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NAVAL VESSELS AND DEFENCE TECHNOLOGY

2010051239

Application of sandwich panel in anti-shock design of warship's side structure.

Shipbuilding of China, v 50 n 4, Dec 2009, p 36 [9 p, 20 ref, 9 fig]

Zhang, Y-c., Wang, Z-l., Et al

Chinese

Resisting the shock wave impact of underwater explosions is an important aspect of warship survivability. Triangle Folded Sandwich Panel (TFSP) and Square Honeycomb Sandwich Panel (SHSP) are applied in the double bottom structures of warships. The numerical method of three-cargo finite model is used to do numerical analysis for traditional, TFSP and SHSP side structures respectively under underwater non-contact explosion. The dynamic responses including fluid-structure interaction forces, deformation, energy absorption, acceleration and velocity are calculated by MSC.Dytran and compared. The results show that the sandwich panels used in warship bottom structures can reduce displacement and add energy absorption, at same time significantly improving the shock environment. The sandwich panel side structure is a protective structure with excellent anti-shock performance. Sandwich panels have higher energy absorption efficiency. The core structure of sandwich panels play an important role in reducing the deformation, fluid-structure force and impulse momentum.

Naval vessels

Sandwich panels

Shock waves

2010051240

A naval perspective on ship stability.

STAB 2009, 10th Intl Conf on Stability of Ships and Ocean Vehicles; 22-26 June 2009; St Petersburg, Russia. Procs. p 21 [24 p, 65 ref, 2 tab, 13 fig]

Reed, A.M.

English

From a naval perspective, three areas have been identified as critical for examining the performance of vessels in extreme seas: the physics of large-amplitude motions; verification, validation and accreditation (VV&A) of tools for these conditions; and performance-based criteria. In the physics of large-amplitude motions, three topics are most important: hydrodynamic forces, manoeuvring in waves, and large-amplitude roll damping. In the VV&A arena, the challenge remains for performing this function for extreme seas conditions, where linear concepts such as response amplitude operators are not applicable. The challenge

of performance-based criteria results from the fact that it is on the leading edge of our knowledge base.

Naval vessels

Ship motions

Stability

2010051241

Stability criteria evaluation and performance based criteria development for damaged naval vessels.

STAB 2009, 10th Intl Conf on Stability of Ships and Ocean Vehicles; 22-26 June 2009; St Petersburg, Russia. Procs. p 155 [16 p, 19 ref, 17 fig]

Peters, A.J., Wing, D.

English

The current quasi-static damage stability criteria used by the UK MoD are largely based on the Sarchin and Goldberg work published in 1962. These criteria ensure a level of stability performance after damage. Like the intact stability criteria, the inherent level of safety in these criteria and the link to the dynamic performance of the vessel in waves is little known. A methodology has been developed to evaluate the dynamic stability performance of naval vessels after damage. The evaluation of the current criteria has been performed using a large number of time-domain ship motion simulations using a computer program capable of simulating a damaged vessel with subsequent water ingress and flooding. This gives an insight into the level of safety inherent in the current damage stability standards. A selection of damage cases were conducted using a frigate hull form with geometric variations made to the internal subdivision. A range of loading conditions from those passing the current criteria through to those failing in each of the geometric damage case variations were systematically assessed in a range of wave conditions representative of post-damage sea states. The results from the dynamic study were then compared to the current damage stability criteria terms to identify how the current criteria relate to the dynamic damage performance in waves.

Naval vessels

Stability

2010051242

Accidental damage templates (ADTS). A basis for the future of naval ship safety certification?

STAB 2009, 10th Intl Conf on Stability of Ships and Ocean Vehicles; 22-26 June 2009; St Petersburg, Russia. Procs. p 229 [6 p, 3 ref, 3 tab, 4 fig]

Smith, D., Heywood, M.

English

The stability standard used for UK Ministry of Defence shipping activities is based upon Sarchin and Goldberg (1962) and it does not distinguish between what can be considered the capability to withstand hostile damage and a minimum level to safeguard against typical merchant shipping accidents. Furthermore there is not a robust link between residual stability and strength following damage. This paper gives discussion of the methodology proposed and assumptions made in order to determine accidental damage extents for naval ships based on experience by merchant ships.

Damage
Naval vessels
Stability

2010051243

Application of dynamic V-lines to naval vessels.

STAB 2009, 10th Intl Conf on Stability of Ships and Ocean Vehicles; 22-26 June 2009; St Petersburg, Russia. Procs. p 235 [10 p, 3 ref, 5 tab, 8 fig]

Heywood, M., Smith, D.

English

Damage stability criteria for UK naval warships include a dynamic allowance for heave and roll in the damage condition. These allowances have been included in the criteria as a prescribed value. The values for this allowance are based on Sarchin and Goldberg's work. Advances in time-domain simulation have allowed dynamic modelling of damaged vessel motion to be investigated. This paper reports on work undertaken to establish a new dynamic standard for UK naval ships. The paper also defines a methodology for undertaking an assessment of the vessel to ensure compliance with the new dynamic standard.

