



Drug-Pro Distribution Teaching Case

Case study

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This case was written by Dr Sabry Shaaban, with the help of Juliet Armand, Groupe ESC Rennes. It is intended to be used as the basis for class discussion rather than to illustrate either effective or ineffective handling of a management situation. The case was compiled from generalised experience.

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Drug-Pro Distribution Teaching Case

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NB: The case describes existing towns and existing institutions in the British Pharmaceutical industry as a means of providing a context for the case. However, all company names and company information are intended to be purely fictitious. Any similarity with existing firms is unintentional.

It was 8.30 am on a cold Wednesday morning in Brentwood near the North East section of the M25 motorway around London. Phillip Newcombe watched the last lorry manoeuvre slowly out of loading bay Number 16, heading off on its collection of medicines from one of the firm's leading suppliers in Chigwell. "If my calculations are right this should be the fastest collection ever", he thought to himself, quietly confident.

Phillip headed back to his office to look over the new route-plan that he had devised. Soon he would be able to finish compiling his recommendations for the Board of Director's meeting to be held at the end of the month.

Phillip was Director of Operations and Logistics at **Drug-Pro**, a leading wholesaler of Pharmaceutical products and member of the British Association of Pharmaceutical Wholesalers (**BAPW**). Drug-Pro distributes a range of over 6,000 medical references including Prescription Only Medicine (**PO**), Pharmacy Only Medicine (**P**) and General Sales Listed medicines (**GSL**) to over 2,000 independent and chain pharmacies in the East of England, registered with the Royal Pharmaceutical Society of Great Britain (**RPSGB**). Their territory covers 10 large counties: Cambridgeshire, Norfolk, Suffolk, Essex, Hertfordshire and Bedfordshire to the North East of London; and Kent, East Sussex, West Sussex and Surrey to the South and East of London.

Phillip was in charge of three main warehouses located in Brentwood, Reigate and Peterborough. The latter had been recently purchased and was undergoing renovation. These locations are identified on the enclosed map of the South of England.

The supply of medicines in the UK is strictly regulated by the Medicines Act 1968, and the Misuse of Drugs Act 1971. The Medicines 1968 Act established a comprehensive licensing system for medicines covering manufacturers, importers, wholesalers and retailers. The industry watch dog is the Medicines and Healthcare Products Regulatory Agency (MHRA).

Wholesalers of pharmaceutical products such as Drug-Pro must be licensed by the MHRA and must also comply with the EU Directive 94/C63/03, the guidelines on good distribution practice of medicinal products for human use. Drug-Pro holds a full licence - permitting the company to handle all product categories including PO products. Every site from which a wholesaler operates must also be registered. Premises are inspected periodically to ensure that Drug-Pro's operations are in compliance with the BAPW Code of Good Pharmaceutical Wholesale Distribution.

Drug-Pro had achieved a leading position in the East of England by focusing on delivering not just pharmaceutical and healthcare products, but also a comprehensive range of services and solutions in innovative and cost effective ways. This was essential if the firm was to maintain customer loyalty in the face of intense rivalry. Drug-Pro strived to realize this mission by setting the highest standards in service, reliability, safety and cost containment in the pharmaceutical services industry.

Phillip had joined the company 5 years ago as Director of Operations and Logistics. He was extremely proud of the unique combination of service excellence, intelligence and expertise in pharmacy supply chain management that Drug-Pro offered its customers. His job was complex, from managing costs, to improving accuracy, to generating growth for his customers and his own employer. Phillip knew that the key to success was not just about delivering the right medicines at the right price, but also about looking at the bigger picture and providing solutions that could maximize each pharmacy's performance.

Reducing costs for the final customers (the high street pharmacies) meant strict cost control in up-stream activities, including delivery of medicines from his suppliers to the central warehouses, including Brentwood where he was based. Savings in travel time and petrol costs could improve Drug-Pro's margins and a fast, reliable delivery time could guarantee less product storage at the pharmacy, greater selling space and more frequent deliveries for Drug-Pro.

A number of major development projects were coming towards completion and Phillip was expected to make a presentation for the next Board meeting to be held in a few weeks' time. Phillip had made a list of tasks to be completed before the meeting.

