

**Logistics & Warehousing Management**

**DM-442/IB418**

**Trimester – I & IV, End-Term Examination: September 2019**

Time allowed: 2 Hrs 30 Min

Max Marks: 50

Roll No: \_\_\_\_\_

**Instruction:** Students are required to write Roll No on every page of the question paper, writing anything except the Roll No will be treated as **Unfair Means**. All other instructions on the reverse of Admit Card should be followed meticulously.

Sections	No. of Questions to attempt	Marks	Total Marks
A	Minimum 3 question with internal choices and CILO (Course Intended Learning Outcome) covered	3*10	30
	Or Maximum 6 questions with internal choices and CILO covered (as an example)	Or 6*5	
B	Compulsory Case Study with minimum of 2 questions	20	20
			<b>50</b>

**Section A**

Q1.

- a. What are the three main forms of integration necessitated under a global approach to operations and logistics activities? (CILO 01)
- b. What are vendor managed inventory practices? Why does firms use them?

Or

Q2. "Cross docking essentially eliminates the inventory-holding function of a warehouse while still allowing it to serve its consolidation and shipping functions"- delineate the process of cross docking in a retail logistics hub? Also discuss briefly the future role of logistics hubs in general? (CILO 01)

Q3.

- a. Assuming that an ocean carrier or a freight consolidator offers an exporter Rs.65 W/M (weight or measurement) for the shipment of 665 cartons of product DX. The specified weight is per 1,000 kg and measure is per cubic meter (m<sup>3</sup>). The gross weight of each carton is 10.5 kg and the dimensions are 0.45 x 0.30 x 0.30 m (LxWxH) which is 0.04 m<sup>3</sup> per carton. What will be the unit freight charged as per the rules? (CILO 02)
- b. Company is examining two choices for moving its goods from the plant to its depot in Eastern India; truck and rail. The relevant information is as follows:

Transport Mode	Transport lead time (days)	Rate (Rs/unit)	Shipment size(Units)
----------------	----------------------------	----------------	----------------------

Rail	12	20	5,000
Road	4	30	500

The company is planning to ship 20,000 units per year. The cost of the product is Rs. 500 per unit. Assume the inventory-carrying to be 20 percent.

- a. Which mode of transport should the company choose?
- b. Will your answer change if you realize that the time shown above is average times and that actually time will follow a normal distribution with a standard deviation of 4 days. (CILO 02)

Or

Q4. "Running a warehouse is certainly not an easy feat. With all those stocks or products that need to be stored, one needs to make the best use of the space available". You need to decide how to allocate the various storage locations to the various SKUs (stock keeping unit). Please elaborate on storage policies a warehouse incharge should focus upon? Also highlight the KPIs used in deciding the policies? (CILO 02)

Q5.

- a. What is a relay trucking? Present your answer with the modern developments happening in logistics industry? (CILO 01)
- b. Discuss how IT plays a crucial role in an effective and value added SCM practicing firms? (CILO 01)

Or

Q6.

- a. One way of extending the logistics organization beyond the boundaries of the company is through the use of a contract logistics services. Considering the statement, highlight the role of a 5 PL, 6 PL and 7PL logistics companies? (CILO 02)
- b. What effect do the use of third party logistics providers have on the bullwhip effect of the supply chain? (CILO 02)

## Section B

At the beginning of January 2013, Renault and Renault Vehicules Industriels (RVI) received a proposal from the management of Aerobus that seemed of particular interest. The airline was expressing its readiness to apply a 30% reduction to current tariffs for Africa, if the two companies would provide them with a total of at least 50 tons of freight per month shared between the two destinations of Abidjan (Ivory Coast) and Douala (Cameroon) where they have installations.

Naturally the task of considering this proposal in a general way was given to the CAT (Compagnie d' Affretement et de Transport/Freight and Transport Company), which is a subsidiary of both Renault and Renault Vehicules Industriels (RVI), and more specifically to Aircat, the "airways" branch of CAT.

CAT is responsible for transport commissioning, and a very large part of its services are carried out on behalf of the Renault group. In particular it organizes the sales transport, that is to say transport of:

Finished vehicles ready to be sold

The collection of vehicles in pre-packed parts, to be put together in the assembly factories owned by Renault abroad (supplied as CKD-Completely Knocked Down)

Spare or replacement parts



Renault closed down its assembly plants in Africa some years ago and now only has a presence there through the intermediary of its branches or importers. Therefore it is CAT that organizes the transport of spare parts to these two destinations-Douala and Abidjan, mostly by sea. Renault Abidjan covers Renault and RVI activities, whereas Renault Douala covers RVI activities only.

