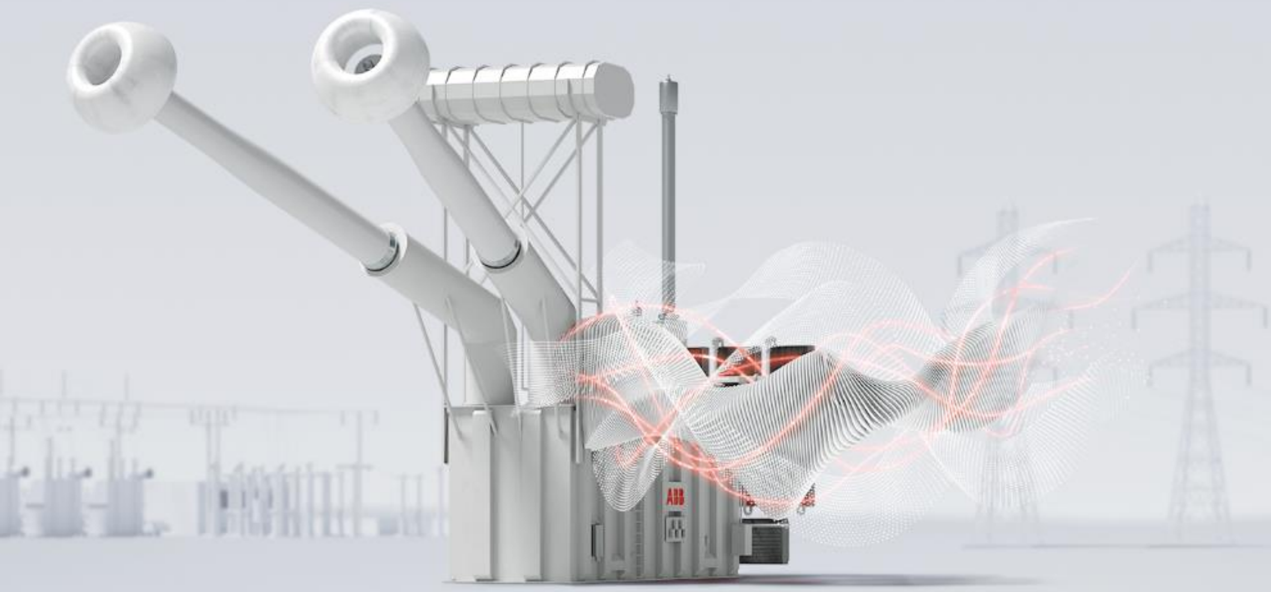


MIT SCM RESEARCH FEST – MAY 2019

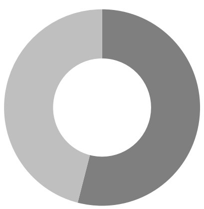
Inbound Incoterm Conversion

Mark Brown & Pratik Yadav

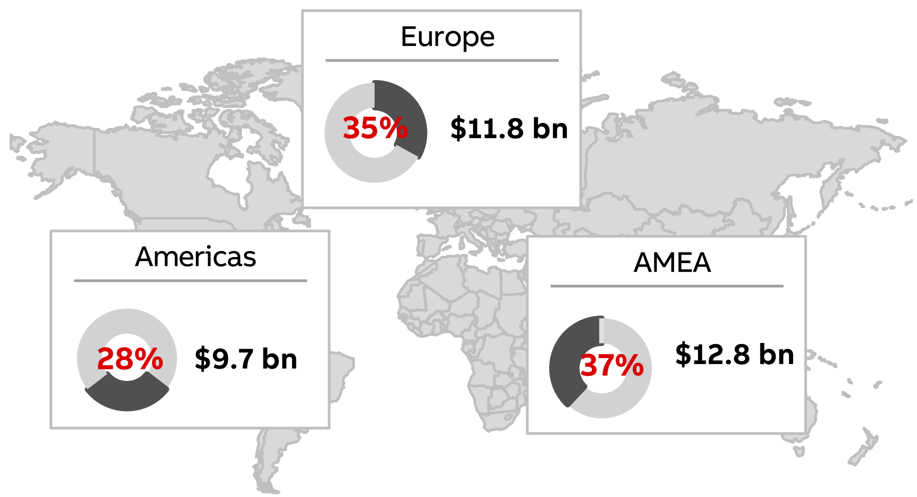
Global Industrial Manufacturer

- Fortune 500 Industrial automation and robotics manufacturer
- Revenue of over $34 bn in 2017 and over 130000 employees globally
- Different supply chains – make to stock, engineer to order, design to order, assemble to order etc.

Revenue split 2017



- Mature markets (54%)
- Emerging markets (46%)



- Manufacturing presence in Americas, Asia and Europe
- Largely regional production for regional consumption
- Transformers, Robots, High Voltage Switchgears, Industrial and Factory Automation, Azipods,

The sponsor company has a global manufacturing presence with large supplier base of over 10000 suppliers

SOURCE: Q4 2017 published financial results; ABB analysis

Should sponsor actively manage their own inbound or should they buy on delivered terms?

- What are we trying to understand?
  - "*Evaluate the costs and risks associated with buying at delivered terms vs. actively managing the inbound flows to the production plant*".
  - Manufacturing site in Helsinki, Finland could be the potential pilot location

- Without active inbound management, global organizations such as ABB have:
  - Limited visibility on the shipment status
  - Increased working capital due to higher safety stock
  - Reduced transparency on the logistics costs
  - Insufficient data to develop shipment consolidation programs at origin

- Industry success stories

– Continental expanded the use of internal logistics control towers to manage their inbound and outbound operations to achieve cost savings through synergies and greater operational control

– Caterpillar established an in-house inbound logistics center (ILC) in North America to manage the material flows from the distribution centers to the production sites and reduced the ILC cost by 50% lower