Task 1: Shortest Route Analysis

In recent months Phillip had been working very closely with **Novensis**, one of the largest Pharmaceutical manufacturers in England and a key supplier of drugs to Drug-Pro, to establish the most cost effective delivery route that truck drivers should take from the Novensis' own factory in **Chigwell** to Drug-Pro's central warehouse in **Brentwood**. The lorry which had just left bay n° 16 was about to test this shortest route. Phillip went back into his office to await the phone call which would inform him of the lorry's exact time of arrival.

Diagram 1 below shows the network of motorways and roads and the associated travel times (in average number of minutes for different travel conditions including traffic density at different times of day, and days of week) between each pair of points. The distances are not drawn to scale.

Savings in petrol and driving time were potentially enormous. If this collaboration with *one* supplier could prove to be successful, Phillip would be able to generalise the use of the same decision making tool to all the other suppliers and warehouses, enhancing performance considerably.

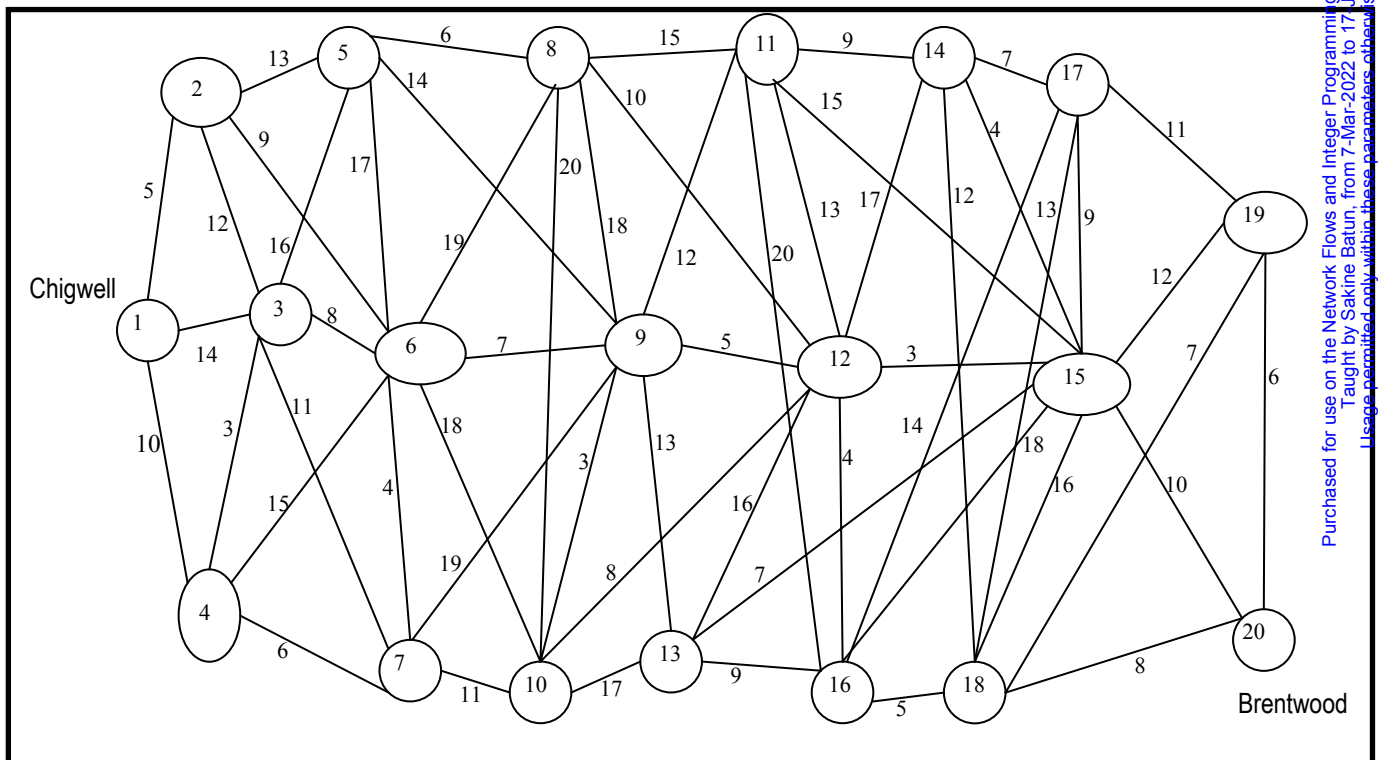


Diagram 1: Network of roads and motorways between Chigwell and Brentwood, with average travel times in minutes.