Air routes are only used at present as a contingency measure to alleviate deficiencies in maritime transport. Aircat therefore sends goods in two ways:

This case was written by Professor Philippe-Pierre Dornier, and research assistant Francois Gandon with the help of Jacques Petetin (Aircat) and Jean-Paul Pechmezac (CAT)

- absolutely urgent cases needed within 48 hours (PVI = immobilized vehicle parts)
- urgent stock (where there is nothing in stock)

Aircat would like to develop a regular air carriage service, operating as more than just a palliative measure, for use by the main Renault firm and its other clients. It would like to operate on the principle of "intelligent air transport." This proposal that Aerobus has made to Renault would seem to offer a good opportunity for a renewed consideration of this subject.

During the whole of 2012, the total number of dispatches of parts to Africa was 993 (538 to Douala and 455 to Abidjan), if Renault (tourist and utility vehicles) and RV! (Industrial vehicles and buses) are counted together. Detailed figures are provided in the appended information. This information includes:

Statistical tables of the whole traffic flow to Renault Abidjan and Renault Douala for the period concerned (air) (Appendix 1). Statistical sheets for Renault Abidjan of the 50 sea voyages as well as the breakdown of air traffic costs (Appendix 2). Statistical sheets for Renault Douala of the 25 sea voyages as well as the breakdown of air traffic (Appendix 3). Detailed dispatch files for four air consignments: two to Abidjan, two to Douala (Appendix 4)

The range of parts that are dispatched to Africa cover 20,000 items from the Renault catalog (of 80,000) and about 30,000 from the RVI catalog (of about 100,000 items).

These parts vary a great deal in type, and therefore there are also great variations in their price and in how often they need to be sent. Their value per kilo, price ex works, can be anywhere between 50 centimes and slightly under 4,000 French Francs.

Supply is assured by five MPRs (spare parts stores) in France:

- Douai, Cergy and Flins for Renault
- Blainville and Lyon for RVI

Renault estimates that 70% of the items are organized by the Cergy MPR, and the remaining 30% equally by Flins and Douai, the two latter firms above all dealing with bodywork sections and other large items. In terms of volume and of the price of each item, the share provided by each MPR is as follows:

		PDU (Price ex Works)
	<i>Volume (% of total)</i>	<i>Volume (% of total)</i>
Flins	58%	31%
Douai	29%	18%
Cergy	13%	51%
TOTAL	100%	100%

CAT has numerous vessels on the Abidjan and Douala routes, which make it possible to provide one or two departures each week, either from the port of Le Havre for Renault parts or from the port of Marseilles for RVI parts.

As far as air transport is concerned, Aircat has the use of 17 weekly flights departing from Paris, with Aerobus serving both Douala and the Ivory Coast capital. These 17 flights represent



a total freight capacity of about 300 tons, given that there are two flights by 747 Combination (each holding 35 tons of freight), and the other fifteen flights use DC-10s, Airbuses, or mixed 747s, with a capacity of between 12 and 14 tons each (see Appendix 5).

The method used by the Africa branch of Renault or RVI to pass on an order can take two forms:

A stock order sent by diskette, to which the "batch" system responds in lots, rather than in real time

An order by special telex (the SpiteX system), which can authorize the dispatch of a maximum of 20 order lines. This information is dealt with directly by the management information system of the Central MPR. If the item is not available, the system reports it and sends on the order either to the other MPRs or directly to the suppliers. This system is used almost exclusively for orders for repairs.

Stock orders are passed on once a fortnight. Urgent orders (urgent stock or absolute urgency) can by definition be passed on at any time and will be sent by air.

The MPR is responsible for packing the parts. To cover packaging, it charges a fixed rate of 5% of the value of each part for both sea and air carriage. It is not able to improve on this rate given the weights and volume and the methods of carriage (sea or air).

This can be explained by the very large part played by mechanization, whose obvious advantage of great speed in carrying out the supply of orders is counteracted by its limited capacity for adaptation.

However, Aerobus has suggested that the MPRs should deliver the parts in their original packaging to them at their Roissy depot. Aircat teams who specialize in air freight would then be able to carry out tailor-made repackaging on the spot: special palleting, the use of dome-shaped storage containers, and of nets; boxes of 4 to 12 M<sup>3</sup>, etc. The whole process could be carried out at a cost of about 2.5% of the value of the items when they leave the factory.

