**Routing optimization options & input**

See below the explanation of the routing optimization and outputs.

# Fixed speed (CP) routing

The instructed speed routing makes sure that the vessel can be validated on good weather performance described in the charter party conditions. C/P speed is leading as a basis for routing advice.

|  |  |
| --- | --- |
| **Optimize On** | **Description** |
| **Time** | Calculates the route to reach the destination in the shortest time based on C/P speed. |
| **Cost\*** | Calculates the route with C/P speed with the lowest costs (daily hire of the vessel and the anticipated fuel costs) |
| **Fuel\*** | Calculates the route with C/P speed with the lowest possible fuel consumption in metric tons (not taken the costs of the different fuels into account).  |

\*With fixed speed (C/P) routing Fuel & Cost optimization input on fuel and hire rates is needed. Within fixed speed (C/P) routing, these options will not always give much additional savings, but can possibly avoidance of SECA zones.

# 1.2 Variable (optimum) speed routing

Goal is to find the optimal speed for the vessel within a speed range and optimize for the weather conditions on the route. Optimal speed depends on the goal of the voyage, which can be defined by costs or fuel.

|  |  |
| --- | --- |
| **Optimize On** | **Description** |
| **Cost** | * Provides variable-speed routing to produce the speed ranges that achieve the lowest possible costs.
* Advises to change speeds at specific points on the route.
 |
| **Fuel** | Calculates necessary speeds to arrive at the destination on time while achieving the lowest possible fuel consumption. |

# Table optimization types - input

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Optimization** | **Variables** | **Outcome** | **Speed/fuel profiles** | **Speed range** | **Daily hire rate** | **Fuel rates** | **Service Type** |
| Costs | Daily rates + fuel prices | Cheapest total voyage costs | X | X | X | X | Optimal Speed Routing, ETA |
| Fuel | Fuel consumption | Least total fuel consumption | X |  |  |  | CP, ETA, Optimal Speed Routing |
| Time | Duration of voyage | Fastest route | X |  |  |  | CP |

* **Speed/fuel profiles**
	+ More accurate speed/fuel profiles will increase the reliability of the optimization (otherwise default vessel model used by DTN)
	+ Updates are responsibility of the customer
* **Speed range**
	+ Speed range needs to be agreed with all stakeholders
	+ A bigger speed range gives more options to optimize
* **Daily hire rate vessel**
	+ Impacts the duration of the voyage
* **Fuel rates**
	+ ECA/Non ECA
	+ Impacts the consumption on the voyage

Keep in mind that a most cost-efficient route as requested, not necessarily the shortest route is. The most cost optimum option, despite being somewhat longer, taking into account the inserted fuel prices and daily cost and forecasted weather conditions. In this case the fuel saved due to slightly better conditions outweighs the additional steaming time because the distance is longer.