

INTEGRATED ASSET MANAGEMENT: PREDICTIVE & FUTURE RESPONSIVE

by

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1. INTRODUCTION

In the recent years Port of Rotterdam worked on a higher level in Asset Management of its maritime infrastructure, which is confirmed by achieving the ISO 55000 certification. The currently running program Integrated Asset Management adds to this basis to look at the assets as part of the logistics chain and/or nautical process and ensure the availability of (asset related) information for all in the chain involved parties, not only within the Port of Rotterdam organization but beyond, such as customers and other stakeholders.

The customers and stakeholders want to know more about the assets, but we want to know more about how customers use and need the assets with the aim of increasing efficiency in all parties. In society and the world around us we see increasingly challenges that result in threats and opportunities, not just for individuals and the environment, but also for organizations such as the Port of Rotterdam. This includes issues such as climate change, world population growth and more specific issues for the port authority like energy transition, autonomous sailing, alliances in the container transport and the demand for mobility.

At the same time, there is exponentially increase in digitization. Everything is measured or can be measured and is available digitally. Port of Rotterdam will have to prepare for major changes in the field of digitization and robotization in the port, which is already recognized in the ports digitization strategy: Port of Rotterdam's aim is not only to have the best port infrastructure, but also the smartest. Same goes for the assets of Port of Rotterdam in the future. Where the assets are "dumb" now, they will be in the future equipped with smart sensors. These sensors monitor continuously the assets of Port of Rotterdam Integrated, anywhere in the Port, all at the same time, all together and on every second of the day, assets will cooperate with each other. Hence: "the inspector of the future is a sensor."

No longer doing things right, but doing the right things in asset management. Using smart and integrated analyses (Analytics) that make it possible to understand and anticipate better and that now are still unknown and unforeseen. Analytics within Asset Management is seen as one of the critical success factors to assets and modalities to make timely measures and developments in the port. Analytics allow us to make future-oriented decisions based on facts, so called ' what-if ' scenarios and to develop aging models based on actual use. This allows us to optimize the performance of assets and modalities based on real time and future use (like predictive maintenance and future-responsive). Analytics will also tell us on which areas still insufficient information is available to support adequate decision-making. Also analytics will trigger for the tuning of appropriate information based on, among other things, sensors, external data sets, and big data.

The availability of (real time) data will also provide benefits in the design of new assets. Integrated asset management does not start when a new asset is built and delivered, but gives added value in the design process, by making clear what the longer term effects are of choices in the design, based on data from actual use. In the end it delivers a saving of deployment of hours and money.

On several areas there is now talk about scaling up, so also in asset management. Eventually, the shared information, lead to systems that are associated with each other and communicate with each other independently, a complex of systems, where plans, information and so on is shared between organizations and leads to more cooperation and decision making based on the interests of the entire

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chain of systems. What eventually leads to an even more efficient port management. The benefits are evident.

2. AT THIS POINT: DOING THE THINGS RIGHT

Since the early days The Port of Rotterdam is building waterfront assets to facilitate the processes of her clients and to guarantee a safe and smooth mooring process of the ships that call Rotterdam. Maintaining the assets is bound to building the assets.

The traditional asset management will change on important points in the coming years drastically due to digitalization and robotizing In the past ten years ever growing effort was put in implementing asset management processes and tools to deal with ever deteriorating assets, risks, investments and service levels.

Based on this effort the Port of Rotterdam was rewarded as the world's best waterfront infrastructure by the World Economic Forum (see: 2015/2016 Global Competiveness Report). Besides that the Port of Rotterdam was the first port authority ever to achieve the PAS55 / ISO55001 certificate for the quality of its asset management process.

3. BUT: TIMES ARE CHANGING:

In the world around us and we experience ever increasing challenges that result in threats and opportunities, not exclusively for individuals and the environment but also for organizations like the Port of Rotterdam. Think about the climate change and the growth of the global population and more specific for the Port of Rotterdam: the energy transition, autonomous sailing ships, alliances in the container transport and the demand for mobility. Asset Management has a challenge.

Performance, risks and costs of assets and modalities need to be optimized. Changes in asset management will effect assets, logistic chains and modalities. New technologies will be developed and will lead to changes in data needs, intelligence and knowledge of the employees. Asset management will use new technology and possibilities in data to extend her service level towards the tenants.

The impact and the pace of these changes demands the asset management department and the asset management process to anticipate on the consequences that the changes have on the asset portfolio. And knowing that the changes will reveal itself increasingly faster and with growing impact on the processes of asset management.

4. AT THE SAME TIME: EXPONENTIAL GROWING DIGITALIZATION

We are living in a world that is rapidly being digitalized and robotized. In the two years more changes were made than in the ten years before that. Everything can be recorded or is digital available. Not only the Port of Rotterdam needs to be ready for the big changes that digitalizing and robotizing will bring. Which is already recognized in the ports digitization strategy: Port of Rotterdam's aim is not only to have the best port infrastructure, but also the smartest. "Dumb" asset therefore will be equipped with smart sensors.