At present, once packaging of the order is complete, the items which have come from different places are regrouped for dispatch:

By air: to the MPR Cergy (Renault); to the MPR Lyon (RVI)

By sea: to the MPR nearest to the departure port

The various dispatch documents (notably air waybills and customs documents) are sent with the merchandise when it is freighted by air. However, in the case of sea transport the documents are sent separately, often after the ship has left port for its final destination. It can even arise through negligence that the documents arrive after the ship has reached its destination, which can cause delays in processing through customs and in unloading the merchandise and delivering it to its destination, in this case either Renault Abidjan or Douala. The goods are transported from the MPR Central Orders department to the port or airport of departure, where they are loaded on to the ship or aircraft. Handling practices vary significantly according to the mode of transport:

By air, carriage is essentially horizontal and vertical

By sea, in addition to these handling principles, sloping surfaces are used, and particularly hoists (cranes)

One of the problems that arises when goods are transported by sea is clearly the length of the transportation itself, as well as the conditions. There is therefore some risk of damage to the merchandise en route.

On arrival at the port or airport of destination, the merchandise must be processed through customs, then unloaded and handled on site, before being transported to the place where it is to be used. These are transit costs. There are spoliation risks during this stage of the journey.

On arrival, airport customs procedures take around 24 hours, as opposed to one week (five working days) at sea ports. When it arrives at the stock depot of the local Renault or RVI subsidiary, the item is finally put into the correct place.

The point when the order is issued to the moment when the required items are stocked in the correct place on site is known as the "supply time." Using a sea route, this supply time is about 90 days (we can simplify given that this time is the same for Abidjan as for Douala, despite the difference in distance). The air route supply time is about a fortnight.



The real money rate is about 14% for Abidjan as for Douala. The full set of costs involved in operating with this stock increases the value of the financial assets by about 8%. The stocking costs are therefore around 22% in relation to the value of the items. On the other hand, Renault estimates that the average rate of stock turnaround (in kg) is about a fortnight, whether by air or by sea. Finally, it should be pointed out that a buffer level of stock has been defined in order to alleviate overrunning the supply time by a third (assuming more or less constant consumption).

### Questions (CILO 03)

Q You are asked to consider the Aerobus proposal and prepare a summary of your conclusions. To help you in this task, here are two questions that you have to answer in framing the conclusion:

- a. What are the parameters to be considered in any calculation of the complete cost of a consignment?  
What is their nature and their value for the destinations under consideration (taking average costs)?
- b. Using the examples given by the four air carriage documents and the data sheet of the maritime transport given in the appendices, on what basis do you think the taxable weight can be defined?

## Appendix 1

### Total Aerobus Flow North/South and South/North. Abidjan and Douala

<i>Annual tonnage carried</i>		
<i>ABIDJAN</i>	<i>North/South</i>	<i>South/North</i>
1990	6,523	12,700
1991	6,158	11,146
1992	6,676	9,376
<i>Annual tonnage carried</i>		
<i>DOUALA</i>	<i>North/South</i>	<i>South/North</i>
1990	3,544	1,059
1991	2,809	788
1992	2,938	618
Note:	Average value of goods North/South: 26F/kg	Average value of goods South/North: 4F (97% perishables)



