PrimeShip
Total Ship Care

ClassNK

[English]

# PrimeShip

## Total Ship Care

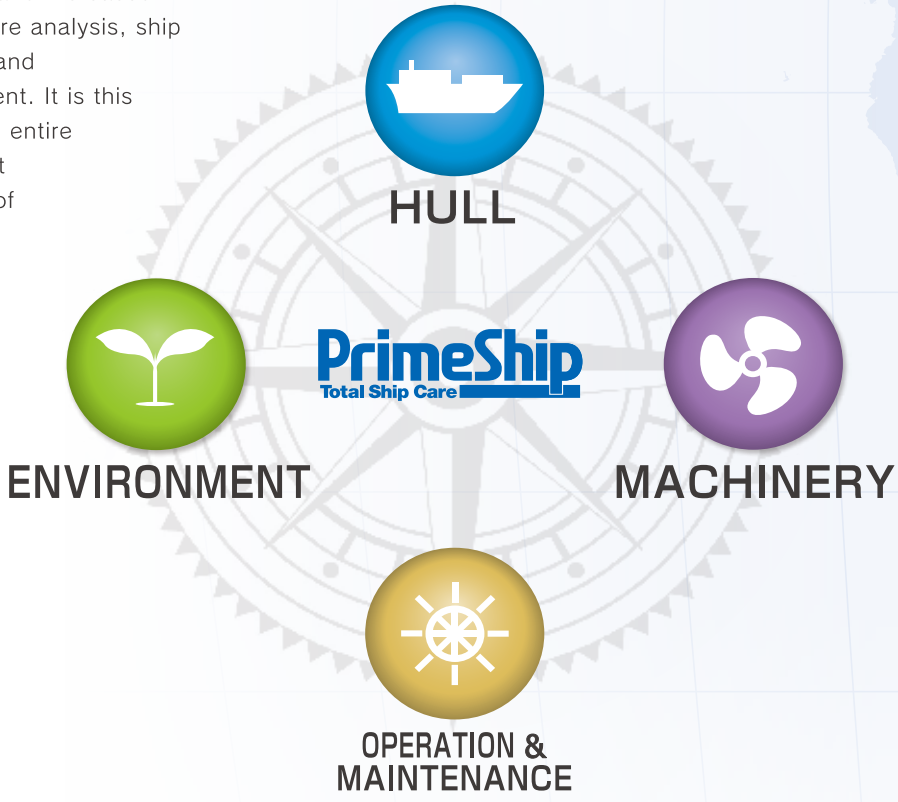
# PrimeShip Total Ship Care

## PrimeShip and the Concept of "Total Ship Care"

In its continuing efforts to provide the maritime industry with the latest and best technical services, ClassNK is actively engaged in the research and development of new technology based on the technical experience it has accumulated over more than a century of ship classification.
The result of these efforts is the integrated, comprehensive approach to total ship care known as PrimeShip.
PrimeShip is the collective name for the entire range of ClassNK' s specially designed technical services. The PrimeShip service suite has been designed to prevent pollution of the marine environment and to help ensure the comprehensive safety of ships at every stage of a ship' s life from inception and design, through construction, operation, management, maintenance, and related activities.

## The Software and Services of PrimeShip

PrimeShip is a full suite of technical products and services which is constantly being upgraded and refined to incorporate the latest technological advances and research information. This commitment to innovation and excellence is the core element of the PrimeShip philosophy.
PrimeShip products and services contribute to the improved reliability and increased efficiency of hull structure analysis, ship design, load planning, and maintenance management. It is this holistic approach to the entire lifecycle of the ship that serves as the hallmark of the PrimeShip.



# PrimeShip

The software and services of PrimeShip

## HULL

- (S) PrimeShip - HULL — Ship Structure Design Support System
- (S) PrimeShip - CTF for PSPC — Coating Technical File (CTF) Preparation Support System

## MACHINERY

- (S) PrimeShip - SHAFT — Shaft Alignment Analysis Program
- (M) PrimeShip - CRANK — Crankshaft Stress Calculation Service
- (A) PrimeShip - TORRES — Shaft Torsional Vibration Analysis Service

## OPERATION & MAINTENANCE

- (T) PrimeShip - ETAS — Emergency Technical Assistance Service
- (S) (I) PrimeShip - PSC Intelligence — Support System for PSC Performance Improvement
- (S) (I) PrimeShip - CHEMISYS — Integrated Database System for Chemical Products
- (M) PrimeShip - CAP — Condition Assessment Programme

## ENVIRONMENT

- (S) PrimeShip - GREEN/ProSTA — Software for Progressive Speed Trial Analysis
- (S) PrimeShip - GREEN/MinPower — Software for Assessment of Minimum Propulsion Power
- (S) PrimeShip - GREEN/SRM — Ship Recycling Management

(S) Software (A) Analysis Services (M) Assessment Services (T) Technical Assistant Service (I) Information Service

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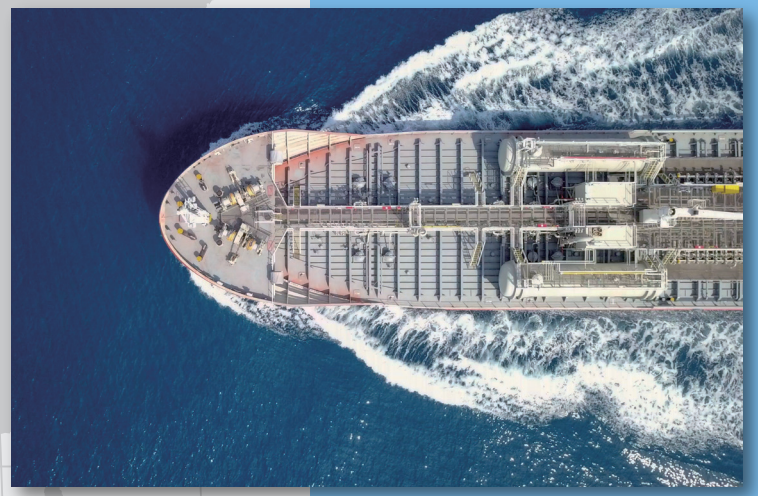
# HULL

## Ship Structure Design Support System



## Key Features

- ◆Comply with the comprehensive revision of Part C of the ClassNK Rules
- ◆Intuitive UI/UX
- ◆Automation/Person-hour reduction
- ◆Versatility with respect to ship type
- ◆Data linkage with NAPA Designer

PrimeShip-HULL is a ship structure design support system for strength assessment based on Part C of the ClassNK Rules and the IACS CSR.

PrimeShip-HULL has an intuitive UI/UX (User Interface/User Experience) that makes the software easy for anyone to use as well as a menu structure that follows the operation flow and a video help function. In addition, PrimeShip-HULL has automatic processing functions that contribute to the reduction of design person-hours and a linkage function with the 3D ship design system of NAPA. The system strongly supports the efficiency improvement of the ship design process.

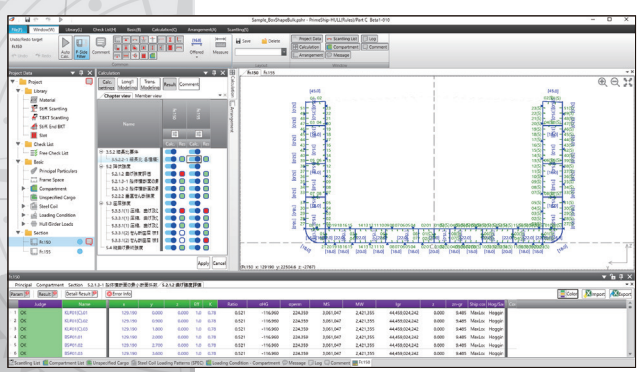
## Composition of PrimeShip-HULL

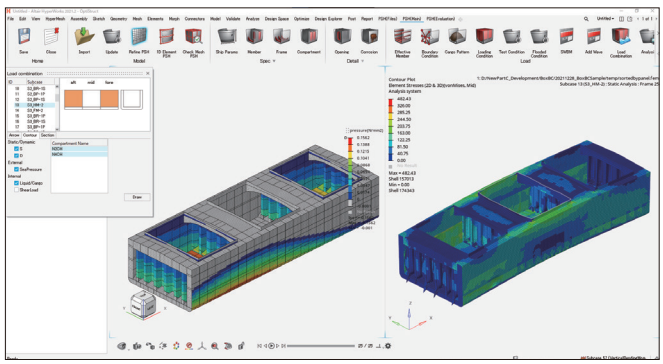
◇Rule Calculation Software

It is possible to evaluate the strength of the input cross sectional data using the prescriptive rule requirements for longitudinal strength, local strength, strength for primary supporting structures, fatigue strength, etc. as specified in the rules. It is equipped with a highly flexible modeling function and a highly transparent calculation function that allows you to check all calculation parameters and results in real time.

◇Direct Strength Analysis Software

It is possible to evaluate the strength of cargo holds and full-ship analyses using the finite element analysis (FEA) specified in the rules. HyperWorks is used as the platform, and various design support functions, such as automatic load generation and sensitivity analysis, enable efficient design review and optimization.





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## Intuitive UI/UX

A unified and visual intelligible UI design with a menu structure that follows the operation flow enables intuitive operation, allowing users to smoothly proceed with their work. In addition, the system is equipped with a help function that allows users to check the operation procedure via video, making the system easy to use by anyone.

## Automation/Person-hour reduction

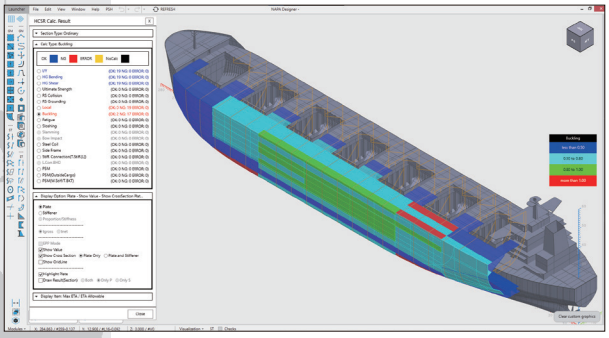
In addition to the automatic calculation and report generation functions, a mesh partitioning algorithm specially developed for direct calculation requirements based on the finite element method (FEM) makes it possible to automatically perform complicated tasks such as the creation of very fine meshes required for fatigue strength evaluation.

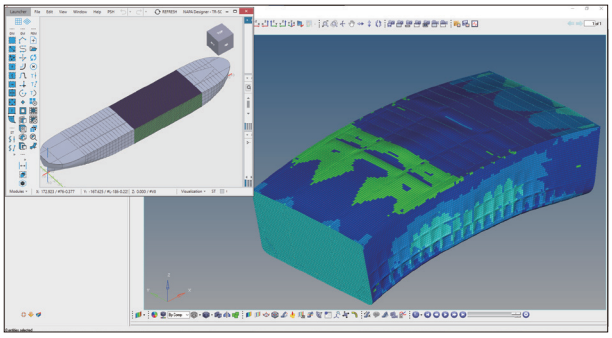
## Versatility with respect to ship type

By consolidating separate systems for each ship type, it is possible to model and evaluate various ship types with the same operability, thus greatly contributing to the reduction of the training time needed to become proficient at using the software.