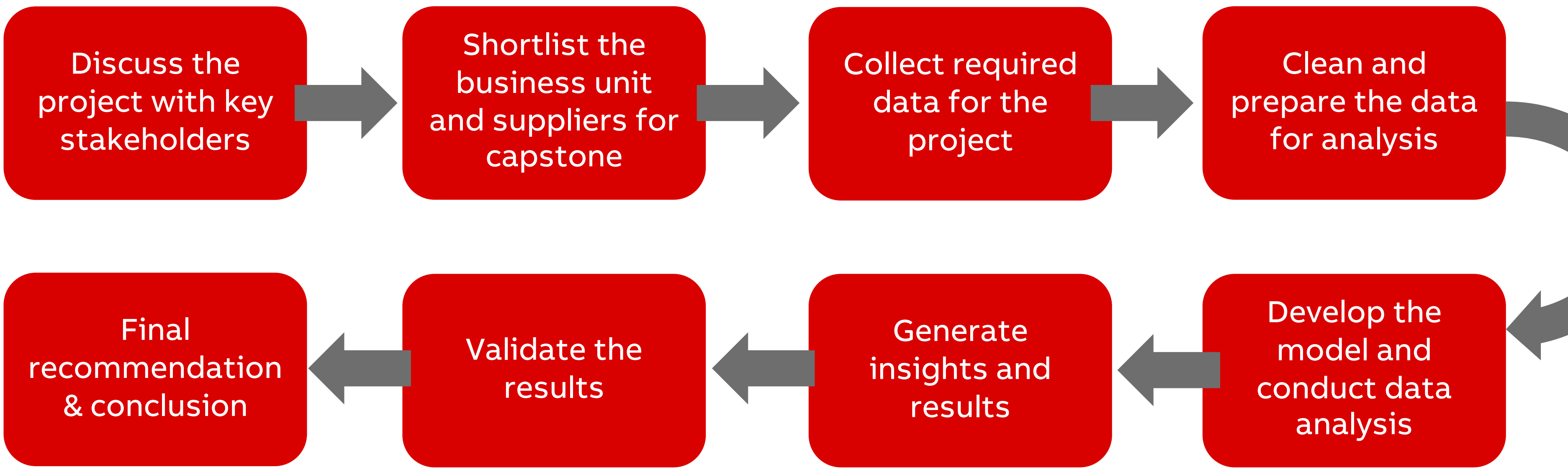
Introduction to Incoterms

- **Definition**
  - Incoterms or International commercial terms are published by International Chamber of Commerce and used to determine the division of costs and risk between a buyer and seller of a product
- **Key points related to Incoterm which define obligations and costs.**
  - Point of delivery
  - Transport costs
  - Export and Import clearance
  - Insurance costs
- **2010 approved incoterms**
  - C Terms – CFR, CIF, CPT, CIP
  - D Terms – DAT, DAP, DDP
  - E Terms – EXW
  - F Terms – FCA, FAS, FOB

What do you know about incoterms?

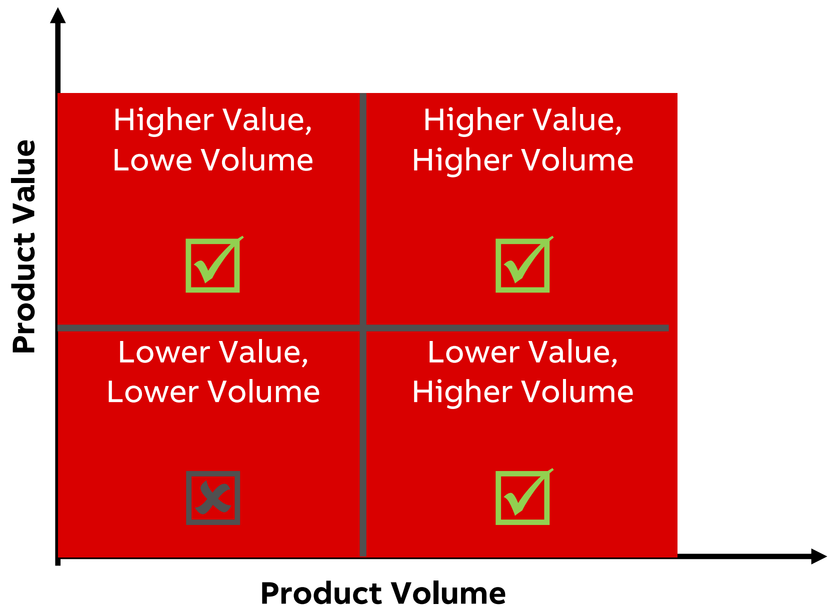
- You are buying product from Shanghai in China and moving it to Michigan, USA. You want to use the incoterm with least liability for your company. Which of the following incoterm should your buyer use?
  - DAP
  - FCA
  - EXW
  - CIP
- You are selling a product to a customer in China and will manufacture and deliver the product from the factory in Helsinki. What incoterm should you use to sell the product so that it will give your organization the maximum control on the shipment?
- EXW
- CFR
- CPT
- DAP
- DDP

How did we approach the project?



Major challenges we faced during project

- How do you shortlist products?
  - Location of suppliers
  - Is there any strategic business reason for which the category managers would like to continue with the suppliers on C&D terms instead of E&F?
- How do you collect the data?
  - System, primary interviews, excel?
- Quality of the data
  - We found incoterms in the data such as FOR (Free on Road), EXWL (Ex works with loading) etc.
- What technique to use for analysis and modelling?
  - Simulation? Optimization?
- Scope overflow



Data Analysis – Total logistics cost vs Risk

Part Number	Origin	Destination	Buying Incoterm	Total logistics costs per shipment for buyer	Business Risk under the incoterm
PRO00000001	Hungary	Estonia	EXW	1000	5
PRO00000001	Hungary	Estonia	FCA	850	3
PRO00000001	Hungary	Estonia	CPT	650	3
PRO00000001	Hungary	Estonia	CIP	750	3
PRO00000001	Hungary	Estonia	DAT	650	2
PRO00000001	Hungary	Estonia	DAP (Estonia Door)	350	1
PRO00000001	Hungary	Estonia	DDP (Estonia Door)	350	1

Results – What incoterm to use while purchasing?