Managerial decision required:

Determine the best (quickest) route and associated minimum journey time between the supplier and the central warehouse.

Task 2: Minimal spanning tree

As part of its expansion plans, Drug-Pro had recently acquired a small medical wholesaler based in Peterborough, whose territory borders that of Drug-Pro in the North.

Deliveries to this new sales territory had initially been ensured from the central warehouse in Brentwood, about 100 miles distant from the southern most point of the new northern sales territory. However, given the difficult travel conditions across these 100 miles, Phillip was far from satisfied with this costly, short term solution. On his recommendation Drug Pro had recently acquired an additional warehouse in **Peterborough**.

The warehouse needs to be equipped with an elaborate security system as stipulated by the MRHA, due to the sensitive nature of many of the pharmaceutical products stocked. Phillip has identified 15 key locations within the Peterborough warehouse which need to be interconnected to ensure maximum security, and satisfy the MRHA requirements.

Diagram 2 below shows the network of 15 points and the relative distances in linear yards between each point.

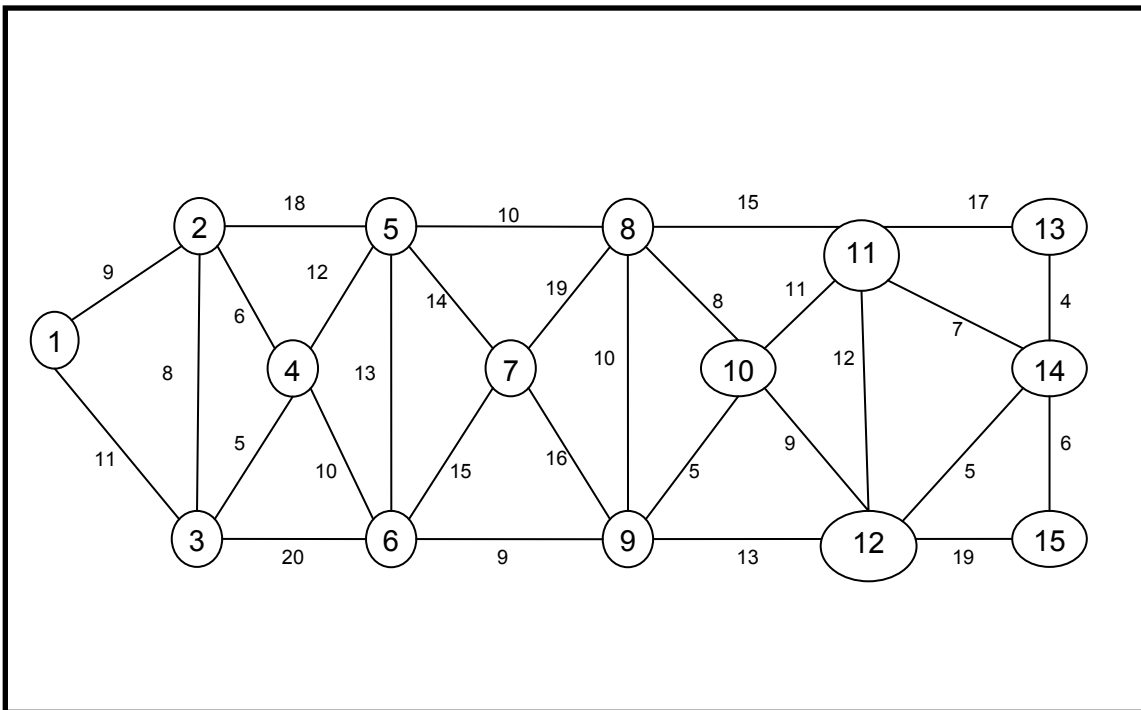


Diagram 2: The alarm network (distances in linear yards).