## Data linkage with NAPA Designer

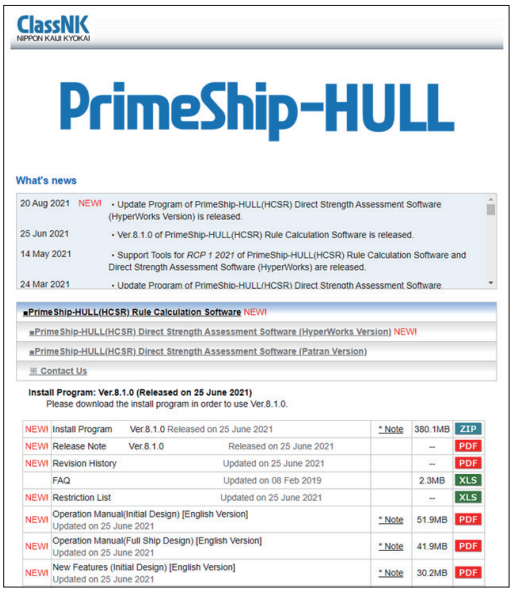
Using NAPA Designer's application programming interface (API), evaluations with PrimeShip-HULL can be performed seamlessly on NAPA Designer. In addition, model changes on PrimeShip-HULL based on calculation results can be reflected in NAPA's 3D model, greatly reducing the person-hours required for data linkage and making more accurate data linkage possible.





## Superior support

A dedicated support desk is available to quickly resolve any operational questions. In addition, information such as update files and FAQs are available on the support page.

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E-mail: dvd@classnk.or.jp Tel: 03-5226-2181 Fax: 03-5226-2172

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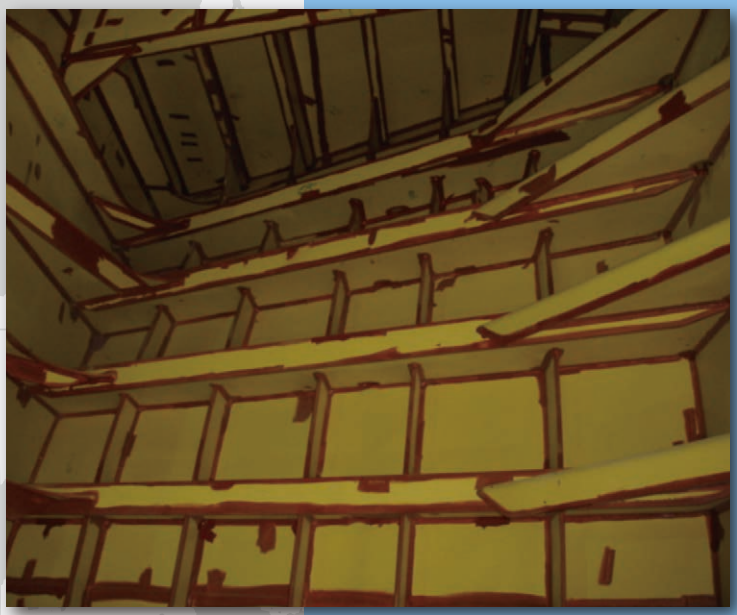
# CTF for PSPC

## Coating Technical File (CTF) Preparation Support System

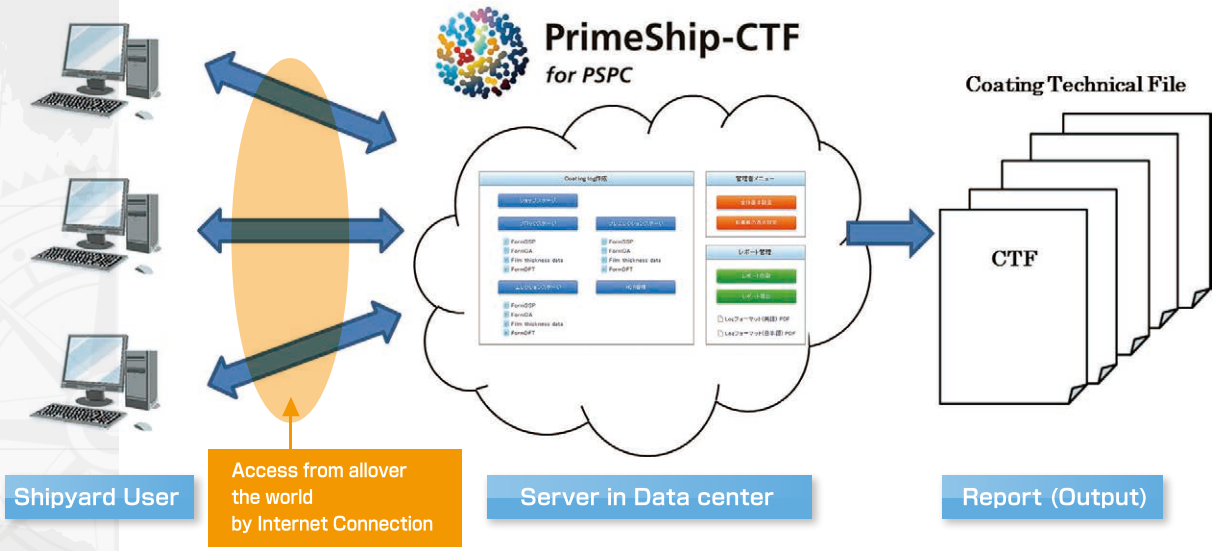


### Key Features

- ◆Adopt the Cloud Computing System
- ◆User friendly interface
- ◆Easy to use – even without operation manual
- ◆Establish the security system strictly

PrimeShip-CTF is the supporting tools for preparing Coating Technical File established by cloud computing systems and the relevant coating logs required by the regulations of PSPC can be made easily by using this tool.

### Concept of PrimeShip-CTF

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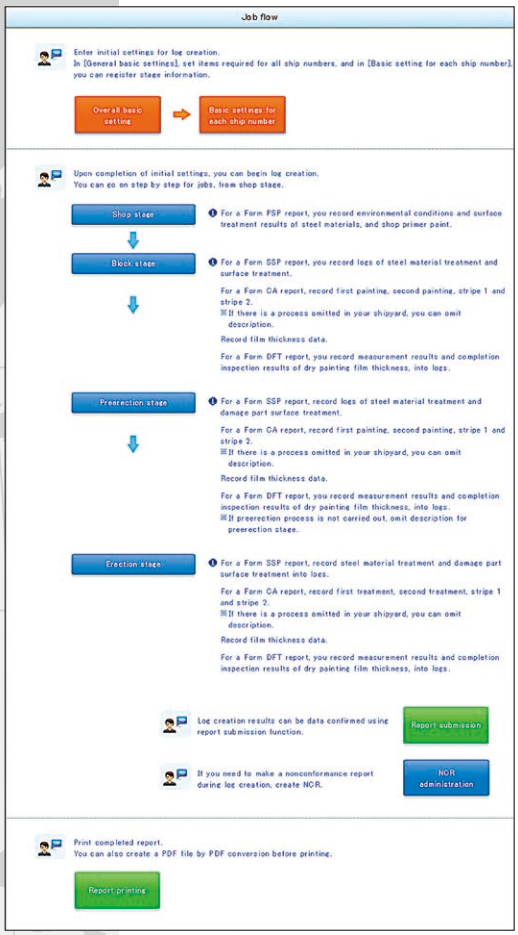
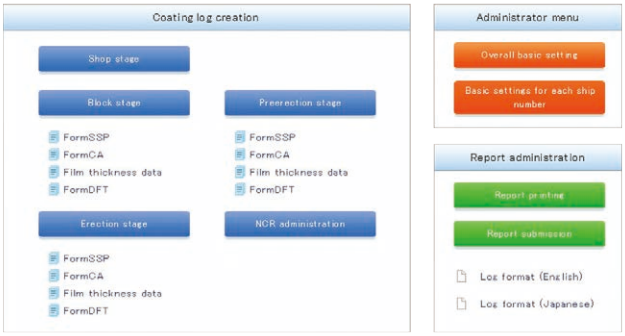
# Main Functions




## Composition of Contents to be easily understood

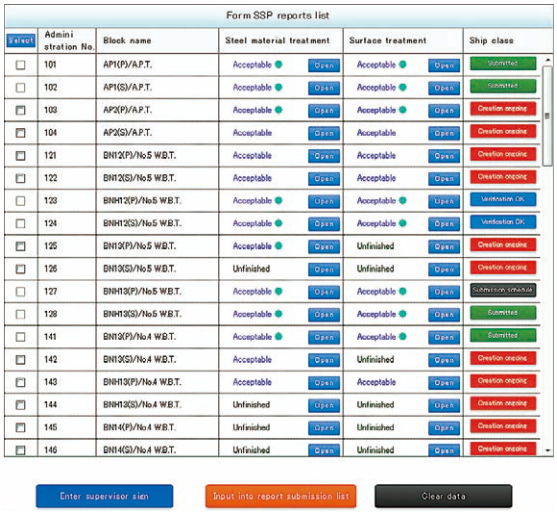



## Preparing the relevant Coating Logs

◇Form PSP (Primary Surface Preparation)
◇Form SSP (Secondary Surface Preparation)
◇Form CA (Coating Application)
(Full Coating & Stripe Coating)
◇Form DFT (Dry Film Thickness)
◇Form NCR (Non-Conformity Report)

## Preparing and Control for Coating Technical File (CTF)

◇Shipyard work record
◇Shipyard's verified inspection report
◇Output report by PDF files
◇Easily confirm the conditions of the relevant Logs




## Security of Data Communication

This system can be used safely by SSL.

## System Requirements

PrimeShip-CTF requires an adequate internet circumstances.


Contact address : Survey Department
ClassNK Administration Center Annex
3-3 Kioi-cho, Chiyoda-ku, Tokyo 102-0094, Japan
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# SHAFT

## Shaft Alignment Analysis Program

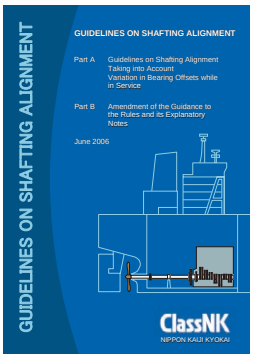
## Key Features

- **Guidelines and software for shafting alignment**
- **Shaft bearing positioning optimization software**

Based on ClassNK's expertise in machinery surveys and an in-depth analysis of machinery damage reports, ClassNK developed and released its new Guidelines on Shafting Alignment. ClassNK's PrimeShip-SHAFT service provides clients with shaft alignment calculations based on these Guidelines. Which serves as the cornerstone of the PrimeShip-SHAFT service. Based on these Guidelines, ClassNK provides a Shafting Alignment calculation system.

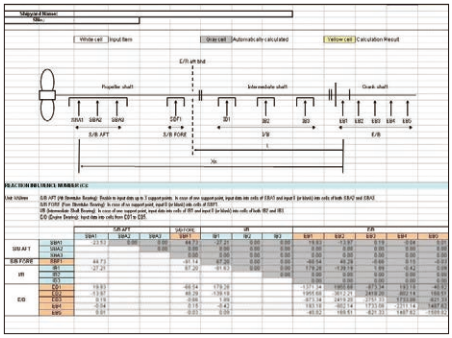
## Guidelines on Shafting Alignment

In recent years ship hull structures have become more likely to deform as result of reaching size and design limitations. At the same time, propulsion shafting is being made increasingly stiff for use in larger and lower-revolution main engines. The combination of these factors is reported to be the main cause of alignment related main bearing damage seen in ships with large differences in draught. Based on a thorough analysis of these alignment related problems, ClassNK has released the new Guidelines on Shafting Alignment in order to help prevent such damage from occurring.




