CLOSING THE BUS

KONGSBERG

ENABLING DPII OPERATIONS WITH CLOSED BUS-TIE

Validation and Recommendation Study

Kongsberg Maritime can support vessel owners to achieve class requirements for closed bus notations by analysing and highlighting the modifications necessary.

Our early feasibility studies designed especially for closed bus notations can be performed in advance of individual upgrades or hybrid conversions.
This will give owners the information needed to make informed decisions for their vessel.

Standardised enablers

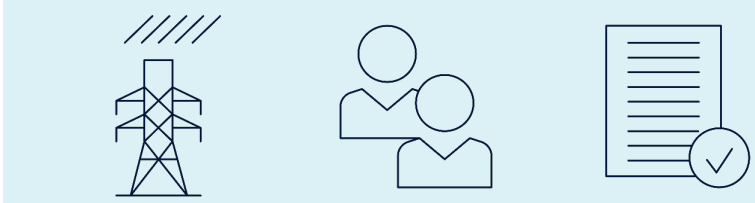
Kongsberg Maritime has developed technologically advanced closed bus enablers for any switchboard, at all voltage levels and applicable for all power management systems. The following solutions are available:

- Integrated solutions for Switchboards and PMS
- Standalone solutions for Switchboards.

ENGINEERING PACKAGES INCLUDING

- Documentation review
- Initial study
- Modelling
- Simulations
- Recommended modifications
- Potential fuel savings*
- Recommendations

* estimated study based on rough operational profiles from the customer



System study

Short circuit analysis
Study of short circuit ratings to determine that they are adequate in case of closed bus operation modes.

Selectivity analysis
Study of main distribution coordination and protection settings related to changes in the short circuit values.

Propulsion system / essential consumer fault ride-through
Study of fault ride-through of propulsion drives and essential consumers.

Transient stability
Study of system response will respond to a worst case electrical failure, and if/ how long it will take for the system to restore after clearing the fault.

Auxiliary systems
Study of all auxiliary systems related to propulsion system to ensure they can handle ride-through.

Recommendation

Kongsberg Maritime will deliver a report that highlights the required modifications towards closed bus notation by class (for example DNV, ABS - whichever is applicable).

The report will ensure vessel owners are able to reduce risks, cost and time as well as being given a full understanding of the modification requirements. Further steps, such as verifications in KM Energy Lab or on-board survey to verify findings may also be suggested in the report.

Follow-up activities

After the initial study, a DP FMEA should be performed by an auditor assigned by the owner using input from the study. With an approved FMEA, the final modifications to the vessel can be performed.

FMEA assistance, final modifications and verification can be offered by KM as additional delivery.

VALIDATION AND RECOMMENDATION STUDY → DP FMEA BY ASSIGNED AUDITOR → MODIFICATIONS AND VERIFICATION

REQUIRED INPUT

Electrical	▪ Single line diagram ▪ Switchboard drawings ▪ Breaker settings ▪ Load list
Datasheets	Datasheet for all: ▪ Generators ▪ Engines ▪ Propulsion systems ▪ Any other relevant essential equipment
Parameters	▪ Generator Voltage Regulator (AVR) ▪ Governor parameters
System	▪ Operational modes ▪ System philosophy

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