1Point2

Port site: future tonnage increase

Following an initial static study, 1Point2 and ExtendSim were chosen to realize the dynamic simulation of a port site and its development, taking into account the hazards (ship arrivals, weather conditions, etc.) as well as the impact of scarce resources on ships' loading/unloading time.

⇒ **ISSUES**

- Check that the new equipment absorbs the increase of loaded/unloaded volume.
- Estimate the waiting time of the ships at anchor and the cost due to late delivery penalties.
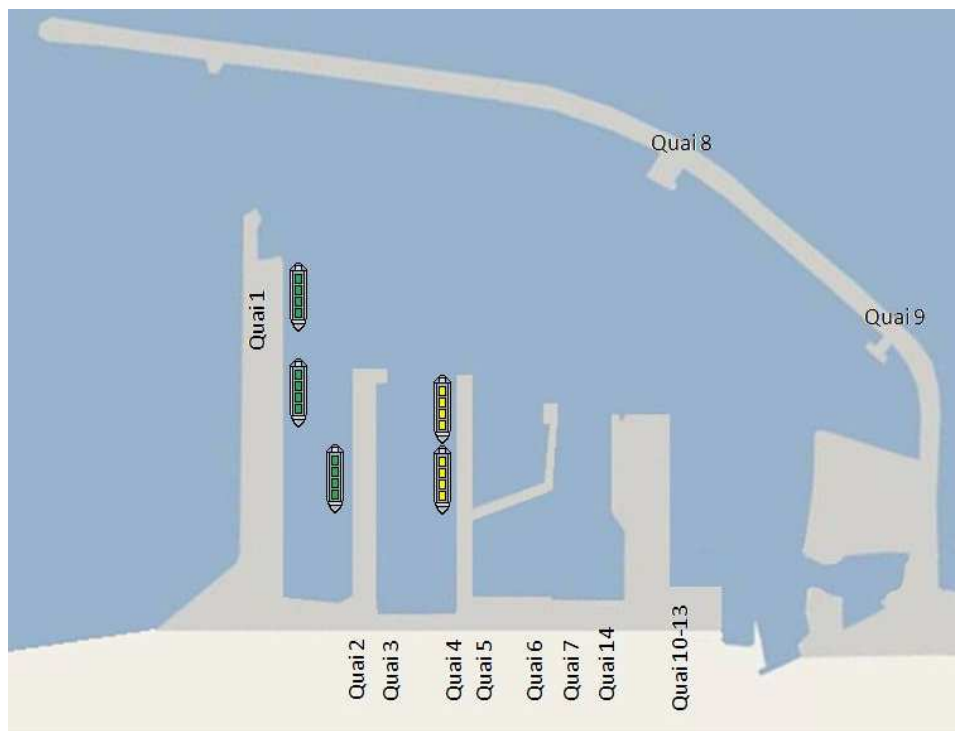
⇒ **SOLUTIONS**

Simulation model that can take into account ship arrivals/departures following a schedule, organize port resources and take into consideration the ships' safety rules (weather conditions, other...) as well as commissioning of new equipment.

⇒ **ADVANTAGES**

- Validation of hold loading times.
- Impact of the scarcity of resources on ship loading.
- Impact of safety rules on ship loading.
- Estimation of the port's absorption capacity following the future tonnage increase.

The dynamic study of the port site comprised two phases.

A first phase validated the static study and demonstrated the impact of dynamic factors on the ships' loading and the utilization of the port:

- Monthly distribution of ships' arrivals in a semi-random way.
- Organization by the ships of scarce resources such as the port entrance, pilots, tugs, gantry cranes, ...
- Utilization of the wharfs: distribution of ships to wharfs according to several criteria (product transported, size, type, etc.)
- Random breakdowns of wharf equipment.
- Safety rules: restriction on entry/exit into or out of the port or the ship's loading depending on weather conditions, products transported. With an annual calendar of weather conditions.

The ad hoc impact of each of these parameters allowed to find a more realistic ship loading/unloading value than the one approximated in the static phase, where these parameters were either not taken into consideration (particularly for the organization of scarce resources) or summarized in an average annual time, to be subtracted from the global available loading time.
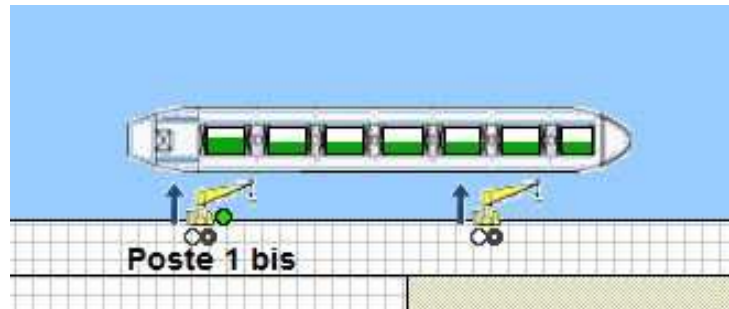
During the second phase, the model simulated the increase in the volume loaded and the commissioning of new equipment. It therefore validated the investments proposed for the expansion of the port and estimated the increase in the necessary scarce resources.

In addition to the average loading time according to the type of ship or its product transported, the simulation calculates the utilization rates of each piece of equipment.

During the tonnage increase phase, these results highlight the saturation of certain equipment, particularly the wharfs. But they also point out the bottlenecks on the port, due to the scarcity of certain resources.

Flow simulation is one of the most powerful tools used to analyze complex systems :

♦ **Understanding** the system's dynamics: how long (minimum/maximum time) does it take to get from one point to another? Where and when may long queues appear?

♦ **Anticipating** the operation of a new system, or **improving** the functioning of existing systems. Simulation can avoid making small or big mistakes!

Poste 1 bis

Loading/unloading a hold , and therefore a ship, follows a precise protocol which is different according to the ship's size, the number of available gantry cranes and holds.

Each protocol comprises different stages of hold filling, an order and a filling percentage.

The model was able to validate the different protocols and estimate the loading/unloading times according to the type of ship and the number of gantry cranes.

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**To know more about us, visit our site:
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We assist industry managers with simulation to facilitate their decision-making process.
Trained in flow simulation in the United States and France, the 1Point2 team has been providing services, quality software, training and methodological assistance since 1987.
1Point2 is the exclusive distributor of ExtendSim in France, Belgium, Switzerland, Italy, Spain, Portugal and Greece.

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