## Appendix 2 Sea Voyages to Abidjan

	Volume (dm <sup>3</sup> )	Net weight kg	Density (m <sup>3</sup> /T)	Departure price F	FOB F	Transport F	Insurance F	Duties, taxes	Transit
<i>RENAULT</i>	25,000	5,034	4.97	354,969	3,029	24,352	1,800	295,529	4,965
	65,491	11,674	5.61	1,057,183	6,193	48,952	5,225	832,494	38,479
	30,000	5,848	5.13	483,137	3,031	24,149	2,403	392,143	4,904
	2,440	713	3.42	22,139	1,015	3,525	141	22,347	2,614
	25,000	4,437	5.63	395,894	2,902	24,102	1,991	315,812	10,820
	23,983	4,184	5.73	281,868	2,816	23,885	1,453	235,135	7,045
	25,000	4,563	5.48	331,724	3,197	23,852	1,689	54,427	3,781
	24,779	4,975	4.98	518,376	2,998	24,102	2,567	408,616	10,634
	27,577	5,323	5.18	405,398	2,914	24,178	2,036	344,272	8,565
	27,025	6,578	4.11	574,416	3,228	24,716	2,835	458,805	4,884
	26,431	4,675	5.65	353,322	2,996	24,102	1,791	284,610	3,933
	25,458	4,037	6.31	325,747	2,956	23,977	1,660	260,594	3,929
	26,203	5,021	5.22	454,828	3,037	24,007	2,268	351,107	4,362
	25,425	4,415	5.76	416,190	3,037	23,475	2,084	314,833	4,193
	66,000	10,882	6.07	661,325	8,044	69,549	3,482	550,211	9,937
	27,650	5,598	4.94	533,813	3,093	23,600	2,638	411,727	4,762
	23,604	3,902	6.05	299,202	2,984	22,759	1,529	237,435	3,846
	27,275	6,922	3.94	716,788	3,289	23,757	3,500	552,737	5,355
	20,337	3,467	5.87	325,915	2,971	22,637	1,655	252,179	3,891
	45,709	8,974	5.09	761,503	5,904	45,611	3,827	602,735	6,592
	51,853	9,067	5.72	519,790	5,917	45,550	2,688	427,707	6,856
	25,989	4,549	5.71	420,461	3,677	22,587	2,104	301,287	4,316
	25,458	5,359	4.75	419,562	3,093	22,674	2,135	341,120	4,397
	28,137	4,591	6.13	236,670	3,030	22,487	1,234	201,812	3,420
<b>TOTAL 1</b>	<b>721,824</b>	<b>134,788</b>		<b>10,870,220</b>	<b>85,351</b>	<b>662,585</b>	<b>54,735</b>	<b>8,449,674</b>	<b>166,480</b>
<i>RVI</i>	14,000	2,364	5.92	260,597	1,416	13,199	1,066	216,669	12,423
	30,000	5,136	5.84	771,929	5,324	22,610	2,847	593,060	21,577
	36,682	11,006	3.33	1,034,325	17,010	49,158	4,016	801,514	31,375
	18,890	4,183	4.52	508,357	10,268	29,961	2,013	325,088	15,524
	26,450	9,602	2.75	1,107,021	12,785	49,738	4,383	913,871	14,905
	15,168	3,090	4.91	463,520	3,879	16,053	1,835	300,260	7,620
	12,956	850	15.24	88,045	1,911	5,468	349	58,300	3,101
	48,842	4,700	10.39	107,781	9,165	26,226	427	120,613	7,249
	30,591	9,476	3.23	569,081	12,149	37,076	2,279	558,827	14,056
	3,779	667	5.67	65,190	1,037	3,114	252	51,731	2,811
	16,227	590	27.50	5,266	1,380	3,293	21	15,372	1,595
	11,950	3,664	3.26	394,329	4,573	15,916	1,624	313,317	7,739
	33,146	9,072	3.65	894,312	11,674	41,853	3,713	714,775	15,327
	14,544	2,646	5.50	434,849	4,922	19,340	1,797	337,979	11,419
	6,964	1,537	4.53	247,015	2,423	8,579	1,021	193,905	8,807
	11,766	3,037	3.87	483,441	4,169	13,448	1,985	383,423	12,594
	12,985	3,255	3.99	606,360	4,281	18,092	2,490	460,626	14,065
	33,668	7,324	4.60	979,216	13,389	38,900	4,080	761,217	26,035
	14,873	3,335	4.46	534,371	5,479	16,329	2,201	407,195	14,909
	17,250	4,018	4.29	703,864	5,252	22,423	2,896	544,380	16,967
	26,954	8,866	3.04	1,114,173	13,499	33,892	4,600	853,158	33,968
	6,746	1,864	3.62	358,681	2,385	9,249	1,466	273,019	15,176
	748	302	2.48	65,682	383	1,145	266	46,140	3,007
	10,435	3,236	3.22	599,433	5,142	16,985	2,460	458,361	17,561
	12,902	2,355	5.48	484,334	4,538	12,437	1,985	314,959	16,163
	17,303	2,298	7.53	326,825	3,307	9,703	1,346	245,501	7,027
<b>TOTAL 2</b>	<b>485,819</b>	<b>108,473</b>		<b>13,207,997</b>	<b>161,740</b>	<b>534,187</b>	<b>53,418</b>	<b>10,263,260</b>	<b>353,041</b>
<b>TOTAL 1+2</b>	<b>1,207,643</b>	<b>243,261</b>		<b>24,078,217</b>	<b>247,091</b>	<b>1,196,772</b>	<b>108,153</b>	<b>18,712,934</b>	<b>519,521</b>



