

Port Clearance Rules

Note: Model developed in BiZZdesign Decision Modeler, using TDM notation



[Decision Management Community challenge](#) for March, 2016, is looking for a decision model capable to decide if a ship can enter a Dutch port on a certain date. The rules for this challenge are inspired by the international Ship and Port Facility Security Code. They were originally developed for The Game Of Rules, a publication of the Business Rules Platform Netherlands. The authors: Silvie Spreeuwenberg, LibRT; Charlotte Bouvy, Oelan; Martijn Zoet, Zuyd University of Applied Sciences. The rule set is not intended to be complete for all possible cases.

Here are the rules:

1. The hold of a ship must be considered clean if the hold does not contain remainders of cargo.
2. An unloaded ship may only enter a Dutch port if the ship complies with the requirements of the Inspection for unloaded ships.
3. A ship must comply with the requirements of the Inspection for unloaded ships if the ship complies with all of the following: a) the ship meets the safety requirements for unloaded ships; b) the ship has a certificate of registry that is valid.
4. A ship must be categorized as large if the total length of the ship is at least 80 meters.
5. A ship's hold contains remainders of cargo if the residual cargo measurement is higher than 0.5 mg dry weight per cm².
6. A ship only meets the safety requirements for unloaded ships if the ship complies with at least one of the following: a) the ship meets the safety requirements for small unloaded ships; b) the ship meets the safety requirements for large unloaded ships.
7. A ship only meets the safety requirements for large unloaded ships if the ship complies with all of the following: a) the ship is categorized as large; b) the hold of the ship is clean; c) the hold of the ship is double hulled.
8. A ship only meets the safety requirements for small unloaded ships if the ship complies with all of the following: a) the ship is categorized as small; b) the hold of the ship is clean.
9. A ship must be categorized as small if the total length of the ship is less than 80 meters.
10. A ship's certificate of registry must be considered valid if the date up to which the registration is valid of the certificate of registry is after the current date.

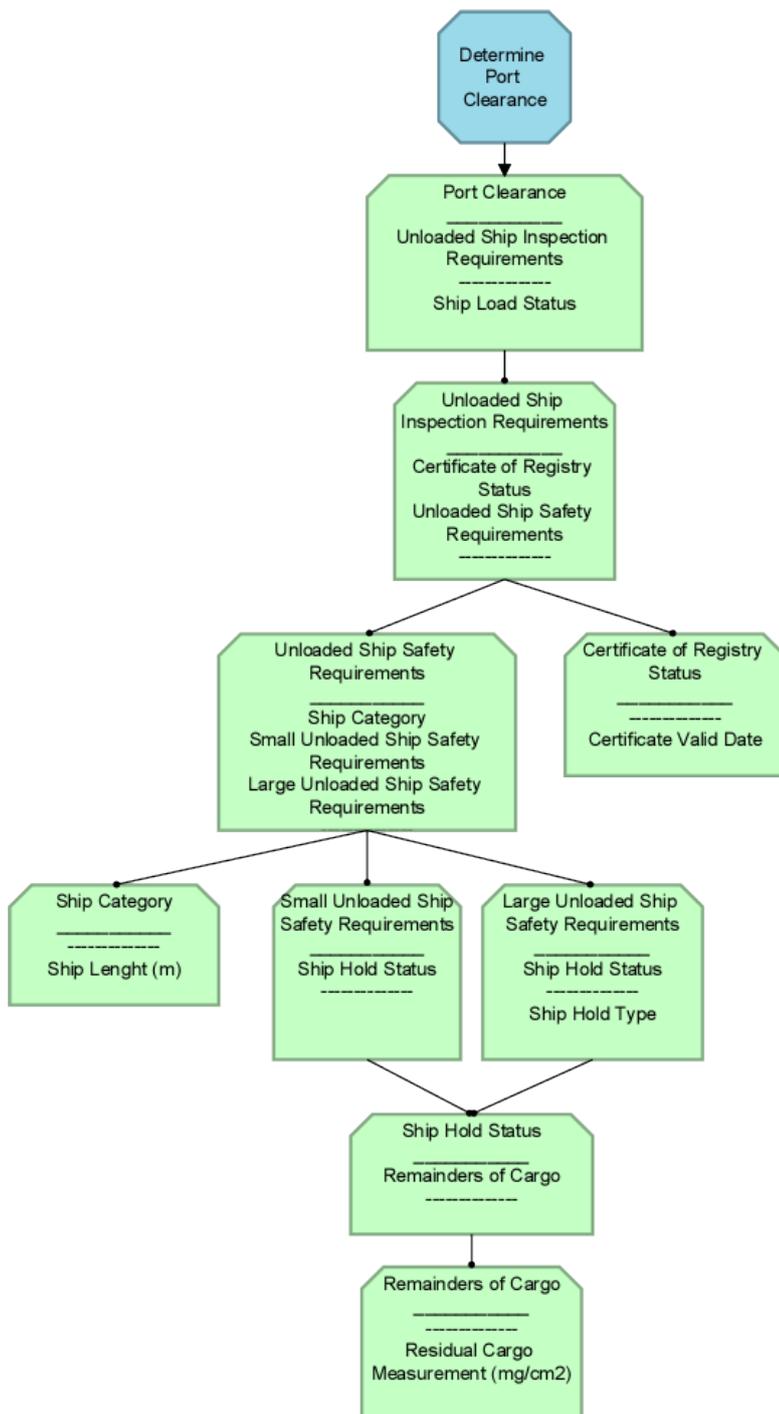
Business Glossary

Glossary

Fact type	Current value	Domain
<u>Certificate of Registry Status</u>		Valid, Not Valid
Certificate Valid Date		date
<u>Large Unloaded Ship Safety Requirements</u>		Comply, Not Comply
<u>Port Clearance</u>		Clear, Not Clear, N/D
<u>Remainders of Cargo</u>		Exist, Not Exist
Residual Cargo Measurement (mg/cm2)		real
<u>Ship Category</u>		Large, Small
<u>Ship Hold Status</u>		Clean, Not Clean
Ship Hold Type		Double Hulled, Single Hulled
Ship Length (m)		real
Ship Load Status		Loaded, Not Loaded
<u>Small Unloaded Ship Safety Requirements</u>		Comply, Not Comply
<u>Unloaded Ship Inspection Requirements</u>		Comply, Not Comply
<u>Unloaded Ship Safety Requirements</u>		Comply, Not Comply