Sensors but also satellite's, drones and the internet of things (IoT) will deliver data that will give us a deep insight in the way we are working in asset management. Different types of data can and will be brought together and the data (like is being done with the current inspections) will be no longer recorded once or twice a year but will be real time available, 24/7.

That opens the possibility for the assets of the Port of Rotterdam to work together. Where the assets are dumb at this moment, they will be made smart by adding smart sensors to the assets. These sensors will continuously monitor the status and condition of the assets of the Port of Rotterdam. Integrated, which means on all spots in the port, all together and every second of the day. The assets of the Port of Rotterdam will work together integrated, that is way the slogan is: “the inspector of the future is a sensor”

5. ANALYTICS ARE THE KEY TO SUCCESS: FOR EVERYONE, BY EVERYONE

The power of integrated asset management will be visible in the availability of information for everyone and to use the information made available by others. Not only within our own organizations. On the contrary: tenants, stakeholders and big data will provide information . Information needs to be in a way that everyone speaks the same language. No longer, we are evaluating whether we do the things right, but we evaluate whether we do the right things. With the help of smart and integrated analytics it will be made possible to understand things and to anticipate on changes that now are unknown or unrevealed.

Analytics is within the asset management considered to be one of the key success factors to connect assets and modalities in time on the demands and developments (like the earlier mentioned energy transition) in the Port of Rotterdam. Analytics will facilitate us to make future responsive decisions based on facts, to calculate so called “what-if” scenarios and to develop models. By doing so we are able to optimize the performance of assets and modalities, based on current use and predicted future use of the assets (predictive maintenance). Analytics will show us the areas in which insufficient information is available to make adequate decisions. In that way analytics will be the trigger to implement needed information bases on sensors, external data sets and big data.

Increasing availability of data and possibilities to record real time continuously, example given the loads on assets, will make it possible to predict the remaining lifetime of a structure more accurately than the current methods that are based on physical research and vendors information. Predictive models are of extreme value to plan the maintenance activities “just in time”, so no expenses or work will done to early or to late.

6. FRAMEWORK: FROM DATA TO THE RIGHT DECISION

Integrated asset management will not only give the asset manager insight on the performance , risks and costs of the individual assets, it will also show the connection of all the assets in a logistic chain or the nautical process. Data on these assets must deliver useable information that can be shared among other asset managers and departments within the Port of Rotterdam, but also among stakeholders like terminals, transport firms and nautical service providers.

Integrated asset management will also provide a framework in which data management is integrated in the processes and information is made visible in an understandable way, so it can be used for modeling and analyses. These so called analytics are giving the opportunity to predict, to plan predictive maintenance and to warn for trouble in an early stage inside and outside the organization of the Port of Rotterdam. In cooperation the most favorable scenario can be chosen to act on. Integrated asset management will bring change in how we think and in which way that thinking will be translated into actions and cooperation.

7. PLATFORM: INTEGRATION OF PEOPLE, PROCESSES, ASSETS AND DATA

Besides a framework integrated asset management will also provide a platform on which people, processes and assets are connected to data and information as a result from analytics and modelling

and also connected to data and information coming from other stakeholders, like tenants, nautical service providers, harbor master etcetera. Not look at the assets as assets but as part of bigger picture, the logistic chain or the nautical process, a holistic approach.

Integrated asset management is in the momentum of changes, not only in the availability of huge amount of data and the possibilities that digitalization and IT infrastructure offers, but also innovations in asset management in the field of among others deterioration models and risk management are developing. This offers opportunities to people, as well as individual as team, department or organizations to work together more intensively and finally be more efficient and effective and achieve better results in service level, risk profile and costs.

8. ALSO FOR THE DESIGN OF NEW ASSETS

The availability of (real time) data will also benefit the design and building of new assets. Integrated asset management doesn't start when an asset has been build, but gives added value in the design process, by making clear what the long term effects are of choices made in the design. The optimal use of data at the begin of the design process will eventually lead to a save of money and hours. The same goes for so called indirect assets of the Port of Rotterdam, for instance participations in pipeline areas and glass fiber networks.

9. MORE EFFICIENT PORT MANAGEMENT

Integrated asset management and the way of working and communicating that goes with it, makes it possible to incorporate the tenants and terminals in the asset management that still has an internal and technical focus. The tenants and terminals want to have more data on the assets, the asset manager wants to have more data on the activities on the terminals. In the end all the parties involved will benefit. Optimal data management results in more efficient use of the port infrastructure. Making the port more efficient, reduction of down time, reduction of turnaround time is necessary to maintain the competitive position of the port now and in the future

10. TOWARDS A LARGER SCALE: A SYSTEM OF SYSTEMS

In different areas there is an upward movement in scale, also in asset management. Eventually the shared information, will lead to systems that are connected and independent communicate with each other, call it a system of system, where plans, information etcetera is being shared between organizations and will lead to more cooperation and decision making based on the interest of the complete logistic chain.