Purchase Price	Volume	Nature of Product	Origin	Destination	Inbound Operations Actively Managed	Proposed Incoterm
0-50 USD	0-10000	Commodity	Asia	Europe	Yes	CPT/ DAP/ DDP
0-50 USD	10000-100000	Commodity	Asia	Europe	Yes	FCA/ FOB
0-50 USD	100000+	Commodity	Asia	Europe	Yes	FCA
0-50 USD	0-10000	Commodity	Asia	Europe	No	DAP/ DDP
0-50 USD	10000-100000	Commodity	Asia	Europe	No	FCA/ FOB
0-50 USD	100000+	Commodity	Asia	Europe	No	FCA
50-200 USD	0-10000	Strategic	Asia	Europe	Yes	FCA
50-200 USD	10000-100000	Strategic	Asia	Europe	Yes	FCA
50-200 USD	100000+	Strategic	Asia	Europe	No	FCA

Inhouse Inbound Setup vs Outsourced Setup to 3PL or 4PL

INHOUSE SETUP

+ Increased visibility allows the organization to plan its production more effectively and thus reducing the need for higher safety stocks
+ Ability to consolidate inbound shipments from multiple suppliers coming from same origin country/region
- Requires additional investment in people and systems
- Suppliers may not be ready to provide data via interfaces

✓ Volvo cars moved inbound logistics from an external provider to an internal Volvo team in order to have better control on planning and operations and generated significant savings

OUTSOURCED SETUP TO 3PL or 4PL

+ Lower initial cost of implementation
+ Lower risk and liability
- Limited control on what services the suppliers can use with the carrier (for e.g. in case of delays, they may use expensive airfreight against a cheaper consolidation service)
- Supplier may not inform the buyer about shipment details

✓ Global car manufacturer saw year on year decline of total logistics cost after setting up a 4PL control tower in Cologne

Future Research Suggestions

- Implementation process and the cost
- Consider the impact of variability
- Cost comparison between 3PL vs Inhouse

BACKUP

EXW - ExWorks

- In EXW, the BUYER is responsible for the risks and all transport and customs related costs once the shipment is handed over to the carrier at seller's premise. In order to ship the goods, the BUYER will organize and order the transportation and customs clearance (if needed)
- The seller makes the goods available at its location, so the buyer can take over all the transportation costs and also bears the risks of bringing the goods to their final destination
- EXW is valid for all modes of transportation and is considered as the incoterm with minimum responsibility and risk on the seller

Services	Responsible
Preparing shipment for export (packaging, marking, labelling etc.)	Selling party
Export Formalities	Buying party
Freight forwarder fees	Buying party
Inland freight to the main carrier	Buying party
Origin port/terminal handling charges	Buying party
Vessel loading fees	Buying party
Ocean or airfreight	Buying party
Nomination of the freight forwarder	Buying party
Marine insurance	Buying or selling party (Depends on the sales contract)
Unloading charges	Buying party
Destination terminal handling fees/port fees	Buying party
Nomination of on-carriage	Buying party
Security information requirements	Buying party
Customs entry service fees	Buying party
Duties, taxes, customs fees	Buying party
Delivery to the buyer	Buying party
Unloading at the buyer site	Buying party

FCA – Free Carrier (Place)

- In FCA, the selling party will hand over the responsibility of goods to the first carrier identified by the buyer. Once the loading is completed, the risk is transferred to the buyer
- FCA can be applied to any mode of transport and is very commonly used in the industry as its quite flexible