Managerial decision required:

Determine the optimal layout to connect all fixed points to the central alarm system using the minimal amount of cabling.

Task 3: CPM

The warehouse needs to be renovated and fully automated to include a computer-controlled order-picking system. After consultation with the architects, engineers and the MRHA inspectors, Phillip came up with the following list of activities and their completion times (durations) together with the immediate predecessors, as indicated in Table 1 below. These activities would need to be completed and the whole installation validated before Drug-Pro could occupy the premises and start operations from the new site.

Activity	Description	Immediate predecessor	Time (in weeks)
A	Determine new warehouse specifications	-	5
B	Obtain tenders for warehouse outfitting	-	9
C	Select vendors	A, B	3
D	Order computerised surveillance system	C	12
E	Order computerised stock control interface	C	6
F	Install stock control interface	E	5
G	Train operators on stock control software	E, F	8
H	Construction of external fencing and Closed Circuit TV cameras	C	7
I	Interfacing of security system and alarm	D, H	4
J	Test all computer systems (stock and security)	F, G, I	5
K	Validation by MRHA inspectors	J	4

Table 1: Activities, and their completion times, and immediate predecessors

Managerial decision required:

Using the information provided about the warehouse renovation project, determine the completion time of the project and the critical path.

Task 4: Transshipment problem

One of the key accounts managed by Drug-Pro for the East of England was the retail chain “Better 4U”. This household name is the key retailer of drugs in the region, and is widely respected and loved by its millions of loyal consumers. Despite diversification of their product range (now including perfumes, cosmetics, baby products and household equipment), the para-pharmaceutical department still generated the largest source of income. There were 16 key branches of Better 4U in Drug-Pro’s territory (namely Luton, Northampton, Lincoln, Peterborough, Cambridge, Norwich, Ipswich, Chelmsford, Maidstone, Canterbury, Ashford, Royal Tunbridge Wells, Brighton, Worthing, Guildford, and Woking). (See map of South England).

Phillip had been working on a joint project involving the 16 Better 4U stores, Novensis and Drug-Pro to improve service deliveries and costs between the 3 parties. This included forecasting monthly production capacity and market demand for various key drugs. This information is summarized in Tables 2 and 3 below:

Plant	Capacity (millions of packets)
Novensis Plant 1 (Chigwell)	12
Novensis Plant 2 (Cambridge)	5
Total	17

Table 2: Drug production capacity of Novensis plants (in millions of packets)

Better 4U retail outlets	Demand (million of packets)
1 Luton	0.5
2 Northampton	1.0
3 Milton Keynes	0.2
4 Peterborough	0.7
5 Cambridge	1.4
6 Norwich	1.2
7 Ipswich	0.9
8 Chelmsford	0.4
9 Maidstone	1.8
10 Canterbury	2.1
11 Ashford	0.6
12 Royal Tunbridge Wells	1.3
13 Brighton	0.1
14 Worthing	1.5
15 Guildford	2.0
16 Winchester	0.3
Total	16

Table 3: Drug demand per Better 4U retail outlets (in millions of packets)

The transportation costs per 1,000 packets in £s sterling for shipments from the two plants to the three warehouses, and from the three warehouses to the sixteen retail outlets are shown in Tables 4 and 5 below:

Plant	Warehouse 1 (B)	Warehouse 2 (R)	Warehouse 3 (P)
Novensis Plant 1 (Chigwell)	1	9	12
Novensis Plant 2 (Cambridge)	8	13	6

Table 4: Transportation Cost in £ of shipments (Manufacturer to Distributor)

Warehouse	Better 4U retail outlets (1-16)															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1 B	7	11	10	12	8	15	7	1	4	8	8	6	10	11	9	13
2 R	9	13	12	19	13	21	14	8	4	10	8	4	6	7	3	7
3 P	8	6	7	1	6	11	12	11	17	20	20	18	22	23	17	23