**Appendix 2 (continued)**  
**Total for Air Journeys Renault Abidjan 1992**

	<i>Air</i>
	<i>405 exp.</i>
Price ex works (FF)	8,138,898
Volume (dm3)	537,681
Net weight (kg)	89,345
Taxable weight (kg)	106,321
FOB (FF)	50,029
Freight (FF)	2,255,506
Insurance (FF)	14,860
CIF value (FF)	10,459,293
Duties and taxes (FF)	7,445,672
Transit (FF)	243,016
<b>Total delivery price (FF)</b>	<b>18,430,802</b>

**Appendix 3**  
**Douala Breakdown of Operating Costs**

	<i>Volume</i>	<i>Net weight</i>	<i>Density</i>	<i>Departure price</i>	<i>FOB</i>	<i>Transport</i>	<i>Insurance</i>	<i>Duties, taxes</i>	<i>Transit</i>
	<i>(dm3)</i>	<i>kg</i>	<i>(m3/T)</i>	<i>F</i>	<i>F</i>	<i>F</i>	<i>F</i>	<i>F</i>	<i>F</i>
<i>RENAULT</i>	107,000	17,562	6.09	1,193,014	23,860	308,752	58,276	853,053	21,834
	25,000	11,869	2.11	722,973	5,835	25,395	15,808	419,086	21,280
	38,925	7,097	5.48	568,794	11,670	50,230	12,431	343,980	11,310
	20,000	3,431	5.83	247,317	5,835	24,186	5,391	152,473	7,879
	50,000	13,510	3.70	788,146	11,670	50,790	17,870	472,540	13,950
	87,000	14,260	6.10	1,089,699	21,793	285,502	53,557	771,551	16,858
	130,000	42,220	3.08	1,507,532	30,151	394,973	53,557	1,098,820	34,971
	60,000	13,269	4.52	411,130	17,505	74,217	8,988	283,409	17,286
	40,000	10,818	3.70	359,788	11,670	50,790	7,778	237,138	14,007
	42,000	7,053	5.95	538,453	11,670	50,790	11,758	334,594	11,173
	23,500	4,420	5.32	219,547	5,835	25,395	4,805	139,506	8,906
	75,000	18,611	4.03	321,083	17,505	76,185	6,376	256,778	19,674
	62,844	12,783	4.92	929,826	17,705	76,185	20,315	556,902	15,128
	41,541	9,181	4.52	606,665	11,670	50,790	13,218	369,692	12,054
	25,000	5,000	5.00	409,858	5,988	25,052	8,961	237,398	11,004
	25,000	10,242	2.44	115,106	5,988	24,559	2,524	87,826	12,463
	42,000	7,109	5.91	511,876	11,976	50,104	11,188	316,211	13,254
	50,000	10,895	4.59	449,788	11,976	49,118	9,832	288,392	13,315
	75,000	14,149	5.30	593,067	17,964	73,677	12,961	385,236	20,873
	75,000	12,614	5.95	489,875	17,964	73,383	10,708	331,323	18,617
	75,000	11,566	6.48	738,603	17,964	71,196	16,135	458,123	18,731
	46,000	8,371	5.50	595,165	116,70	50,230	13,007	362,231	11,773
	28,137	4,591	6.13	208,878	3,030	22,487	1,234	201,512	3,720
	24,000	4,714	5.09	255,372	5,835	24,739	5,587	158,420	8,255
	50,000	10,779	4.64	848,314	11,670	48,372	18,535	496,672	15,653
<b>TOTAL</b>	<b>1,317,947</b>	<b>286,114</b>		<b>14,719,869</b>	<b>326,399</b>	<b>2,057,097</b>	<b>400,800</b>	<b>9,612,866</b>	<b>373,968</b>



