



# Risk and Human Error Assessments

## Improving the safety of your operations

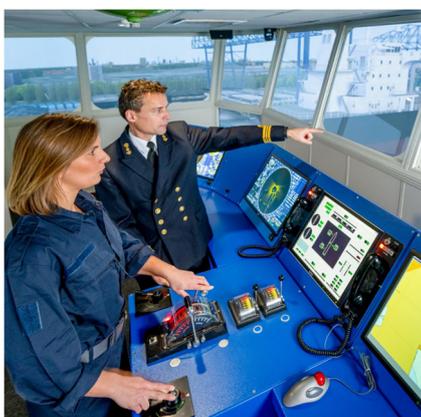
Many maritime operations deal with large and heavy equipment which can lead to serious consequences if accidents occur. When new operations or changes in your operations are planned, it is of vital importance to be aware of any possible risks that may be introduced due to this new operation. A structured risk assessment including a human error assessment gives insight in areas where risk control options may reduce the risk level before going operational. Either required by legislation or simply because you want to be sure you are ready for starting the operation, MARIN can help to increase your safety level by performing a structured risk and human error assessment.

### Services for

- Authorities and regulators
- Vessel owners
- Vessel operators
- VTS providers
- Insurance companies
- Classification societies
- Contractors

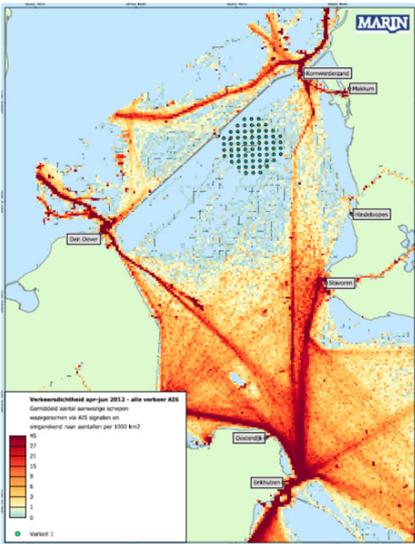
### What you need

You need to know your level of safety when changing your operation or starting a new operation. Without the life experience of such an operation it is vital to know whether the operation is safe to start with. Safe in terms of technical equipment, but also with regard to your organisation and staff, both operational and supporting. In many cases legislation requires to assure the right safety level. A formal safety assessment including a qualitative and quantitative part gives insight in the weak spots to fix or gives assurance to go operational in a safe way.



### What MARIN can offer your organisation

MARIN can help defining your level of safety for future operations or planned changes in existing operations. Generation risk control options gives you the opportunity to increase safety levels where required before going operational.



- Related products**
- Accident investigations
  - Observations and advisory on board or in simulator
  - Development policy advice, design rules and regulations

For more information contact MARIN:

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## Our approach

The core of our approach is the IMO defined Formal Safety Assessment methodology. For each request we adjust our service to specific needs, for instance by expanding or limiting the methodology.



We use real data (e.g. incident reports, AIS data), expert judgment, physical models, simulations and analytical models to achieve results. The human element is an important contributory aspect to the causation and avoidance of accidents. Therefore we include the human element throughout the whole safety assessment process.

## Expertise and tools involved

MARIN has a wide range of expertise available (in house) to support you. For instance, the following experts can help you with risk assessment related projects:

- Maritime operation specialists
- Hydrodynamic specialists
- Hazard identification workshop facilitators
- Human factors specialists
- Data analysts

During the various steps of a safety assessment we use sophisticated tools including simulators and the SAMSON Risk Model. MARIN has extensive experience in simulations with human in the loop. Simulations can be applied to assess human performance in complex operations, to identify risks or to assess the effect of risk mitigating measures.

SAMSON includes accident frequency models for collision, grounding, fire/explosions, contacts etc. to determine the accident frequencies. This model also includes impact modules for assessing the consequences of the accidents.