## PrimeShip-SHAFT calculation software

Based on these Guidelines ClassNK has developed the new PrimeShip-SHAFT calculation software tool which enables users to easily determine optimized positions for shaft bearings.



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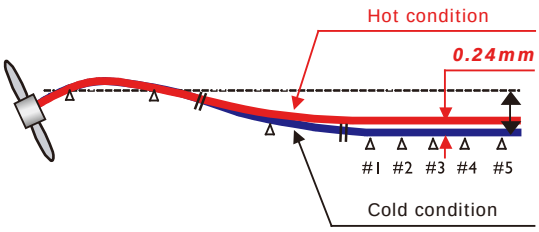
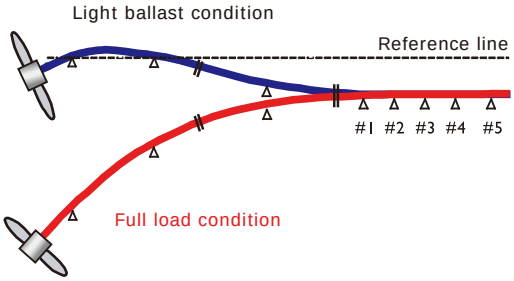
## Causes for engine bearing failures

There have been a growing number of incidents of engine bearing damage reported in recent large two-stroke cycle main engines. Among the various cases of bearing damage reported, there have been several cases in which engine bearings have become unloaded due to the effects of changes in temperature and hull deflection.

### Temperature Changes



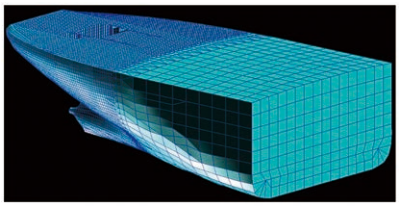

### Hull Deflection

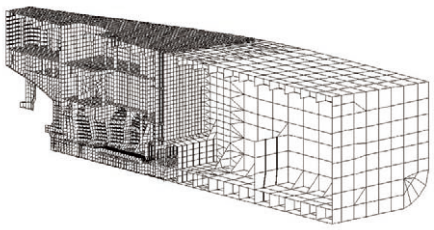


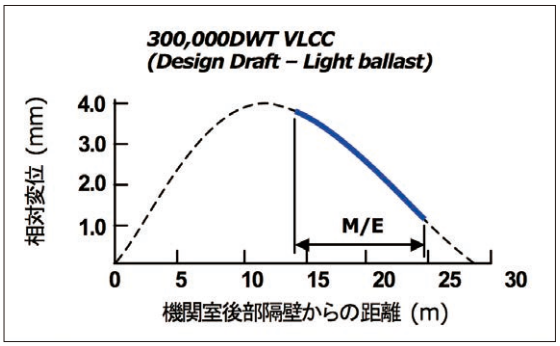

## Validation by analysis and testing

The accuracy of these guidelines has been validated by both Finite Element Analysis and full-scale measurements.

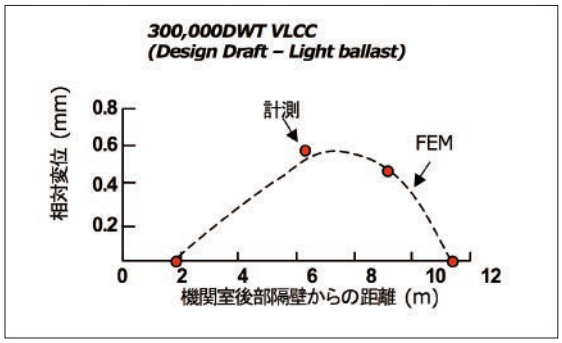
### Finite Element Analysis

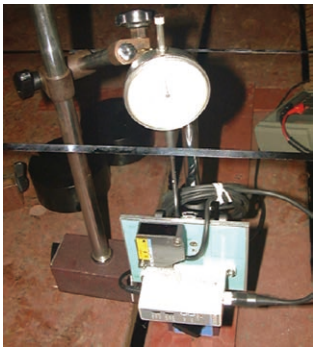







### Measurement of Hull Deflection



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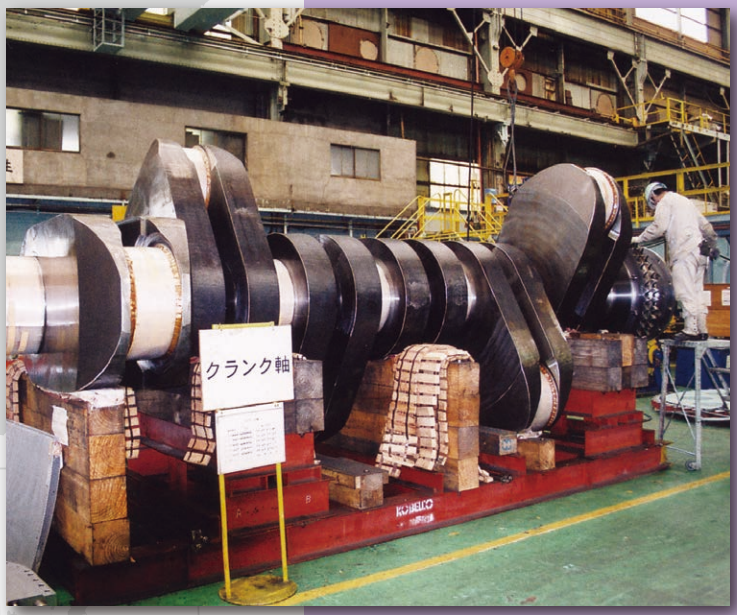
# CRANK

## Crankshaft Stress Calculation Service




### Key Features

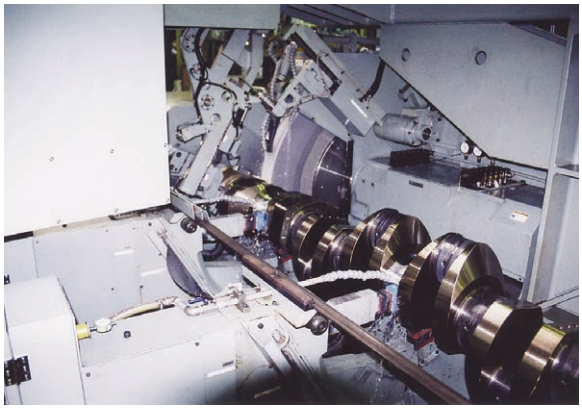
◆Crankshaft stress calculation service

◆Compliant with both the NK Rules and IACS UR M53

PrimeShip-CRANK is a crank shaft stress calculation service designed to evaluate the strength of diesel engine crankshafts of in accordance with Chapter 2, Part D of the ClassNK Rules for the Survey and Construction of Steel Ships and IACS UR M53.

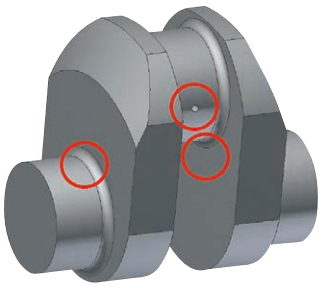
### Calculation method and evaluation criterion

PrimeShip-CRANK provides crankshaft strength evaluation based on the rigorous methods developed over more than a century of classification experience and embodied in the ClassNK Rules.
ClassNK evaluates the crankshaft strength of NK classed diesel engines during the drawing approval process; however, PrimeShip-CRANK allows the owners and operators of non-NK classed ships to have their crankshafts evaluated using ClassNK's highly reliable crankshaft strength evaluation system.



### Evaluation of high stress areas

In order to evaluate the overall strength of the crankshaft, stresses at following high stress parts can be calculated.
◇Fillet transitions between the crankpin and web
◇Fillet transitions between the journal and web
◇Outlets of crankpin oil bores
For built-up crankshafts, strength evaluations relevant to shrinkage fitting can also be carried out.



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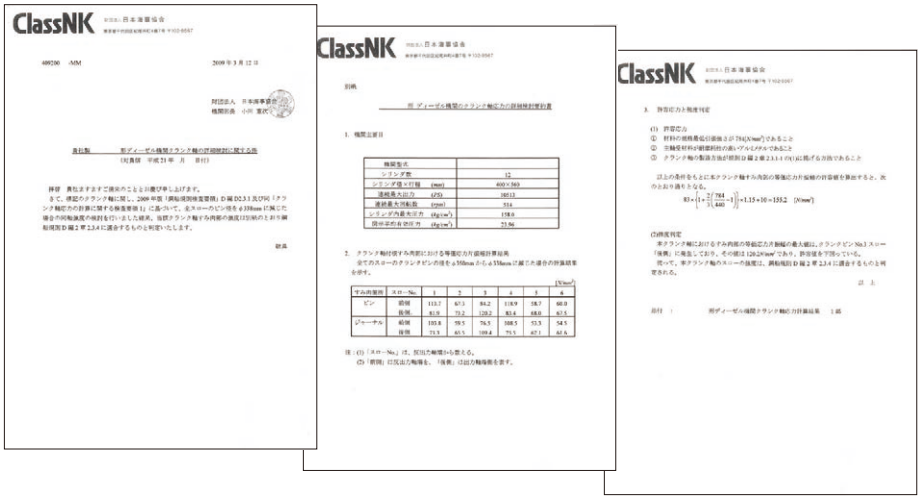
## Rule based crankshaft evaluation

PrimeShip-CRANK evaluations are conducted in accordance with the simplified calculation formula specified in 2.3, Part D of the ClassNK Rules and can also be carried out using either of the detailed calculation methods specified in “Annex D2.3.1-2(1) Guidance for Calculation of Crankshaft I” or “Annex D2.3.1-2(2) Guidance for Calculation of Crankshaft II” at the applicant’s request.

## Crankshaft statement of compliance

After confirmation of compliance with Chapter 2, Part D of the Society’ s Rules, ClassNK will issue a statement of compliance to the applicant.




## How to apply

To apply for the PrimeShip-CRANK evaluation service, please contact the ClassNK Machinery Department at the address below.

Contact address：Machinery Department
ClassNK Administration Center Annex
3-3 Kioi-cho, Chiyoda-ku, Tokyo 102-0094, Japan
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# TORRES

## Shaft Torsional Vibration Analysis Service

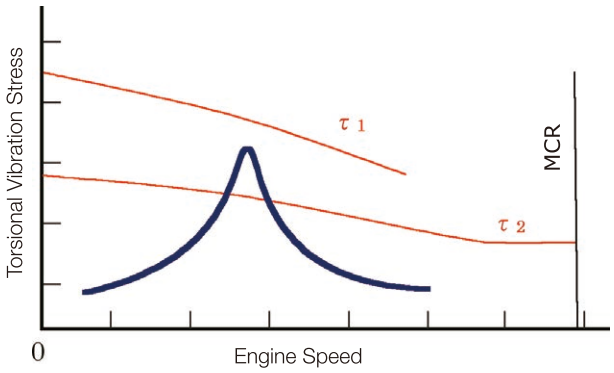
### Key Features

- **Shaft torsional vibration analysis service using the new TORRES (TORsional vibration RESponese analysis) calculation program**
- **Analysis based on both NK Rules and IACS UR M68**

Evaluation of torsional vibration is essential for shafting system design. This is especially true for diesel engine driven shafting systems, as diesel engines generate exciting torque due to the internal combustion in each cylinder. ClassNK's PrimeShip-TORRES is a service for carrying out torsional vibration analysis and evaluation.