Services	Responsible
Preparing shipment for export (packaging, marking, labelling etc.)	Selling party
Export Formalities	Selling party
Freight forwarder fees	Buying party
Inland freight to the main carrier	Buying or selling party (Depends on the agreed “F” delivery place)
Origin port/terminal handling charges	Buying party
Vessel loading fees	Buying party
Ocean or airfreight	Buying party
Nomination of the freight forwarder	Buying party
Marine insurance	Buying or selling party (Depends on the sales contract)
Unloading charges	Buying party
Destination terminal handling fees/port fees	Buying party
Nomination of on-carriage	Buying party
Security information requirements	Buying party
Customs entry service fees	Buying party
Duties, taxes, customs fees	Buying party
Delivery to the buyer	Buying party
Unloading at the buyer site	Buying party

FAS – Free Alongside Ship (Port)

- FAS is primarily used for ocean and inland water transport only. It is used commonly in situations where the selling party can access the loading vessel directly however the loading is still a responsibility of the buying party. For e.g. bulk cargos
- The selling party is expected to clear the goods from export customs and deliver them next to the vessel at a named port

Services	Responsible
Preparing shipment for export (packaging, marking, labelling etc.)	Selling party
Export Formalities	Selling party
Freight forwarder fees	Selling party
Inland freight to the main carrier	Selling party
Origin port/terminal handling charges	Selling party
Vessel loading fees	Buying party
Ocean or airfreight	Buying party
Nomination of the freight forwarder	Buying party
Marine insurance	Buying or selling party (Depends on the sales contract)
Unloading charges	Buying party
Destination terminal handling fees/port fees	Buying party
Nomination of on-carriage	Buying party
Security information requirements	Buying party
Customs entry service fees	Buying party
Duties, taxes, customs fees	Buying party
Delivery to the buyer	Buying party
Unloading at the buyer site	Buying party

FOB – Free On Board

- FOB is used in case of ocean and inland waterway transports. The difference between FOB and FAS is that in case of FOB, its still the seller who is responsible for loading the cargo on the vessel at the named port

Services	Responsible
Preparing shipment for export (packaging, marking, labelling etc.)	Selling party
Export Formalities	Selling party
Freight forwarder fees	Selling party
Inland freight to the main carrier	Selling party
Origin port/terminal handling charges	Selling party
Vessel loading fees	Selling party
Ocean or airfreight	Buying party
Nomination of the freight forwarder	Buying party
Marine insurance	Buying or selling party (Depends on the sales contract)
Unloading charges	Buying party
Destination terminal handling fees/port fees	Buying party
Nomination of on-carriage	Buying party
Security information requirements	Buying party
Customs entry service fees	Buying party
Duties, taxes, customs fees	Buying party
Delivery to the buyer	Buying party
Unloading at the buyer site	Buying party

CFR – Cost & Freight (Port)

- CFR is another incoterm used in case of ocean and inland waterways transportation. BUYERS need a port representative to verify charges
- It is used commonly in situations where the selling party can access the loading vessel directly and the responsibility of the cargo transfers to the buyer as soon as the goods are loaded on the vessel but before the main carriage starts. For e.g. bulk cargos
- Under CFR incoterms, the selling party is not responsible for the marine insurance however it may be agreed as an exception in the sales contract

Services	Responsible
Preparing shipment for export (packaging, marking, labelling etc.)	Selling party
Export Formalities	Selling party
Freight forwarder fees	Selling party
Inland freight to the main carrier	Selling party
Origin port/terminal handling charges	Selling party
Vessel loading fees	Selling party
Ocean or airfreight	Selling party
Nomination of the freight forwarder	Selling party
Marine insurance	Buying or selling party (Depends on the sales contract)
Unloading charges	Buying or selling party (Depends on the contract of carriage)
Destination terminal handling fees/port fees	Buying or selling party (Depends on the contract of carriage)
Nomination of on-carriage	Buying party
Security information requirements	Buying party
Customs entry service fees	Buying party
Duties, taxes, customs fees	Buying party
Delivery to the buyer	Buying party
Unloading at the buyer site	Buying party

CIF – Cost, Insurance & Freight (Port)

- CIF is used only for transport via inland waterways or ocean. The main difference between CIF and CFR is that in case of former, the selling party is also responsible to organize the insurance for the main carriage.

