1.28)(1151) = 1473$ units

Annual cost of holding $SS = (1473)(.15)(\$10)$
$= \$2{,}210$

Annual cost of Supplier 1 $= \$596{,}510$

We now calculate the cost of Supplier 2:

Calculating cost of Supplier 2:

$C = \$9 \quad L = 4 \text{ weeks} \quad \sigma_L = 2 \text{ weeks} \quad Q_L = 4000 \text{ units}$

Annual material cost $= (1140)(52)(\$9) = \$533,520$

Average cycle inventory $= \frac{4000}{2} = 2000$ units

Annual cost of holding cycle inventory $= (2000)(.15)(\$9)$
$= \$2,700$

$\sigma_{D_L} = \sqrt{(4)(114)^2 + (1140)^2(2)^2} = 2,291$ units

$ss = (1.28)(2,291) = 2932$ units

Annual cost of holding ss $= (2932)(.15)(\$9)$
$= \$5,958$

Annual cost of Supplier 2 $= \$536,614$

From our calculations above, Julie should choose Supplier 2 in order to minimize total cost.

Part B:

The Figure below is a Supplier Scorecard which can be used to help determine the total costs associated with a particular supplier.

Figure 5.1: Supplier Scorecard

Supplier Scorecard			
Supplier Metrics		*Inventory Metrics (units)*	
Price per unit ($)		Avg. Cycle Inventory	
Avg. Lead Time (weeks)		Safety stock	
Std. dev. Of lead time			
Lot size			
Annual Costs ($)			
Material cost			
Cycle Inventory			
Safety Inventory			
Total Cost			

Step 4: Check work

All calculations have been performed twice and are clearly shown. Supplier scorecard seems appropriate for determining the cost of a supplier.

Step 5: Learn and Generalize

The supplier lead time must be taken into consideration when calculating the cost of using a supplier because it contributes to the cost of safety inventory.

Problem 6: Transportation Design for SPC

Structured Problem Solving

Step 1: Define the problem

a) Create the appropriate table in Excel for comparing rail versus truck delivery options for modes of transportation.

b) Use the table form (a) to select the optimal mode of transportation. Provide quantitative evidence to support your selection. (Use information on costs given in the case-study, and make appropriate assumptions about transportation costs).

Step 2: Plan

- read section 13.5 in textbook
- Create a table in Excel for comparing rail vs. truck delivery options.
- use table to select the optimal mode of transportation, provide quantitative evidence

Step 3: Execute

Part A:

When comparing costs of different transportation modes, we need not only consider the transportation cost of each mode, but also its impact on inventory costs. For this reason, we consider all inventory costs associated with transportation in our table below which compares the cost of truck versus rail delivery modes. The sum of all costs, Total Cost, determines which transportation mode is best for SPC.

Table 6.1: Rail vs. Truck Transportation Costs

Mode of Transportation	Lot Size	Transportation Cost	Cycle Inventory Cost	Safety Inventory Cost	In-transit Inv. Cost	Total Cost
Rail						
Truck						

Part B:

We now use this table to help determine which mode of transportation should be used by SPC. First we will determine the costs associated with rail:

We assume the lot size to be the optimal lot size, 2,214 units, which was determined in Problem 3. We also note that each unit is 1000 pounds. We assume the shipping cost per cwt (hundred pounds) for rail to be $6.50. Note that SPC has a holding cost, h, of 0.15 and a cost, C, of $50/unit. We assume that replenishment lead time, L = 6 days. Also recall from Problem 3 that the annual demand is 73,553 units.

Calculating costs associated with rail:

Transportation cost = ($6.50/cwt) * (2214 units * 1000 lbs/unit / 100 lbs/cwt)

= $143,910

Cycle Inventory = 2214/2 = 1107 units

Annual Cycle Inventory holding cost = 1107 * hC = 1101 * (.15)($50) = $8,258

Safety Inventory = (L/2) * days of demand = (6/2) * (73,553/365) = 605 units

Annual Safety Inventory holding cost = 605 * (0.15)($50) = $4,538

In-transit Inventory = Annual demand * (days in transit/365) = 73,553 * (6/365) = 1209

Annual In-transit Inventory holding cost = 1209 * (.15)($50) = $9,068

Total cost of using rail = Transportation Cost + Cycle Inventory holding cost +

Safety Inventory Cost + In-transit Inventory Cost

= $143,910 + $8,258 + $4,538 + $9,068

= $165,774

Now we calculate the costs associated with truck:

Note that all input parameters stay the same as for rail except for shipping cost and lead time. We assume that the shipping cost is $7.50 per cwt and the lead time, L, is 4 days.