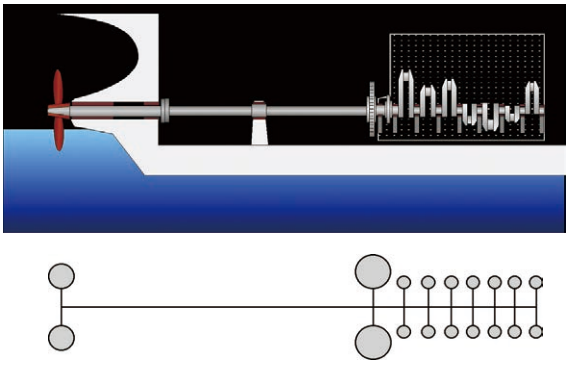
### Evaluation criterion

PrimeShip-TORRES is an analysis and evaluation service developed based on the wealth of knowledge contained in the ClassNK rules. PrimeShip-TORRES can be used to evaluate torsional vibration both at the design stage and during shafting system modification,
e.g. replacement of the propeller etc. This service is a vital tool for preventing damage caused by torsional vibration.




### Evaluation of essential items relevant to torsional vibration

Evaluations are provided for all essential items related to torsional vibration, including torsional vibration stress, barred speed range and gear chattering, among other items.



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## Rule based evaluation criteria

All evaluations are carried out in accordance with Chapter 8, Part D of the ClassNK Rules and Guidance, as well as IACS UR M68.

## Comprehensive analysis reports

After the evaluations are completed, comprehensive analysis reports will be provided. Reports include diagrams of the torsional vibration stress and the engine speeds at which torsional vibration stress is generated, are diagrammatically as well as information on allowable stresses.

TORSIONAL VIBRATION

NK COMPUTER SERVICE 1/1

CONDITION of CALCULATION : Case 2 Disengaged condition

| MASS No. | MASS NAME |
|---|---|
| 1 | VIB. DAMPER |
| 2 | FLANGE |
| 3 | FLANGE |
| 4 | #1 CRANKTHROW |
| 5 | #2 CRANKTHROW |
| 6 | #3 CRANKTHROW |
| 7 | #4 CRANKTHROW |
| 8 | #5 CRANKTHROW |
| 9 | #6 CRANKTHROW |
| 10 | #7 CRANKTHROW |
| 11 | #8 CRANKTHROW |
| 12 | FLYWHEEL |
| 13 | FLEX. COUPLING |
| 14 | FLEX. COUPLING |
| 15 | FLEX. COUPLING |
| 16 | FLANGE |
| 17 | GEAR |
| 18 | GEAR |

| 1ST MODE | F(1) = 1084.98 [C.P.M.] | | 2ND MODE | F(2) = 2815.46 [C.P.M.] | | 3RD MODE | F(3) = 3701.59 [C.P.M.] | |
|---|---|---|---|---|---|---|---|---|
| ORDER | STRESS [N/mm²] | SHAFT | ORDER | STRESS [N/mm²] | SHAFT | ORDER | STRESS [N/mm²] | SHAFT |
| - | - | - | - | - | - | - | - | - |
| - | - | - | - | - | - | - | - | - |
| - | - | - | - | - | - | - | - | - |
| 4TH MODE | F(4) = 4390.1 [C.P.M.] | | 5TH MODE | F(5) = 8617.31 [C.P.M.] | | 6TH MODE | F(6) = 17010.6 [C.P.M.] | |
| ORDER | STRESS [N/mm²] | SHAFT | ORDER | STRESS [N/mm²] | SHAFT | ORDER | STRESS [N/mm²] | SHAFT |
| 4.0 | 15.36 | CRANK | 4.0 | 6.31 | CRANK | 7.0 | 1.09 | CRNK |
| 3.0 | 6.03 | CRANK | - | - | - | - | - | - |
| - | - | - | - | - | - | - | - | - |

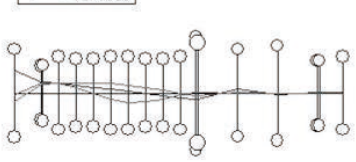
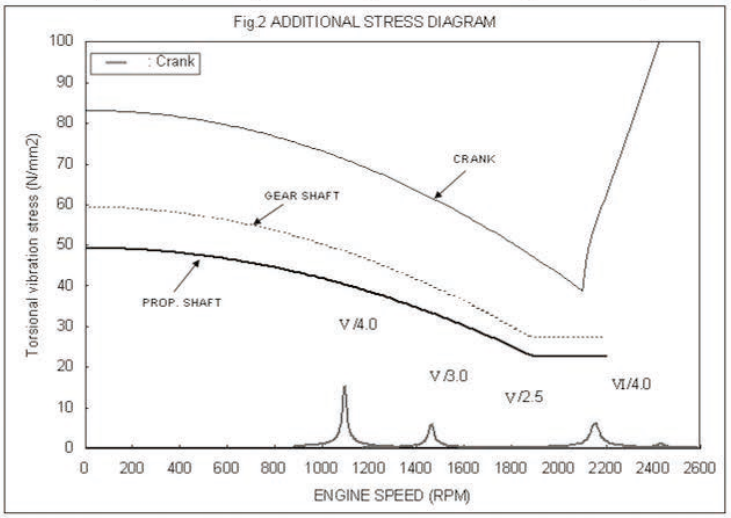



Fig.1 NOMAL ELASTIC CURVE

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# ETAS

## Emergency Technical Assistance Service

## Key Features

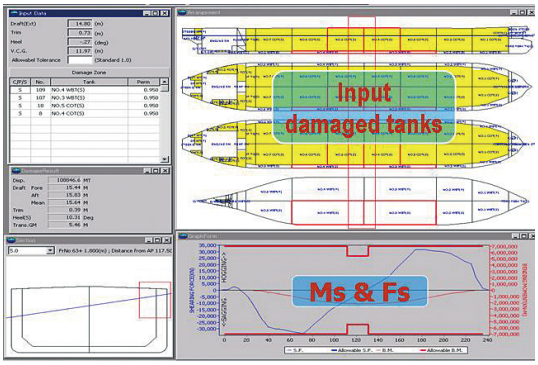
- **Computer-based strength & stability analysis for damaged ships.**
- **Available at any time- 24 hours a day, 365 days a year.**
- **Meets the MARPOL 73/78 Annex 1 "Shore-based Computer Programs" requirement for 5,000+ dwt oil tankers**

PrimeShip-ETAS is an emergency service designed to help ship owners and operators ensure ship safety and prevent or minimize the effect of marine pollution in the event of a serious ship casualty such as stranding, collision or explosion. Working closely with the owner and salvage team, the ClassNK ETAS team is often the brains behind the brawn, making sure that salvage operations don't make the situation worse, while minimizing environmental impact.

## PrimeShip-ETAS: Emergency Technical Assistance Service

### Damage stability and residual longitudinal strength

Using exclusive software incorporating each individual ship's data, the ClassNK ETAS team can swiftly calculate stability at damage condition and residual longitudinal strength.




### Quick results and reliable countermeasure advice

Once stability and residual strength calculations are completed, the ETAS team can will report the results to the client, and advise the client of appropriate countermeasures, including the sequence for transferring/ offloading cargo and ballast water for salvage operations. After a successful salvage operation, the ETAS team will provide advice on stability at damage condition and residual longitudinal strength for the voyage to the repairyard.

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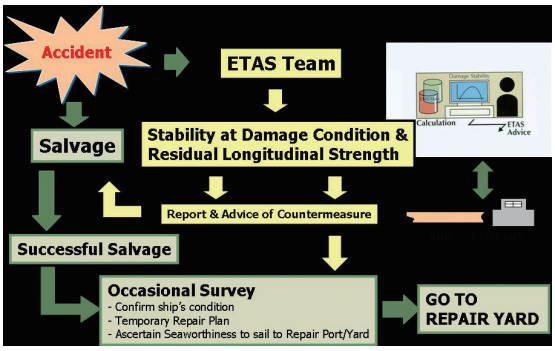
## 24 hours a day, 365 days a year

A special team composed of highly trained, expert surveyors and naval architects is on call to respond to client emergencies 24 hours a day, 365 days a year.




## "Shore-based Computer Programs" requirement of MARPOL 73/38 Annex I

PrimeShip-ETAS complies with the MARPOL 73/78 Annex I shore-based computer programs requirement for oil tankers of 5,000 tons deadweight and above, and the PrimeShip-ETAS address can be used as the contact address for the stability at damage and damage longitudinal strength assessments shown in SOPEP, as required by MARPOL 73/78 Annex I. PrimeShip-ETAS also complies with the OPA 90 vessel response plan requirement for oil tankers entering the territorial waters of the USA.

## Applicable to all types of ships

PrimeShip-ETAS is available for all types of ships, not just oil and chemical tankers. At present, more than 1,200 ships are registered for PrimeShip-ETAS, including bulk carriers, gas carriers, and other vessels.

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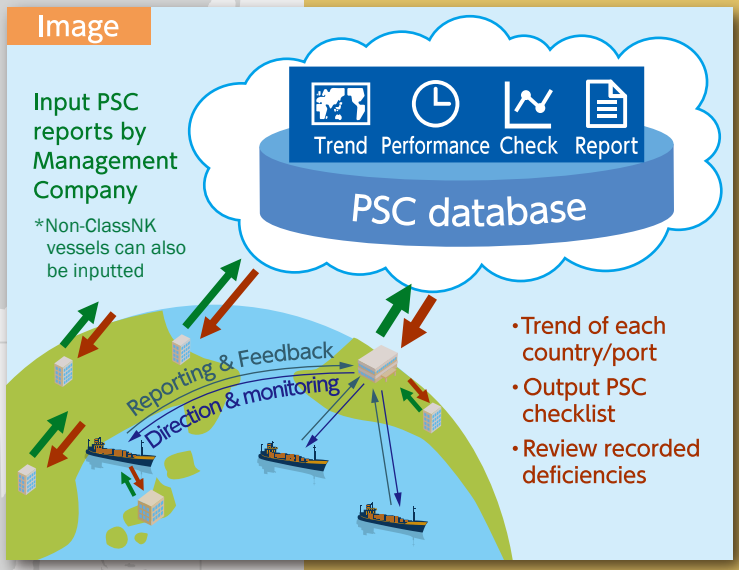
# PSC Intelligence

HULL
ENVIRONMENT
MACHINERY
OPERATION & MAINTENANCE

## Support System for PSC Performance Improvement




## Key Features

◆Easy visual checking of a trend in the number of detentions and deficiencies at each port or country on world-map with frequent deficiency examples

◆Output 1) PSC checklists for each port or country based on the trend and 2) a summary report for PSC performance of managing ships

◆Analysis of the trend of deficiencies recorded on managing ships on a real-time basis through the managing company's input of PSC reports

◆Easy registration for ships using a data link with NK-SHIPS

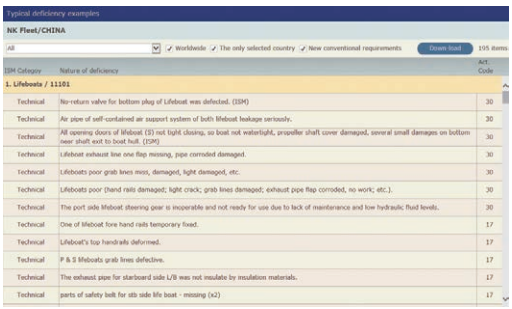
PrimeShip-PSC Intelligence is a support system for improvement of PSC performance as well as a ship management system providing: 1) trend analysis of deficiencies recorded at each port or country 2) output of PSC checklists for each port or country based on the trends 3) clarification and review of frequently recorded deficiencies for managing ships