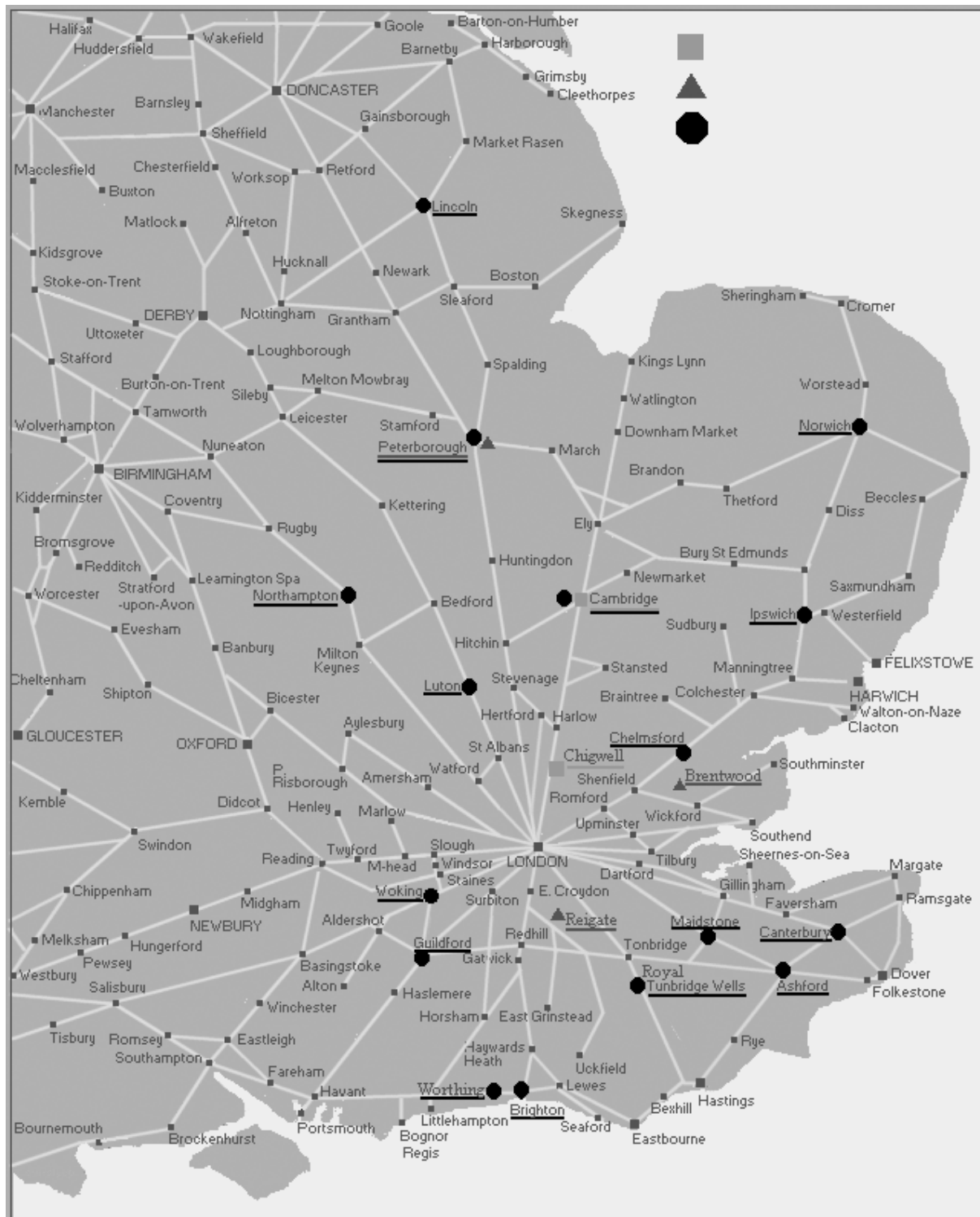
Table 5: Transportation Cost in £ of shipments (distributor to retail outlet)

Management Decision Required:

Phillip is looking to improve service to the Better 4U key account. He should determine how many products each warehouse should receive from the two plants, and which warehouse should deliver to which of the 16 retail outlets of Better 4U in Drug Pro's territory. To do this he should draw the network representation and determine the minimum cost shipping schedule for this transshipment problem.

MAP OF SOUTH OF ENGLAND

Geographic location of towns quoted in the case



- ▲ Drug Pro Warehouses
- Novensis Manufacturing Plants
- Better4U retail outlets