Transportation cost = ($7.50/cwt) * (2214 units * 1000 lbs/unit / 100 lbs/cwt)

= $166,050

Annual Cycle Inventory holding cost = $8,258

Safety Inventory = (L/2) * days of demand = (4/2) * (73,553/365) = 403 units

Annual Safety Inventory holding cost = 403 * (.15)($50) = $3,022

In-transit Inventory = Annual demand * (days in transit/365) = 73,553 * (4/365) = 806

Annual In-transit Inventory holding cost = 806 * (.15)($50) = $6,045

Total cost of using truck = $166,050 + $8,258 + $3,022 + $6,045 = $183,375

Inputting these costs into our table:

Table 6.2: Rail vs Truck Costs

Mode of Transportation	Lot Size	Transportation Cost	Cycle Inventory Cost	Safety Inventory Cost	In-transit Inv. Cost	Total Cost
Rail	2214	143910	8258	4538	9068	165774
Truck	2214	166050	8258	3022	6045	183375

From Table 6.2 above, we can see that the total cost of using rail is $165,744 compared to a cost of $183,375 for truck. We conclude that given our assumptions on shipping cost and lot size, that SPC should use rail as its mode of transportation.

Step 4: Check work

All of my calculations are correct and my assumptions of shipping rates are reasonable given similar rates in the textbook. My table clearly shows all costs associated with transportation.

Step 5: Learn and Generalize

The cost of inventory that is in-transit can sometimes be sufficient enough to determine which mode of transportation should be used and therefore should always be factored into the total cost of a transportation mode.

Problem 7: Execution of Plan

Plan of each problem	Execution	Reasons for difference	What could be changed
Problem 2: 1 hr to 1.5 hrs	Finished slightly over time	Took some time to create diagrams, completely reviewed my entire project process	Quickly identify the key steps in designing a supply chain, have a template for diagrams pre-made
Problem 3: 30 mins	Finished on time	No difference	Nothing needs to be changed
Problem 4: 90 mins	Finished late	Spent a lot of time checking my calculations	Nothing really needs to be changed since I knew I had an extra day to work with and resulted in quality work
Problem 5: 90 mins	Finished on time	No difference	All went as planned
Problem 6: 90 mins	Finished an hour late	Wasn't quite sure how to begin, took several minutes to find a good approach	Do readings in advance to better understandappropriate assumptions

Three key lessons learned in this course:

1) Planning is essential while designing a supply chain, particularly performing demand forecasting.

2) Inventory is incredibly expensive; managing inventory effectively can greatly reduce costs and add to the supply chain profit.

3) The bull-whip effect can be sensational and causes several back logs in the supply chain which decreases supply chain profit greatly. The bull-whip effect is one of the greatest factors which makes supply chain management so difficult.

Extra Credit

During the development of our SCM software, my main contribution was developing the forecasting software. I also helped develop the Facilities software with another group member and aided in the design of the system (user interface).

The first way that our company could use our SCM software would be to perform demand forecasting for all of its products. This would help the company determine there is sufficient demand for a new product and would give reliable estimates on the quantity needed to be produced.

The system would also be a great tool for calculating inventory metrics. Given annual demand, holding cost, per unit cost, supplier lead time, and a targeted CSL, we could quickly calculate the optimal lot size, cycle inventory, safety inventory, and ROP. These values could be calculated for every facility in the supply chain (manufacturing plants, assembly plant, DC etc…) and would help to minimize the bullwhip effect. This would also allow us to perform 'what if' scenarios, for example by changing the CSL and seeing the effects on safety inventory costs. This could potentially lead to cost savings.

Regarding transportation, our software could be used by our company to run several transportation scenarios, changing lot size, re-order intervals, shipment sizes, and many other inputs, to determine the most cost effective transportation mode for our products. This could optimize our shipping modes between our various facilities, supplier facilities, and retail outlets.

Developing an IT architecture for our SCM software:

If I were to design an IT architecture for our SCM software, every part of the supply chain, suppliers, manufacturers, distributors, retailers, etc. would all be linked via an intranet. The servers for the entire network would be stationed at our company's (Hydro Fittings) corporate headquarters. This would also be where network administration would be in order for us to be able to effectively control the supply chain.

At the heart of the network would be a centralized database which would receive information from every link in the supply chain on a real-time basis. This would include information such as inventory levels, sales, and shipment status. The system would be able to keep track of inventory levels and alert managers at each facility when to place an order and what the quantity should be. In fact, since the system would be fully distributed, after a trial period (say 6 months) if all such calculations were correct the system could be made to place orders automatically, eliminating human error. This would reduce the bull-whip effect dramatically as each member of the supply chain would have up-to-date information on inventory levels and delivery times of all other facilities.