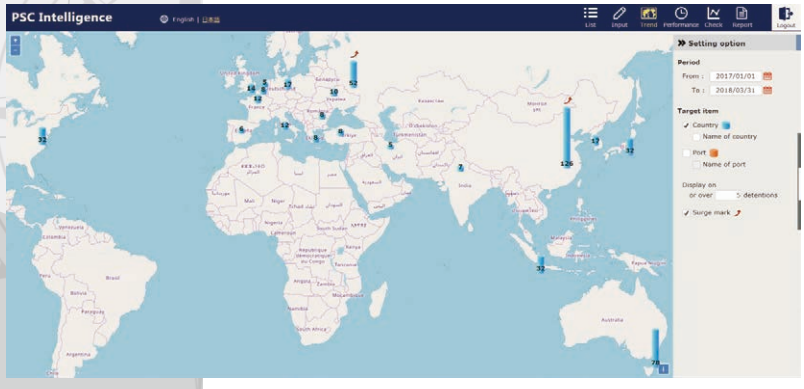
## Main Functions

### Research on the trends of ports and countries on world-map

◇Perceive a trend of detention numbers and recorded deficiencies

◇Perceive common deficiencies, particular deficiencies of each country/port and newly recorded deficiencies for new conventional requirements



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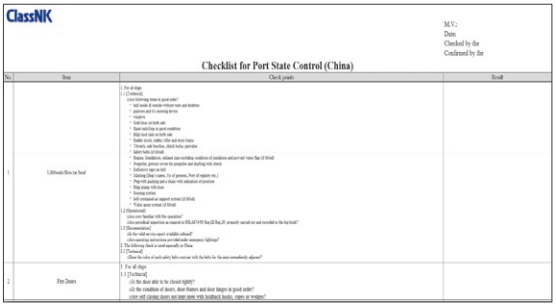
## Output PSC checklists for each port/country



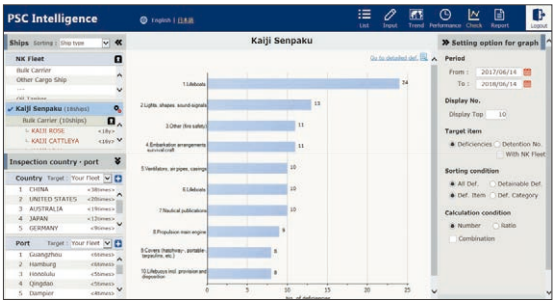

◇Checkpoints corresponding with PSC deficiencies

◇Output checklists based on the trends during a user-designated period

◇Output checklists based on trends focused on detainable deficiencies

◇Selectable numbers of checklist items by users

## Analysis of recorded deficiency trends

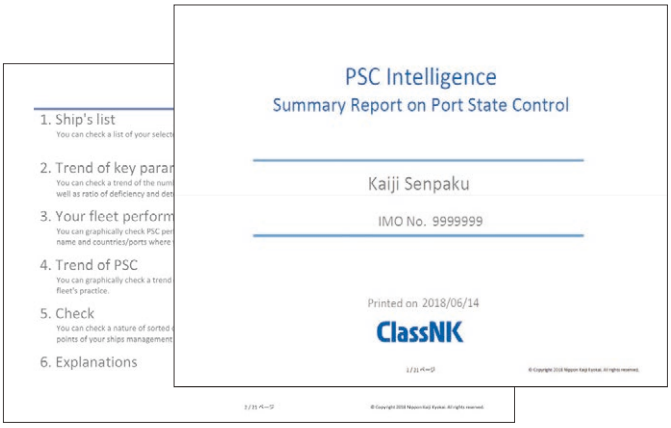



◇Easy review of ship management systems by checking the sorted deficiencies recorded in frequent order

◇Trend analysis of the combination of deficiency amounts or detention of multiple ships, countries and ports selected by users

◇Trend analysis focused on detainable deficiencies

## Summary report




◇Output a summary report for PSC performance, content of deficiencies frequently recorded on managing ships and in the trends of frequently visited ports or countries

## How to register

All ship managers/owners may use the service regardless of whether their vessel is of the ClassNK fleet. Please refer to our PSC Intelligence website for details.
(http://www.classnk.or.jp/hp/en/activities/portal/psc-Intelligence.html)

## PrimeShip-PSC Intelligence System requirements

| Browser | Software |
|---|---|
| Internet Explorer 10.0 or later<br>Google Chrome, Firefox | Microsoft Excel 2007 or later |

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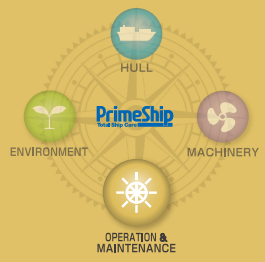
# CHEMISYS

## Integrated Database System for Chemical Products



## Key Features

**PrimeShip-CHEMISYS (Search & Data)**

- ◆Cargo suitability search system
- ◆Up-to-date information on ship COF status
- ◆Additional data services for Chemical Products

PrimeShip-CHEMISYS is a convenient and powerful tool for the design and operation of chemical carriers.

PrimeShip-CHEMISYS consists of two specialized applications. For designers, PrimeShip-CHEMISYS provides an easy search and reference system for determining chemical loading suitability. For owners, PrimeShip-CHEMISYS provides a tool to easily assess the present status of the ship and determine the loadability of potential cargoes.

## Main functions

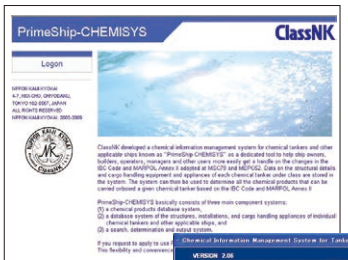
### PrimeShip-CHEMISYS

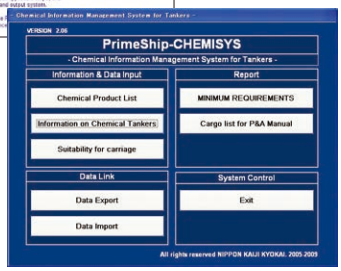
**Design Support System (for designers)**

◇Chemical cargo database system
◇Vessel database system (construction and installations)
◇Cargo Suitability Search System (compliance with IBC Code)

**Information Service (for owners)**

◇Ship Status/Cargo Loadability service accessible via the Internet

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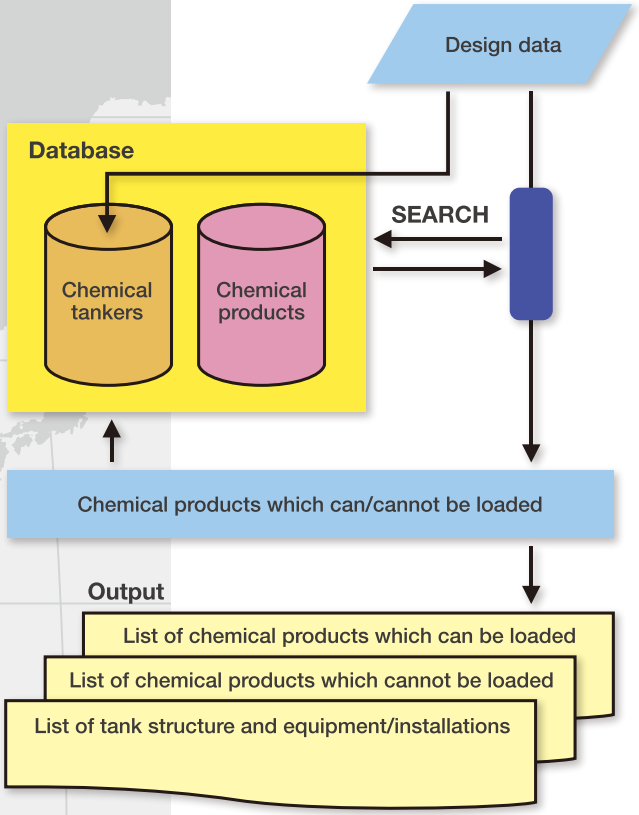
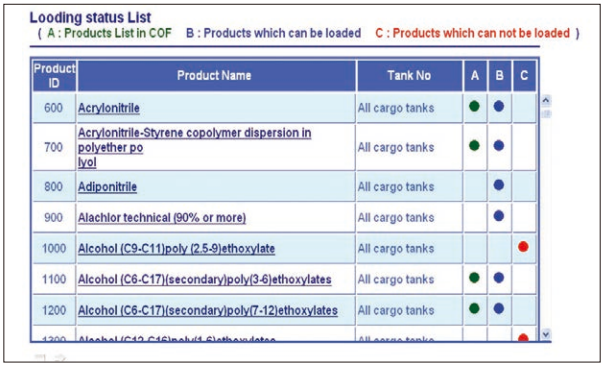
## Overview of Design Support System [for designers]




## Information Service - Cargo Loadability Service [for owners]

Ship List

Loading Status List




## Additional Data Services for Chemical Products

In addition to the above service, the PrimeShip-CHEMISYS website also provides users with reference data on the typical properties of a wide variety of chemical products.

## System requirements for use

■ CHEMISYS [Design Support System] : Microsoft Office Access 2010
■ CHEMISYS [Information Service] : Microsoft Internet Explorer ver.9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# CAP

## Condition Assessment Programme

## Key Features

- **Provides owners with a thorough understanding of the actual condition of their vessel**
- **Easy to understand vessel condition rating from level 1 (highest) to 4 (lowest), based on the results of an onboard inspection.**
- **Makes planning vessel maintenance easier and more efficient**

PrimeShip-CAP (Condition Assessment Program) is a quality assessment tool for certifying and documenting the condition of aging vessels that goes beyond the scope of regular classification & statutory regulations.

## Purpose & Benefits

◇Condition Assessment Programs (CAP) offered by reputable classification societies have become the standard methodology for assessing the condition of a ship's hull structures and PrimeShip-CAP meets the requirements of major oil charterers.

◇PrimeShip-CAP provides an independent evaluation of a ship's condition based on onboard inspections. Ships are provided with comprehensive reports and certificates, and given a rating from level 1 (highest) to 4 (lowest)

◇PrimeShip-CAP reports provide comprehensive descriptions, photos and analyses of necessary upgrades or repairs. Suggestions for further maintenance are also provided based on damage history and fatigue strength assessments.

◇A favorable PrimeShip-CAP rating level, e.g. CAP 1 or 2, provides objective evidence of good maintenance, a useful tool during charter negotiations.