Appendix 3 (continued)  
Total for Air Journeys Renault Douala 1992

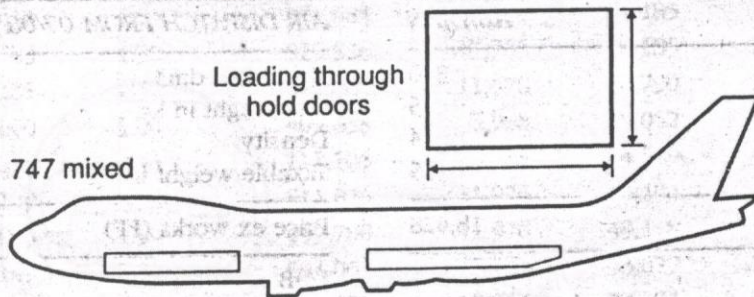
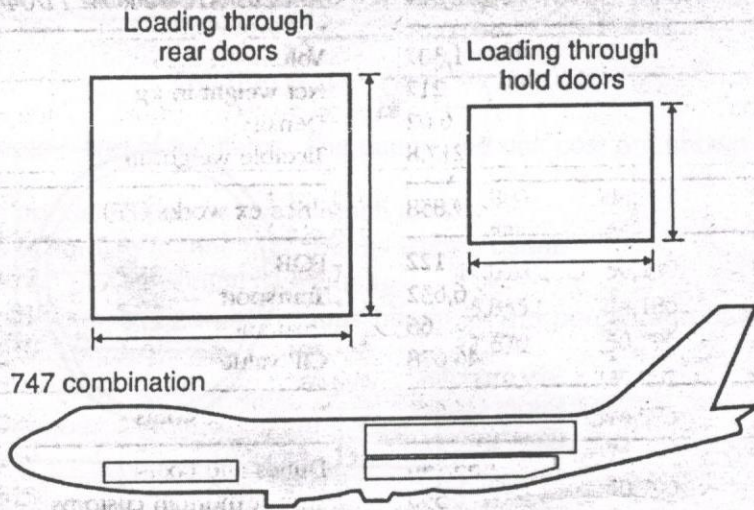
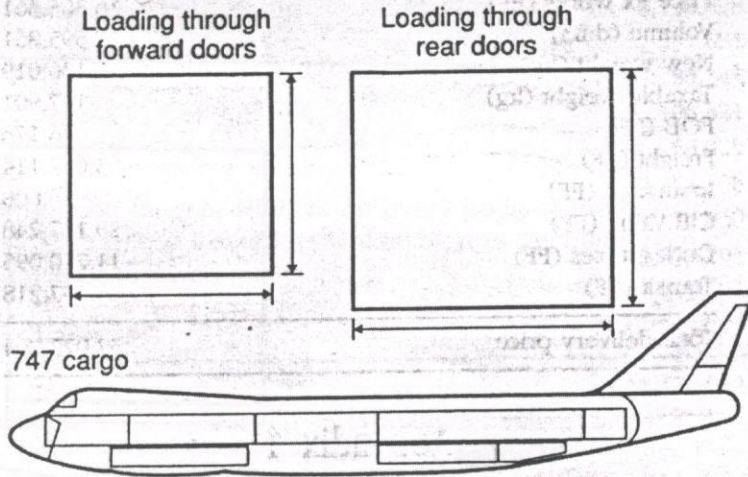
	AIR
	513 exp.
Price ex works (FF)	16,305,361
Volume (dm3)	595,861
New weight (kg)	136,019
Taxable weight (kg)	147,901
FOB (FF)	76,173
Freight (FF)	3,697,114
Insurance (FF)	28,608
CIF Value (FF)	20,107,248
Duties, taxes (FF)	11,270,095
Transit (FF)	197,218
<b>Total delivery price</b>	<b>32,077,764</b>

Appendix 4

AIR DISPATCH FROM 18/02/92	ABIDJAN	AIR DISPATCH FROM 11/04/92	DOUALA
Volume in dm3	1,307	Volume in dm3	1,145
Net weight in kg	217	Net weight in kg	97
Density	6.02	Density	11.8
Taxable weight in kg	217.8	Taxable weight in kg	190.8
Price ex works (FF)	39,858	Price ex works (FF)	6,123
FOB	122	FOB	54
Transport	6,632	Transport	4,408
Insurance	66	Insurance	15
CIF value	46,678	CIF value	10,600
Value in customs	46,678	Value in customs	10,600
Duties and taxes	33,740	Duties and taxes	5,941
Transit through customs	590	Transit through customs	141
Delivery price	81,008	Delivery price	16,682
AIR DISPATCH FROM 23/10/92	ABIDJAN	AIR DISPATCH FROM 07/08/92	DOUALA
Volume in dm3	380	Volume in dm3	36
Net weight in kg	95	Net weight in kg	6
Density	4	Density	6
Taxable weight in kg	95	Taxable weight in kg	6
Price ex works (FF)	18,428	Price ex works (FF)	332
FOB	53	FOB	3
Transport	2,726	Transport	270
Insurance	30	Insurance	1
CIF value	21,237	CIF value	606
Value in customs	21,237	Value in customs	606
Duties and taxes	15,394	Duties and taxes	340
Transit through customs	258	Transit through customs	9
Delivery price	36,889	Delivery price	955



# Appendix 5 Regular Lines





## Appendix 5 Special Charter