Services	Responsible
Preparing shipment for export (packaging, marking, labelling etc.)	Selling party
Export Formalities	Selling party
Freight forwarder fees	Selling party
Inland freight to the main carrier	Selling party
Origin port/terminal handling charges	Selling party
Vessel loading fees	Selling party
Ocean or airfreight	Selling party
Nomination of the freight forwarder	Selling party
Marine insurance	Selling party
Unloading charges	Buying or selling party (Depends on the contract of carriage)
Destination terminal handling fees/port fees	Buying or selling party (Depends on the contract of carriage)
Nomination of on-carriage	Buying party
Security information requirements	Buying party
Customs entry service fees	Buying party
Duties, taxes, customs fees	Buying party
Delivery to the buyer	Buying party
Unloading at the buyer site	Buying party

CPT – Carriage Paid To (Place)

- CPT is recommended if Letter of Credit is being used. In the scenario where CPT is used, the selling party is responsible to arrange the transportation to the named place. However the insurance of the goods to the named place is not under the seller responsibility unless otherwise agreed with the buyer.
- Terminal Handling Charges or THC is typically levied by the terminal operator and this charge may or may not be included in the CPT prices. Hence its advisable that buyer confirms whether CPT includes terminal handling charges or not in the freight rates

Services	Responsible
Preparing shipment for export (packaging, marking, labelling etc.)	Selling party
Export Formalities	Selling party
Freight forwarder fees	Selling party
Inland freight to the main carrier	Selling party
Origin port/terminal handling charges	Selling party
Vessel loading fees	Selling party
Ocean or airfreight	Selling party
Nomination of the freight forwarder	Selling party
Marine insurance	Buying or selling party (Depends on the sales contract)
Unloading charges	Buying or selling party (Depends on the contract of carriage)
Destination terminal handling fees/port fees	Buying or selling party (Depends on the contract of carriage)
Nomination of on-carriage	Buying or selling party (Depends on the contract of carriage)
Security information requirements	Buying party
Customs entry service fees	Buying party
Duties, taxes, customs fees	Buying party
Delivery to the buyer	Buying party
Unloading at the buyer site	Buying party

CIP – Carrier and Insurance Paid to (Place)

- CIP is very similar to CPT with the difference being that the seller is also responsible for organizing the main carriage insurance. It is typically recommended to use in case a letter of credit is involved in the transaction
- Similar to CPT, the risk transfers from the selling party to a buying party at the point where goods are handed over to the carrier
- An important aspect to keep in mind is that although the obligation is on the seller to arrange the insurance, it may only provide the minimum level of cover. Hence its advisable that buying party covers the additional need of broader insurance coverage in commercial agreement

Services	Responsible
Preparing shipment for export (packaging, marking, labelling etc.)	Selling party
Export Formalities	Selling party
Freight forwarder fees	Selling party
Inland freight to the main carrier	Selling party
Origin port/terminal handling charges	Selling party
Vessel loading fees	Selling party
Ocean or airfreight	Selling party
Nomination of the freight forwarder	Selling party
Marine insurance	Selling party
Unloading charges	Buying or selling party (Depends on the contract of carriage)
Destination terminal handling fees/port fees	Buying or selling party (Depends on the contract of carriage)
Nomination of on-carriage	Buying or selling party (Depends on the contract of carriage)
Security information requirements	Buying party
Customs entry service fees	Buying party
Duties, taxes, customs fees	Buying party
Delivery to the buyer	Buying party
Unloading at the buyer site	Buying party

DDP – Delivered Duty Paid

- In case of DDP, the seller is responsible to deliver the goods at buyer named place with the import duties and taxes already paid.
- The risk or liability of the goods transfer from seller to the buyer once the goods are handed over to the buyer before unloading
- DDP can be a risky incoterm for the seller as in case of some countries the import clearance procedures are complex and bureaucratic..