Sample for Rating

No. 3 W.B.T. (S)

| Level: 2 | Sub Level | 1 | 2 | 3 | 4 | Photo Report No.H-19 |
|---|---|---|---|---|---|---|
| Structure | | | | | | |
| Overhead Deck | | ☐ | ☒ | ☐ | ☐ | See Note 1 |
| Side Shell | | ☐ | ☒ | ☐ | ☐ | See Note 2 |
| Bottom | | ☒ | ☐ | ☐ | ☐ | |
| Stringers | | ☒ | ☐ | ☐ | ☐ | |
| Bulkheads | | ☒ | ☐ | ☐ | ☐ | |
| Internals | | ☐ | ☒ | ☐ | ☐ | See Note 3 |
| Bottom Pitting | | ☒ | ☐ | ☐ | ☐ | |

Notes:
1. Coating Condition : Good with anodes (IACS rating level)
2. Cracked side shell Longitudinal SL41, SL42, SL43 at Fwd. T.Bhd. Fr.77 were cropped and renewed. Additional Brackets were fitted on Side shell Longitudinal, SL34 to 44, as reinforcement.
3. Wastage /Thin downed internal members were cropped and renewed as follows:
   a) Upper deck longitudinal face / web plates
   b) Side longitudinal face plates
   c) Slot openings / Web plates / Stiffeners / Brackets / Lightning holes on transverse rings and bulkheads.
   d) Stiffeners / Web plates / Lightning holes on vertical web (center girder)

As to detailed repair works, please refer to repair plan.

Reference H19

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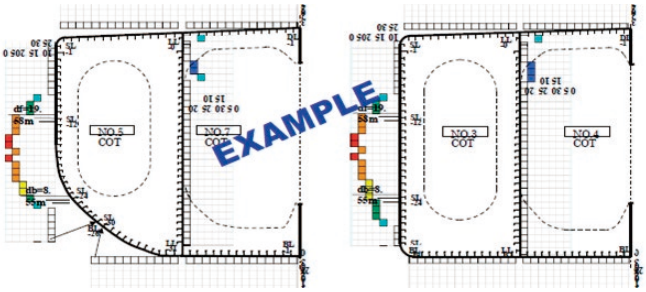
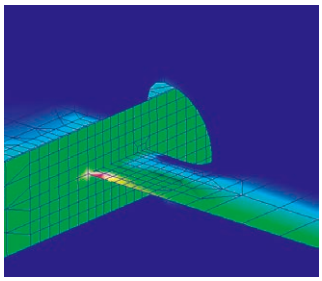
## Implementation

CAP ratings are given for each structural member in each hull compartment based on comprehensive visual inspection, thickness measurements, and hull longitudinal strength analysis. Overall ratings levels are based on the lowest rating level of any structural member.

### Visual inspection

Visual inspections are carried out based on fatigue strength assessments and thorough analysis of damage histories to ensure that critical areas are inspected thoroughly and effectively.

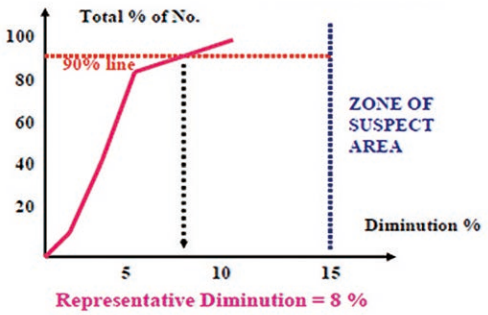


Reinforcement has been applied to critical points based on damage history & FSA results.

### UTM (Ultrasonic Thickness Measurement)

General wastage is evaluated via S-Curve based on thickness measurement with a 90% relative diminution distribution.
Hull longitudinal strength is evaluated by using actual thickness gauging data.




### Scope of application:

■PrimeShip-CAP covers the hull, machinery and cargo systems.
■PrimeShip-CAP is designed for older tankers and bulk carriers, but may be applied to any type of ship regardless of age.

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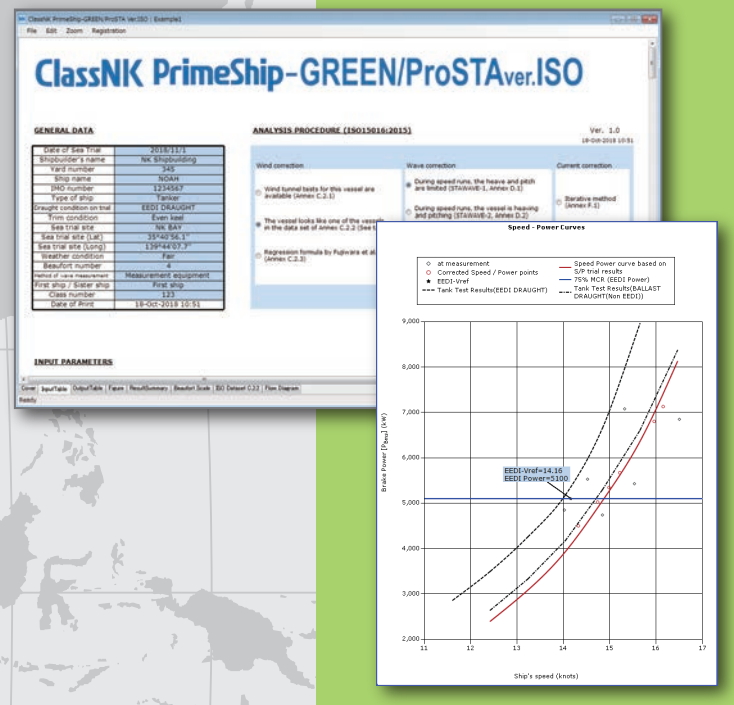
# GREEN / ProSTA ver.ISO

## Software for Progressive Speed Trial Analysis




## Key Features

- Speed-Power performance analysis of progressive speed trial in compliance with ISO 15016:2015
- User-friendly interface
- Transparent and easy-to-understand output
- Auto-generation of output results and figures for class approval

PrimeShip-GREEN/ProSTA ver.ISO is a software that allows users to analyze ship speed correction at progressive speed trials taking into account factors such as wind, current, wave, shallow water, displacement, water temperature and water density in compliance with ISO 15016:2015, and derive a ship speed for Energy Efficiency Design Index (EEDI) calculation.

## Structure of the software

### Input

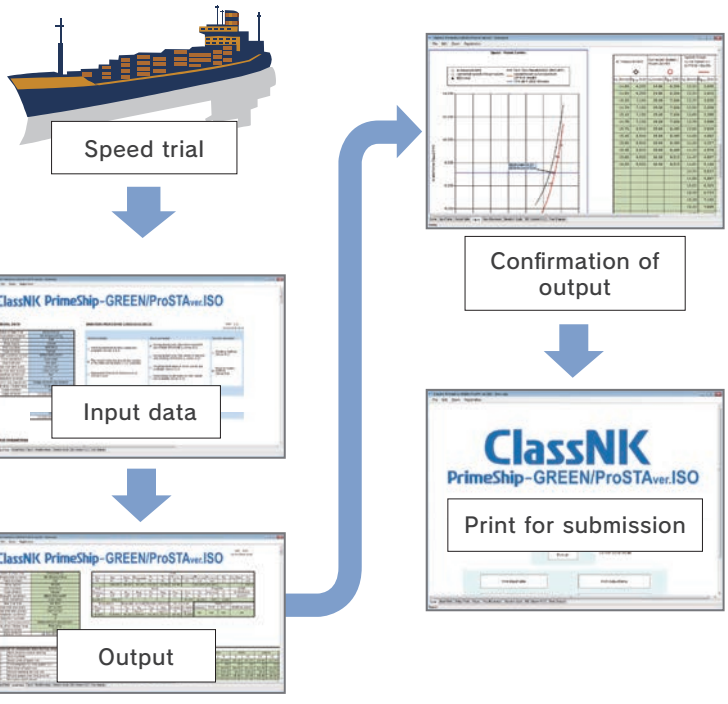
- ◇Ship's principal particular
- ◇Measured data on speed trial
- ◇Weather conditions
- ◇Self-propulsion factors, etc

### Analysis steps

- ◇Correction for resistance increased by wind, waves, water temperature and water density
- ◇Correction for current
- ◇Correction for displacement
- ◇Correction for shallow water

### Output

- ◇Calculation details
- ◇Current curve
- ◇Speed-rpm curve
- ◇Speed-power curve

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## Estimation of the reference ship speed (Vref)

◇The reference ship speed (Vref) required for EEDI calculation can be estimated on the basis of analysis results.

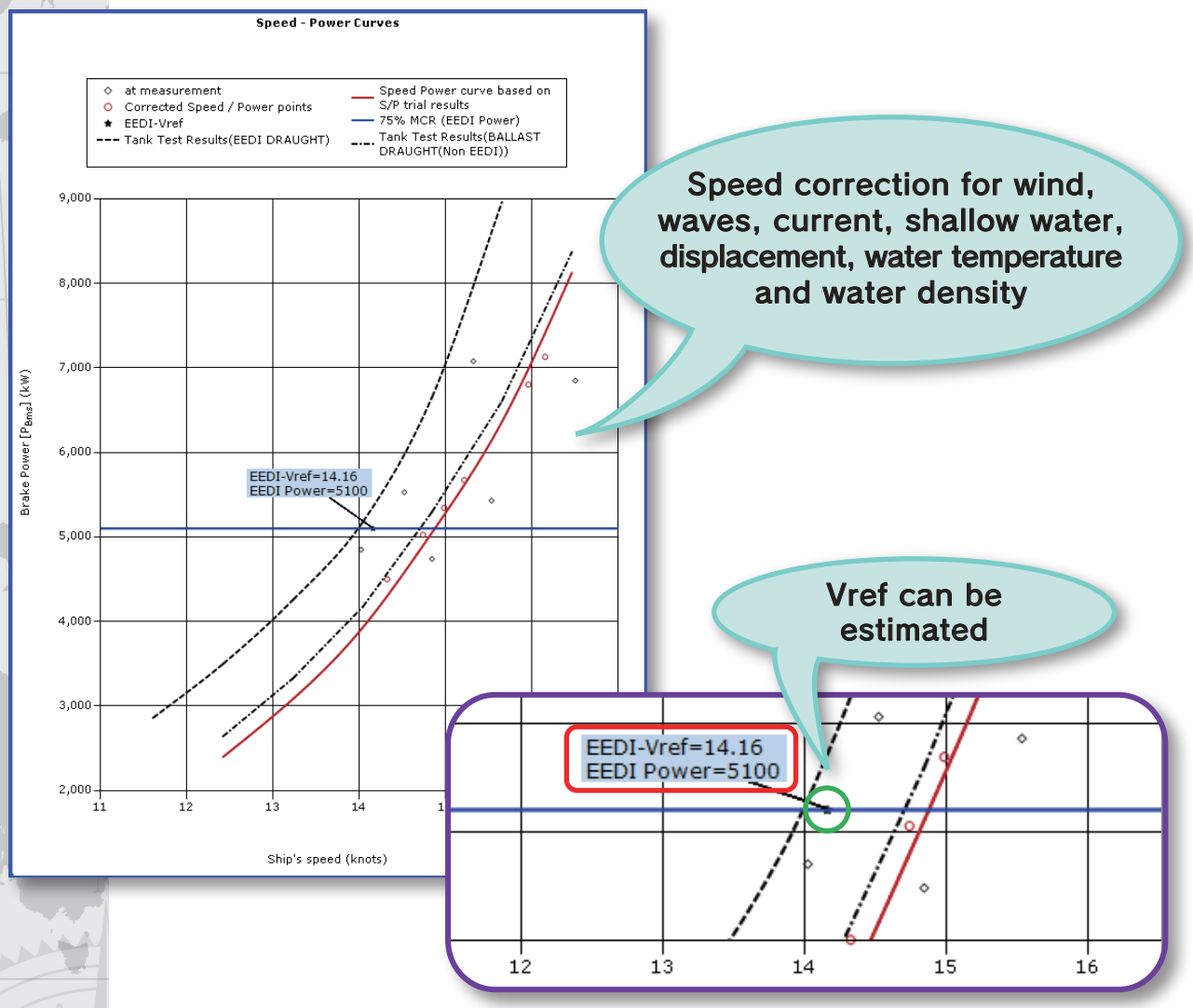
◇Vref is the ship speed in EEDI loaded condition* at 75%MCR assuming calm weather with no wind and no waves.