Underlined fact types denote Support Rule Families (interim fact types)

Decision Model



The blue octagon defines the decision to be made. The green cards represent the Rule Families (sub-decision logic) needed to achieve the conclusion of the decision. The fact type above the solid line is the RF conclusion, fact types below the dotted line are raw data, and fact types in between represent supporting rule families (interim fact types/data).

Rule Family Tables

TDM principles require that the complete fact type domain is considered on a RF table.

Reminders of Cargo

Rule	<input type="checkbox"/> Residual Cargo Measurement (mg/cm2)	<input type="checkbox"/> Reminders of Cargo
1	> 0.5	is Exist
2	<= 0.5	is Not Exist

Ship Hold Status

Rule	<input type="checkbox"/> Reminders of Cargo	<input type="checkbox"/> Ship Hold Status
1	is Exist	is Not Clean
2	is Not Exist	is Clean

Large Unloaded Ship Safety Requirements

Rule	<input type="checkbox"/> Ship Hold Type	<input type="checkbox"/> Ship Hold Status	<input type="checkbox"/> Large Unloaded Ship Safety Requirements
1	is Double Hulled	is Clean	is Comply
2	is not Double Hulled		is Not Comply
3		is Not Clean	is Not Comply

Small Unloaded Ship Safety Requirements

Rule	<input type="checkbox"/> Ship Hold Status	<input type="checkbox"/> Small Unloaded Ship Safety Requirements
1	is Clean	is Comply
2	is Not Clean	is Not Comply

Ship Category

Rule	<input type="checkbox"/> Ship Length (m)	<input type="checkbox"/> Ship Category
1	>= 80	is Large
2	< 80	is Small

Unloaded Ship Safety Requirements

Rule	<input type="checkbox"/> Ship Category	<input type="checkbox"/> Small Unloaded Ship Safety Requirements	<input type="checkbox"/> Large Unloaded Ship Safety Requirements	<input type="checkbox"/> Unloaded Ship Safety Requirements
1	is Small	is Comply		is Comply
2	is Small	is Not Comply		is Not Comply
3	is Large		is Comply	is Comply
4	is Large		is Not Comply	is Not Comply

Certificate of Registry Status

Rule	<input type="checkbox"/> Certificate Valid Date	<input type="checkbox"/> Certificate of Registry Status
1	> =Today()	is Valid
2	<= =Today()	is Not Valid

Unloaded Ship Inspection Requirements

Rule	<input type="checkbox"/> Unloaded Ship Safety Requirements	<input type="checkbox"/> Certificate of Registry Status	<input type="checkbox"/> Unloaded Ship Inspection Requirements
1	is Comply	is Valid	is Comply
2	is Not Comply		is Not Comply
3		is Not Valid	is Not Comply

Port Clearance

Rule	<input type="checkbox"/> Ship Load Status	<input type="checkbox"/> Unloaded Ship Inspection Requirements	<input type="checkbox"/> Port Clearance
1	is Not Loaded	is Comply	is Clear
2	is Not Loaded	is Not Comply	is Not Clear
3	is Loaded		is N/D

As there are no rules for Loaded Ships, I decided to include a placeholder to denote “not determined”.

Testing

Fact Type	Value
Certificate Valid Date	30-04-2016
Residual Cargo Measurement (mg/cm2)	0.200
Ship Hold Type	Double Hulled
Ship Length (m)	90
Ship Load Status	Not Loaded

Type	Element	Result
Conclusion	 Ship Category	large
Conclusion	 Reminders of Cargo	not exist
Conclusion	 Ship Hold Status	clean
Conclusion	 Small Unloaded Ship Safety Requirements	comply
Conclusion	 Large Unloaded Ship Safety Requirements	comply
Conclusion	 Unloaded Ship Safety Requirements	comply
Conclusion	 Certificate of Registry Status	valid
Conclusion	 Unloaded Ship Inspection Requirements	comply
Conclusion	 Port Clearance	clear
Decision	 Determine Port Clearance	clear

Fact Type	Value
Certificate Valid Date	30-04-2016
Residual Cargo Measurement (mg/cm2)	0.600
Ship Hold Type	Double Hulled
Ship Length (m)	90
Ship Load Status	Not Loaded

Type	Element	Result
Conclusion	 Ship Category	large
Conclusion	 Reminders of Cargo	exist
Conclusion	 Ship Hold Status	not clean
Conclusion	 Small Unloaded Ship Safety Requirements	not comply
Conclusion	 Large Unloaded Ship Safety Requirements	not comply
Conclusion	 Unloaded Ship Safety Requirements	not comply
Conclusion	 Certificate of Registry Status	valid
Conclusion	 Unloaded Ship Inspection Requirements	not comply
Conclusion	 Port Clearance	not clear
Decision	 Determine Port Clearance	not clear