Services	Responsible
Preparing shipment for export (packaging, marking, labelling etc.)	Selling party
Export Formalities	Selling party
Freight forwarder fees	Selling party
Inland freight to the main carrier	Selling party
Origin port/terminal handling charges	Selling party
Vessel loading fees	Selling party
Ocean or airfreight	Selling party
Nomination of the freight forwarder	Selling party
Marine insurance	Buying or selling party (Depends on the sales contract)
Unloading charges	Selling party
Destination terminal handling fees/port fees	Selling party
Nomination of on-carriage	Selling party
Security information requirements	Buying party
Customs entry service fees	Selling party
Duties, taxes, customs fees	Selling party
Delivery to the buyer	Selling party
Unloading at the buyer site	Buying party

DAP – Delivered At Place

- In case of DAP, the seller is responsible for organizing the transport and deliver the goods at the named place. The seller is not responsible to unload the cargo but getting the cargo ready for unloading
- In this incoterm, the buyer is responsible for import control procedures and payment of local taxes or duties

Services	Responsible
Preparing shipment for export (packaging, marking, labelling etc.)	Selling party
Export Formalities	Selling party
Freight forwarder fees	Selling party
Inland freight to the main carrier	Selling party
Origin port/terminal handling charges	Selling party
Vessel loading fees	Selling party
Ocean or airfreight	Selling party
Nomination of the freight forwarder	Selling party
Marine insurance	Buying or selling party (Depends on the sales contract)
Unloading charges	Selling party
Destination terminal handling fees/port fees	Selling party
Nomination of on-carriage	Buying or selling party (Depends on the contract of carriage)
Security information requirements	Buying party
Customs entry service fees	Buying party
Duties, taxes, customs fees	Buying party
Delivery to the buyer	Buying or selling party (Depends on the contract of carriage)
Unloading at the buyer site	Buying party

DAT – Delivered At Terminal

- In case of DAT, the selling party is responsible to organize the transport, delivery of goods at a named place which can be a terminal, a quay, a container yard or a warehouse
- Here the buying party is responsible for import clearance and any applicable local taxes/duties
- A key things to keep in mind is that the place of delivery The place for delivery should be specified as precisely as possible, as many ports and transport hubs are very large

Services	Responsible
Preparing shipment for export (packaging, marking, labelling etc.)	Selling party
Export Formalities	Selling party
Freight forwarder fees	Selling party
Inland freight to the main carrier	Selling party
Origin port/terminal handling charges	Selling party
Vessel loading fees	Selling party
Ocean or airfreight	Selling party
Nomination of the freight forwarder	Selling party
Marine insurance	Buying or selling party (Depends on the sales contract)
Unloading charges	Selling party
Destination terminal handling fees/port fees	Buying or selling party (Depends on the contract of carriage)
Nomination of on-carriage	Buying or selling party (Depends on the contract of carriage)
Security information requirements	Buying party
Customs entry service fees	Buying party
Duties, taxes, customs fees	Buying party
Delivery to the buyer	Buying or selling party (Depends on the contract of carriage)
Unloading at the buyer site	Buying party

References

- https://www.incotermsexplained.com/the-incoterms-rules/the-eleven-rules-in-brief/ex-works/
- https://freighthub.com/en/blog/ddp-delivered-duty-paid-incoterm/
- https://www.export.gov/article?id=Incoterms-2010-Reference-Chart