



Nauticus Machinery

for marine propulsion design and analysis

DNV Software

Safe and reliable operations at sea

Bridging the gap between shaft theory and reality



DNV has a strong tradition of involvement in the development of design-verification methodology and acceptance criteria for shafting systems for ship propulsion. This activity is a consequence of DNV's main objectives: to assure safe and reliable operation at sea. DNV has done extensive research bridging the gap between shaft design theory and reality.

Technical expertise makes better software

Nauticus Machinery is developed in close cooperation with DNV technical experts and with other major users with extensive knowledge of marine propulsion systems. The software package benefits from continuous improvements based on the latest results from R&D projects and damage experience.

Hull flexibility

Shaft alignment has in recent years become more of a challenge due to increased power, lower shaft speeds and heavier propellers in combination with a shorter propulsion shaft. Consequently, these effects should be carefully considered when designing an optimal shaft line in order to avoid problems in operation.

Shaft alignment challenges

Proper shaft alignment analyses during the design phase help to avoid both delays in delivery and alignment problems in operation, thereby reducing expensive off-hire. DNV has experience from several research projects studying the interaction between hull deflections and the shaft line. DNV has in-house multidisciplinary technical knowledge and experience and is therefore a preferred active partner for finding the underlying reason for damage caused by shaft alignment and for providing assistance in shaft design.

Shaft Alignment

Shaft Alignment provides efficient methods to build a shaft model and analyze bearing loads, bending moments, deflections and more. It also provides customised verification results such as hydraulic jacking curves and gap/sag values in flanged connections. Whirling and axial vibration analysis is also covered.

Torsional Vibration

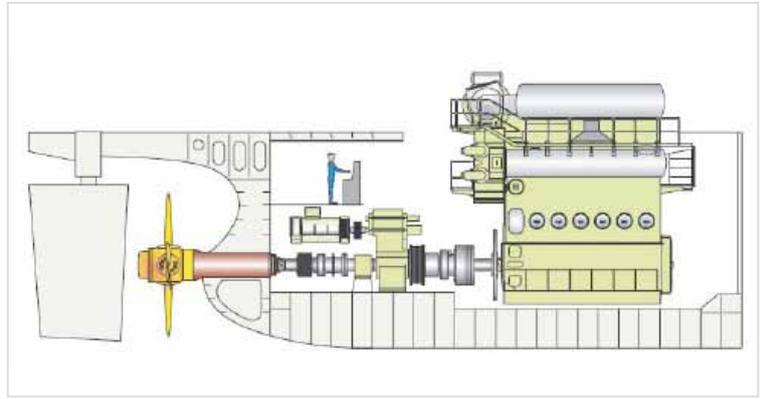
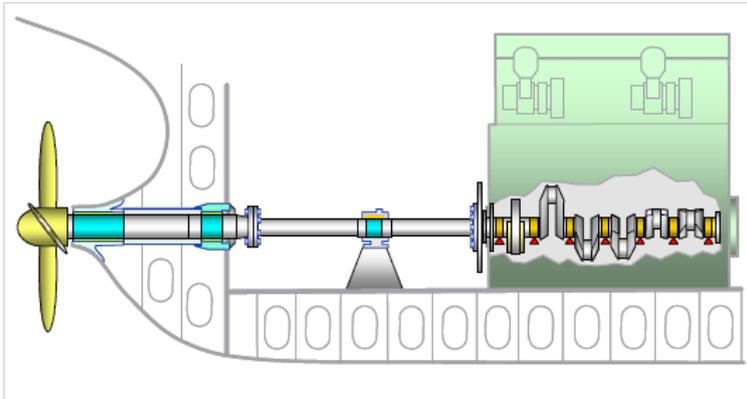
Torsional Vibration is a state-of-the-art tool for analysis of steady-state vibratory levels in all kinds of marine propulsion systems (diesel, electric, gas or steam powered). It contains a powerful mass-elastic modeller, scripting functions and advanced charting and reporting.

“The Nauticus Machinery Shaft Alignment software was an easy choice for us. We have found it the most user-friendly and effective analysing tool for alignment and natural whirling on the market.”