* EEDI loaded condition: 70%DWT for Container ships, summer full load draft for other types of ships.

◇For ships for which sea trial cannot be conducted under EEDI loaded condition, Vref is estimated by the following procedure:

①Power curves under EEDI loaded condition and sea trial condition should be determined by conducting tank tests.

②Vref should be adjusted taking into account the speed trial results.




## PrimeShip-GREEN/ProSTA system requirements

| Hardware requirement | Software requirements |
|---|---|
| Print function of Microsoft Windows | ・Windows 7 SP1 and above<br>・NET Framework 4.5.2 and above |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# GREEN / ProSTA ver.ITTC

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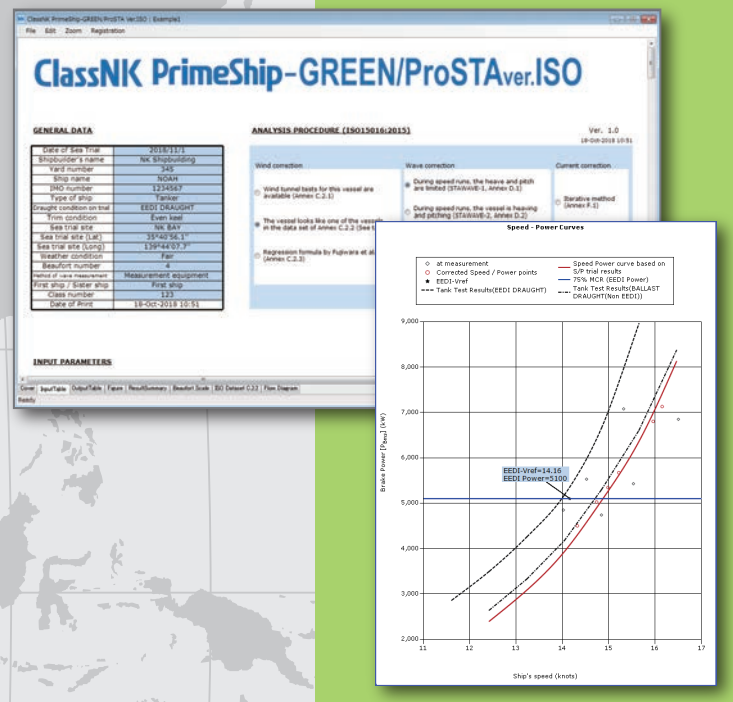
## Software for Progressive Speed Trial Analysis




## Key Features

- **Speed-Power performance analysis of progressive speed trial in compliance with ITTC 2017 Guidelines (ITTC Recommended Procedures and Guidelines 7.5-04-01-01.1 Preparation, Conduct and Analysis of Speed/Power Trials; 2017)**
- **User-friendly interface**
- **Transparent and easy-to-understand output**
- **Auto-generation of output results and figures for class approval**

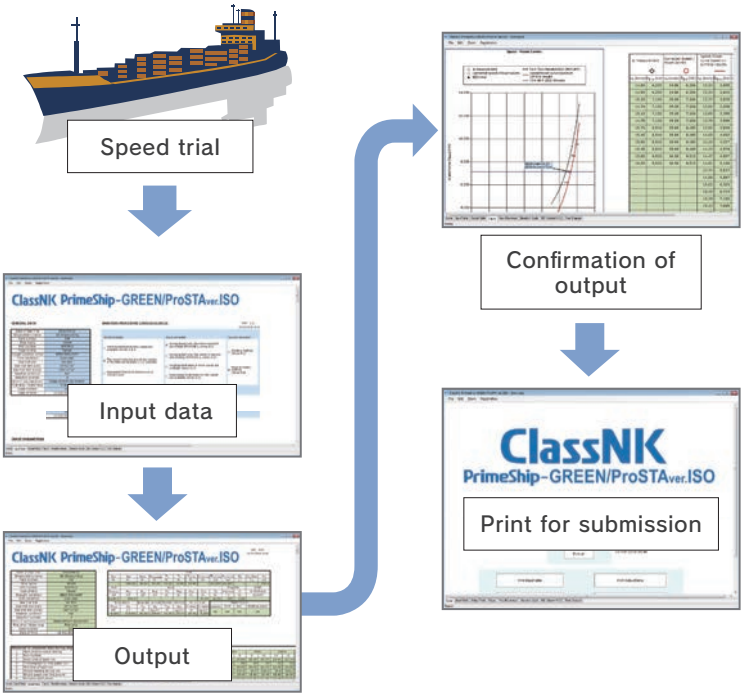
PrimeShip-GREEN/ProSTA ver.ITTC is a software that allows users to analyze ship speed correction at progressive speed trials taking into account factors such as wind, current, wave, shallow water, displacement, water temperature and water density in compliance with ITTC 2017 Guidelines, and derive a ship speed for Energy Efficiency Design Index (EEDI) calculation.

## Structure of the software

### Input
- ◇Ship's principal particular
- ◇Measured data on speed trial
- ◇Weather conditions
- ◇Self-propulsion factors, etc

### Analysis steps
- ◇Correction for resistance increased by wind, waves, water temperature and water density
- ◇Correction for current
- ◇Correction for displacement
- ◇Correction for shallow water

### Output
- ◇Calculation details
- ◇Current curve
- ◇Speed-rpm curve
- ◇Speed-power curve

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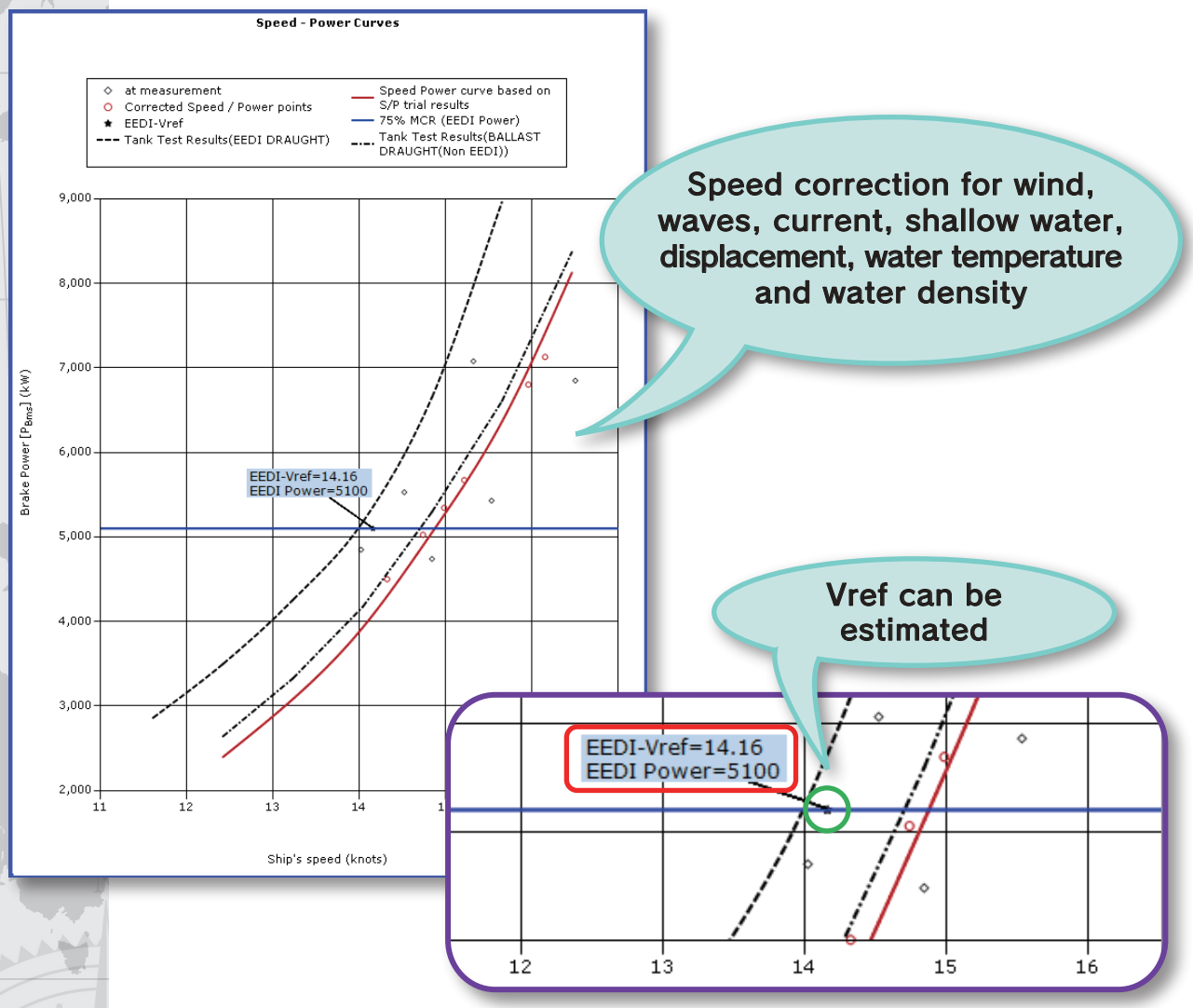


## PrimeShip-GREEN/ProSTA system requirements

| Hardware requirement | Software requirements |
|---|---|
| Print function of Microsoft Windows | ・Windows 7 SP1 and above<br>・NET Framework 4.5.2 and above |


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# GREEN / MinPower

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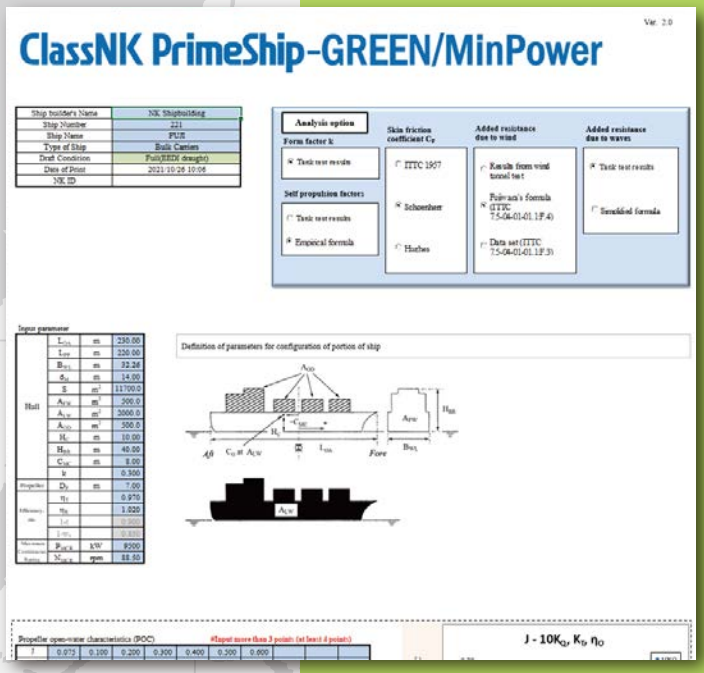
OPERATION & MAINTENANCE

## Software for Assessment of Minimum Propulsion Power




## Key Features

- ◆Easy to assess the minimum propulsion power to maintain the manoeuvrability in adverse conditions according to the "minimum propulsion power guidelines"
- ◆Stand-alone software base on Microsoft Excel
- ◆User-friendly interface
- ◆Auto-generation of output results and figures for class approval

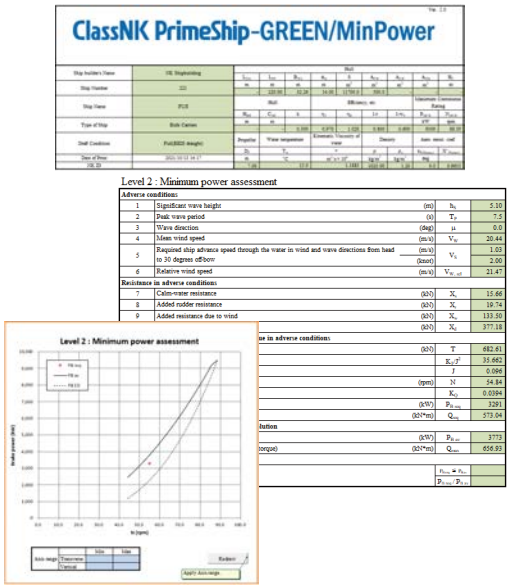
This software is intended to conduct assessments of required minimum propulsion power in adverse conditions for bulk carriers, tankers and combination carriers with the size of equal or more than 20,000DWT by means of methods defined in MEPC.1/Circ.850/Rev.3 of IMO " GUIDELINES FOR DETERMINNING MINIMUM PROPULSION POWER TO MAINTAIN THE MANOEUVRABILITY OF SHIP IN ADVERSE CONDITIONS".