Damage stability
Naval vessels

2010051244

The research on the flooding time and stability parameter of the warship after compartments damage.

STAB 2009, 10th Intl Conf on Stability of Ships and Ocean Vehicles; 22-26 June 2009; St Petersburg, Russia. Procs. p 253 [8 p, 12 ref, 10 fig]

Mironiuk, W.

English

A short description of Polish warship accidents and damage between 1985-2004 is presented in the paper. The flooding time of the damaged compartments and stability parameters are one of the basic parameters which have an influence on the rescue action. Knowledge of the compartments flooding time and a metacentric height are very important for the commanding officer making decisions while

fighting for survival of the ship. A computational method was designed to provide information about possibility of calculation the flooding time of damaged watertight compartments. An analysis of the calculated results is made and described. On the basis of the built computer program, a simulation of the flooding process of the damaged compartment of ship type 888 is shown. The next part of the research was carried out on the laboratory stand bed where the flooding time of damaged compartment of the warship model was measured. Results of both calculations and measurements are compared in the paper. Results received from research can provide basic information to make a decision to carry out proper action of damage control.

Damage stability
Flooding
Naval vessels

2010051245

Enabling the virtual navy enterprise.

SNAME Annual Meeting; 21-23 Oct 2009; Providence, Rhode Island, US. Ppr P18 [14 p, 13 ref, 9 fig]

Briggs, T., Carpenter, T., Et al

English

The Virtual Navy Enterprise encompasses those Navy organisations, shipbuilders, integrators, and suppliers necessary to provide life cycle support for the fleet. The efficiency of this virtual enterprise is typically hampered by lack of interoperability and effective data exchange. This is particularly true for activities, such as ship alterations, that involve several different organisations. The paper discusses the development of a technical approach that fosters interoperability across the Virtual Navy Enterprise. A key result was the ability to automate identification of change impacts to technical publications; reducing the costs to evaluate changes and supporting cost benefit analysis and design trade studies. A demonstration of this approach was conducted for a ship alteration resulting from a vendor change to the radar oscillator.

Cooperation
Data
Naval vessels

2010051246

The befits and cost impact of aluminium naval ship structure.

SNAME Annual Meeting; 21-23 Oct 2009; Providence, Rhode Island, US. Ppr 41 [14 p, 14 ref, 9 tab, 7 fig]

Lamb, T., Beavers, N., Et al

English

Due to budget pressure and a growing diversity of mission requirements, the US Navy is in need of affordable and operation flexible ships. This paper presents an acquisition and total-life cycle cost comparison of steel and aluminium equivalent naval ship designs. A common perception is that aluminium ships cost significantly more than steel ships. This paper illustrates that even though the cost of the equivalent aluminium ship structure is 40% more than the steel structure, the equivalent aluminium naval ship can be built within just 7.5% of the acquisition price of the steel ship. This is possible because of the cascading benefits of the aluminium ship's significantly lighter weight. Advances in aluminium technology and new facilities in the shipyards for aluminium production are further improving the acquisition cost of aluminium ship. From a total life-cycle cost perspective, aluminium ships enjoy a clear advantage over steel ships, the details of which are provided in this paper. Based on the findings presented in the paper it is suggested that the US Navy should consider broadening its use of aluminium ships.

Aluminium
Cost benefit analysis
Naval vessels

2010051247

Performing detailed design reviews of a US Navy surface combatant within an integrated data environment.

SNAME Annual Meeting; 21-23 Oct 2009; Providence, Rhode Island, US. Ppr P6 [11 p, 7 ref, 7 fig]

Grogan, G.R., Borthen, J.L.

English

Between November 2006 and March 2009, the US Navy's first ZUMWALT class Guided Missile Destroyer, DDG 1000, underwent detailed design. According to a Government Accountability Office shipbuilding study in 2005, late changes to a ship's design is recognised as the primary factor contributing to increasing ship construction costs. Therefore a strict detailed design review process was implemented for DDG 1000 that included improved computer aided design tools and more efficient communication methods than previous ship detailed design efforts. The actual benefit of the design reviews of the ZUMWALT Class will not truly be known until after the Lead Ship has been commissioned, however, the design reviews, along with the unprecedented involvement by stakeholders via an Integrated Data Environment, have already proved to be an effective means for reducing the probability that setbacks will be encountered at the waterfront.

Naval vessels
Ship design

2010051248

NSRP-US Navy initiatives to reduce the costs of painting Navy ships.

SNAME Annual Meeting; 21-23 Oct 2009; Providence, Rhode Island, US. Ppr P14 [5 p, 5 ref, 1 fig]

Ault, J.P., Cogswell, S.

English

The paper discusses how the US Navy and NSRP SP-3 panel are working together to reduce the cost of painting Navy ships. In addition to describing the various entities and how they interact, the paper summarises several recent initiatives such as the acceptability of flash rust on hydroblasted surfaces, implementation of single coat tank coatings, retention of pre-construction primers, humidity control during tank painting and paperless QA processes.

Coatings

Naval vessels

Surface preparation