Andreas Malmkvist, Contract Management, Shaft Analysis, Kamewa Products, Rolls-Royce AB

Propulsion design and analysis

For fatigue, strength and vibration analysis in marine propulsion systems



Shaft Fatigue

Shaft Fatigue is a rule based calculation tool for validation of fatigue life and safety factors in steel shafts according to IACS and DNV Rules. The tool calculates the maximum stress limits for high, low and transient cycle fatigue which can be applied as acceptance criteria check in Nauticus Torsional Vibration.

Gear Faceload and Gear Rating

Gear Faceload evaluates the face load factor for parallel axis spur and helical gears based on the graphical method (iterative analytical method) outlined in DNV Classification Note 41.2. The face load factor takes into account the effects of the non-uniform load distribution across the gear face width on the surface stress. Nauticus Gear Rating is intended for cylindrical and bevel gears. The calculation procedures cover gear rating as limited by contact stresses, tooth root stresses and scuffing resistance.

Crankshaft Fatigue

Crankshaft Fatigue is a rule based calculation tool for calculation of safety against fatigue failure in pin and journal fillets and in oil bores, as well as safety against slippage for semi built crankshafts. The calculations methods are according to IACS and DNV Rules.

Project Manager and collaboration

Nauticus Machinery contains an easy-to-use Project Manager which acts as the common entry point to all the available calculation tools in the package. It provides a scalable deployment model where users can install the calculation tools and database on the same physical computer, or work towards a central/remote database. With the Project Manager in Nauticus Machinery, it is easy to organise calculations, notes, spreadsheets and attachments in one common user interface. In-house spreadsheets and tools can easily be integrated in the Tool Library which provides a simple role-authentication and revision control for your calculation tools.

User conferences and seminars

DNV Software offers numerous software conferences and seminars worldwide. Users and potential users can gain insight, not only in the applications we offer, but also into future trends. The conferences and seminars provide us with a unique opportunity to communicate with other users, and to receive valuable feedback. Our goal is to make sure that the participants learn about efficient use of our products and develop competence.

The conferences and seminars will typically include presentations of new releases, case sharings, customer studies, and hands-on workshops.

Oslo
Det Norske Veritas AS
DNV Software
NO-1322 Høvik
Norway
Tel: +47 67 57 99 00
Fax: +47 67 57 99 11

e-mail: dnv.software@dnv.com
web: www.dnvsoftware.com

DNV Software regional offices:

Beijing
7/F, East Tower Prosper Centre,
Chaoyang District
No. 5 Guang Hua Road
Beijing 100020
P.R. China
Tel: +86 10 6562 7792
Fax: +86 10 656276666

Busan
7th Floor, Kolong Bldg, 36-7
Namcheon 1 Dong, Suyong Gu,
Busan
613-815
Republic of Korea
Tel: +82-51-610-7792
Fax: +82-51-611-7154

Dubai
Bur Juman Office Tower,
14th Floor, Trade Center Road,
Dubai,
United Arab Emirates
Tel: +971 4 352 6626 Ext 308
Fax: +971 4 352 3717

Houston
1400 Ravello Drive,
Katy
Houston, Texas 77449
USA
Tel: +1 281 396 1700
Fax: +1 281 396 1880

London
Palace House
3 Cathedral Street
London SE1 9DE
United Kingdom
Tel: +44 (0)20 7716 6525
Fax: +44 (0)20 7716 6738

Mumbai
Emgeen Chambers
10, C.S.T. Road
Vidyanagari, Kalina
Santacruz (East).
Mumbai 400098
India
Tel: +91 22 26676667
Fax: +91 22 266 56102

Rio de Janeiro
Rua Sete de Setembro
111/12 Floor
20050006 Rio de Janeiro
Brazil
Tel: +55 21 3722 7232
Fax: +55 21 3722 7572

Shanghai
House No. 36
1591 Hong Qiao Road
Shanghai 200336
P.R. China
Tel: +86 21 3208 4518
Fax: +86 21 6219 5107

Singapore
DNV Technology Centre
10 Science Park Drive
Singapore 118224
Singapore
Tel: +65 6508 3284
Fax: +65 6779 7949

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