## Main Functions

◇Assessment Level2 in the guidelines is available.

◇This assessment procedure is based on the assumption that, if the ship has sufficient installed power to move with a certain advance speed in head waves and wind, the ship will also be able to keep course in waves and wind from any other direction. It is necessary to input self-propulsion factors, aerodynamic resistance, added resistance, etc. for the assessment.

◇Easy to confirm the level of achievement since the assessment is conducted just at the point where the added resistance due to wind and waves is at maximum.

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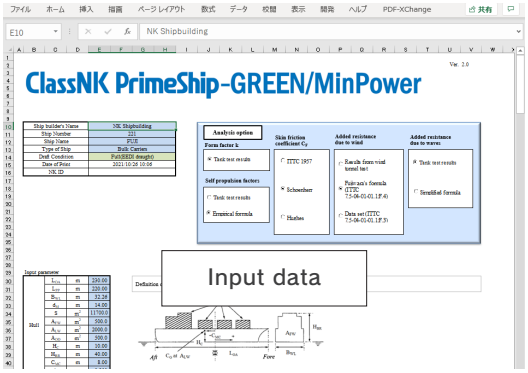
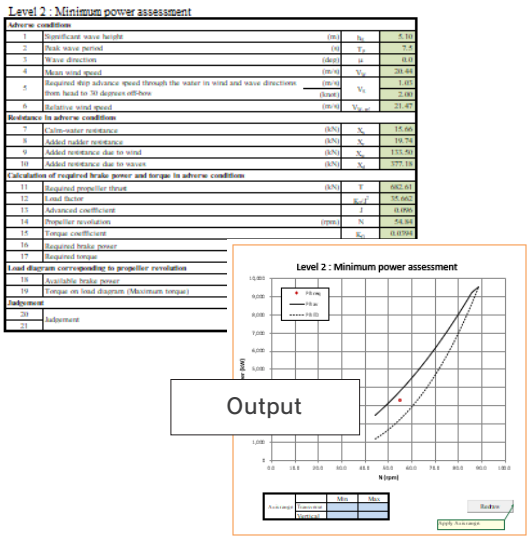
Total Ship Care

## Structure of the system



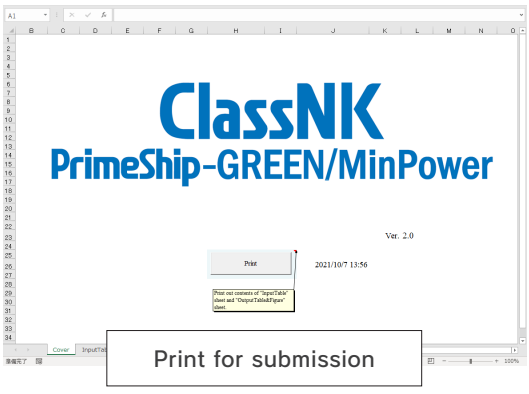

### Input

◇Ship's principal particulars
◇Self-propulsion factors
◇Frontal and side windage area of hull and superstructure
◇Propeller open water characteristics
◇Torque-speed limitation curve of the engine provided by the engine manufacturer
◇Added resistance in short-crested irregular waves, etc.




### Analysis options

There are selectable options below.
◇The self-propulsion factors
①Tank test results
②Empirical formula
◇For the added resistance due to wind
①Results from wind tunnel test
②Fujiwara's formula
(ITTC 7.5-04-01-01.1:F.4)
③ITTC data sets
(ITTC 7.5-04-01-01.1:F.3)
◇For the added resistance due to waves
①Tank test results
②Simplified formula




### Output

◇Results of the assessment for submission

## PrimeShip-GREEN/MinPower system requirements

| Hardware requirement | Software requirements |
|---|---|
| Print function of Microsoft Windows | OS : Windows 10 (64bit)<br>Office : Microsoft Excel 2016, 2019 (64bit, 32bit) |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# GREEN/ SRM

## Ship Recycling Management

### Key Features

**◆Inventory development software compliant with the Ship Recycling Convention* requirements**

**◆Exchange Material Declaration (MD) data electronically**

PrimeShip-GREEN/SRM is an essential software tool for the development of the Inventory of Hazardous Materials (IHM) required for all ships greater than 500GT by the Ship Recycling Convention adopted in May 2009.
PrimeShip-GREEN/SRM allows suppliers and shipbuilders to exchange information electronically to reduce paperwork related to IHM development.

In order to substitute the client/server based IHM development software: PrimeShip-INVENTORY, NK has developed the web-based software “PrimeShip-GREEN/SRM”. Utilizing cloud computing, PrimeShip-GREEN/SRM will certainly improve the productivity of users.

### 【For Suppliers】

PrimeShip-GREEN/SRM enables suppliers to consolidate the responses for shipbuilders’ requests to submit Material Declaration and Supplier’s Declaration of Conformity. In addition, suppliers can post their MD on MD Library so that the shipbuilders can find the MD by themselves.

### 【For Shipbuilders】

PrimeShip-GREEN/SRM allows shipbuilders to develop the IHM (Excel format) by requesting MD/SDoC to suppliers in the system and setting locations for MDs containing Hazardous Materials. PrimeShip-GREEN/SRM eliminates the need to post MD data and automatically calculates the amounts of Hazardous Materials at each location.

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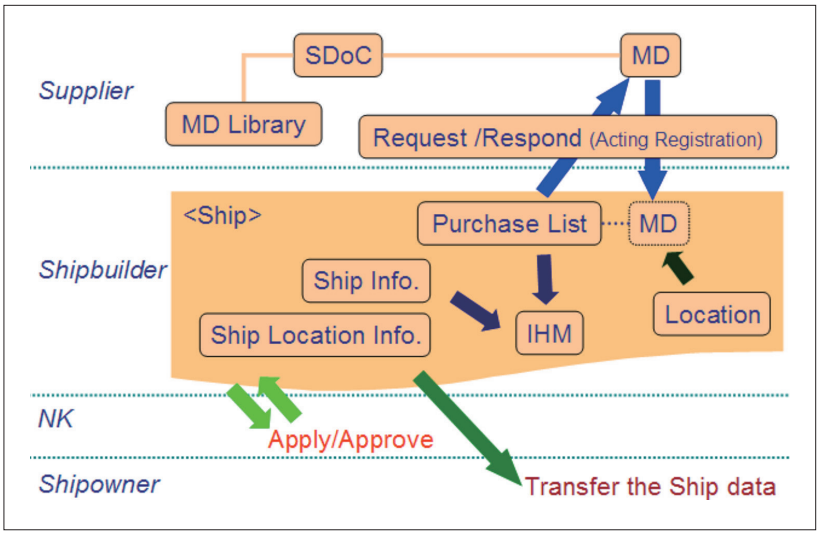
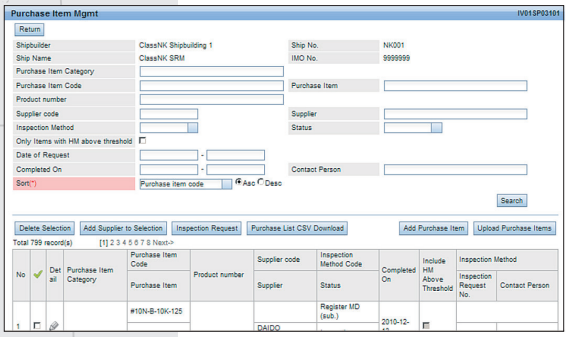
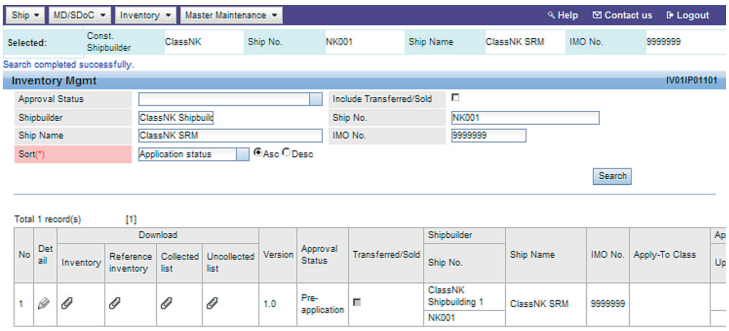
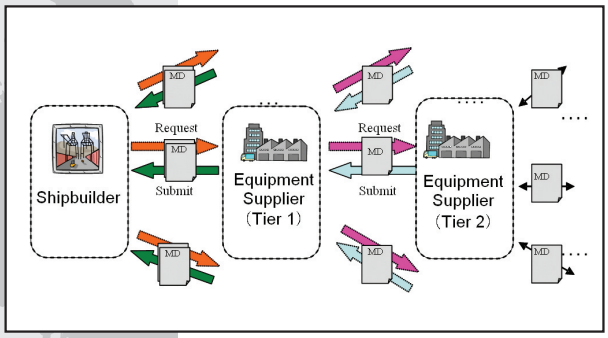
## Concept of PrimeShip-GREEN/SRM




## Screenshots




## Ship Recycling Convention

Ship Recycling Convention* was adopted by the IMO in May 2009. Once the convention enters into force, all ships 500GT and greater, excluding those scrapped or recycled in their flag states, will be required to carry an Inventory of Hazardous Materials on board the ship.

## IHM Development for New Ships

Shipbuilders develop an Inventory by the following steps:

<Step 1> Record submitted Material Declaration (MD) and Supplier's Declaration of Conformity (SDoC) for all procured products.

<Step 2> Screen all products containing Hazardous Materials above the threshold levels.

<Step 3> Identify the location of these products and calculate the amounts of Hazardous Materials at each location.

<Step 4> Prepare properly formatted Inventory.

## Access to PrimeShip-GREEN/SRM

The requirement for using PrimeShip-GREEN/SRM is a web browser.
Please access the following top page for user registration.

https://www.psgreensrm.com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