

INTEGRATED SOFTWARE APPLICATION FOR E-APPROVAL OF SHIP & OFFSHORE CLASSIFICATION

T Indrawan and T Firmandha, Biro Klasifikasi Indonesia, Indonesia

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SUMMARY

BIRO KLASIFIKASI INDONESIA (BKI) is a state-owned classification society that develops and maintains technical rules and regulations for the construction and operation of ships as well as the offshore structures. One of the main business activities is the plan approval for both new-building design and existing. The plan approval was conducted by using conventional and manual method which focused on the hardcopies storage and exchange system. Consequently, it is consuming a lot of time and huge document's storage spaces in the office is needed. DEWARUCI software was developed by BKI-R&D and introduced as an electronic-based plan approval in order to overcome those challenges. The electronic plan approval processes through Dewaruci indicates process time shortened compared with the conventional means, thus make it more effective and efficient. To support the system, Dewaruci is equipped with a set of technical calculation application system and proved to be able to integrate data amongst clients (i.e. between field surveyor and technical surveyor) as well as between client and DCC server (Dewaruci Control Centre). Moreover, Dewaruci provides verification and validation of the data from the client's computer. Further these data will be collected and used as a data bank in the DCC server.

1. BKI PLAN APPROVAL REVIEW

Classification of Ship and Offshore structure activities has been done by Biro Klasifikasi Indonesia since 1st July 1964.

The core of classification activities is classifying ship or offshore structure based on its dedicated function and the area of its operation, which includes verifying the satisfaction of Hull construction, Machinery and Electrical equipment, Statutory and Load lines matters

Routes towards ship satisfaction verification is started from Design Plan Approval which is submitted in hardcopies to BKI Branch Office and then those documents will be sent to Company Technical Approve section such as Hull Division, Statutory, Load lines and Cargo Gear Division and also Machinery & Electrical Division in order to having calculation assessment according to applicable Rules to date

Since 90's, BKI have been employed many commercial technical application aid to do various thing of assessment. However, those condition was raised several issues and problems as follows:

1(a) Commercial Software

- Large amount of License fee which paid annually
- Commercial software tends to be inflexible and will be outdated to following development of international marine regulations each year

1(b) Calculation with MS Excel

- Less interesting interface and less capabilities to carry on huge scales of calculation
- Unrecorded verification process and validation and should be updated each time there is a change in International Maritime Regulations

Other than above mentioned problems, all application that have been used is considered a *standalone* application hence all files and records of assessment rather than stored nice and properly in Company database, is distributed in each engineer's workstation instead. This will results as a serious issue if, someday, those past data is required as an evidence.

Important Notes of Safety Factor:

Commonly unsighted, that secrecy and security of data was often disregarded when we used commercial software application where in most situation those documents is highly confidential. Therefore, data security concept needs to be clearly designed where it is appropriate to implement without disturbing customer satisfaction.

2. DEVELOPMENT METHOD

With regards to increasing efficiency and covering all the gaps from previous system which had been discussed briefly earlier, new system had been created with various development stages as follows:

2 (a) Engineering Proses

This process will includes data collection and calculation tracking, system architecture planning also code programming. The source of data collection will made

from:

- Ship Hull Structural Module, according to BKI Rules Pt.1, Vol. II, Rules for Hull – 2013
- Machinery Module according to BKI Rules Pt.1, Vol. III, Rules for Machinery Installations-2013
- Statutory and Loadlines Module according to ILLC '66 and Ministry of Transportation Regulation No. KM. 3 – 2005 about Freeboard and IMO MEPC 245(66) for EEDI verification.

2 (b) Application Tools Development

Application base design architecture becomes the early stage of software development, where modular concept application being used in order to having easier further development. Modular concept will be implemented by define a function with similar type and specification which further will be classified into each separate module that can be combined later by main application.

2 (c) Gap engineering concept

Gap engineering concept is categorized into 2 sections:

- Gap which emanate as application error in certain condition such as memory jump, improper output variable, etc.
- Gap that came as a difference between calculation algorithm result and manual validation from engineer/user

2 (d) Test and Validation

Testing and validation will be carried out in parallel with application development and program arrangement, which followed by engineer assessment and validation from related division/user

2 (e) Optimization

This process will be carried out after completing all assessment and all modules has been running properly, where the settling time for certain process is considered not fast enough. In this case, the algorithm will be modified until the desired settling time have been achieved.

3. DEWARUCI

Development foundation of technical application DEWARUCI is to build centralized networking system, which means concentration of all data information input about ship characteristic, related documents, and drawings wherein its structural valuation standard will be accessed and transferred into sort of database server.

This process will be followed by calculation assessment which carried out by technical division (Hull, Electrical & Machinery, Statutory & Loadlines). The evaluation result then will be stored in Server Database.

Output value of this system is a proper file management, easy tracking of past evaluation history, and simplicity in monitoring and control of each registered vessel status. For more detail, please refer to Figure 1.

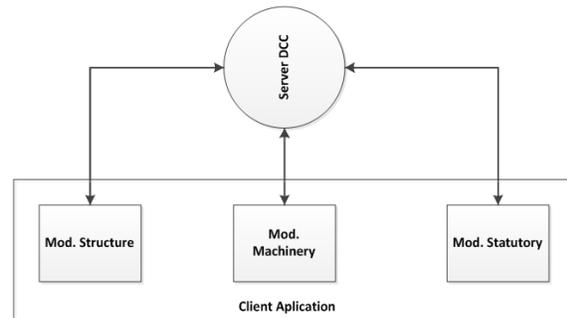


Figure 1

3.1 Module Development

In order to properly address the needs of calculation assessment, therefore the application will be developed generally in three Main section, namely Structural, Machinery & Electrical and Statutory & Loadlines Modules with set of job scheme as follows:

Structural Module:

- Plate thickness, Modulus & shear area Profile
- Longitudinal strength, minimum Midship section modulus
- Deck load, modulus calculation, equipment number.
- Etc.

Machinery & Electrical Modules:

- Main Shafting & gearbox & steering
- Propeller
- Piping system, valve, fitting and pump
- Fire protection and fire extinguishing equipment

Statutory & Loadlines Modules:

- Load line ILLC 66
- Load line ILLC P88
- Load line KM.3 2005
- Load line NCVS
- NCVS Indonesia (Non-Convention Vessel Standard)
- EEDI IMO MEPC 245(66)

3.2 DCC application development

DCC (Dewaruci Control Centre) is a system which consists of centered application that includes client application and server. Application server originated as an

application which is embedded inside centralized server that having a role to controlling client application and also functioned as process data transfer bridge from one client to another and for other computer policies.

DCC also carried out archives storage from various evaluation process as an evidence of plan approval that continuously stick into concerned vessel register. All of plan approval process will be integrated with COPs (Classification Operation System). COPs system itself is a previous developed system which handling classification activities from job request up to classification service delivery. Therefore with combination of COPs and DCC, the administration process will be shortened because evaluation result data from plan approval process will be passed directly inter server at classification database

3.3 Beneficial Impact from centralized database

By centralized all the data and processed by DCC, there will be several acquired benefits as follows:

- Much secured data reliability, because the system is already provided by DRC (Disaster Recovery Center), that enables much easier troubleshooting caused by hardware malfunction or natural disaster.
- Enhanced data security level, because the data will be saved in a special server with proper storage procedure which capable to avoid data scattered in client's computer
- Having traceable characteristic to avoid data duplication and controlled each alteration clearly and efficiently as can seen in Figure 2
- Capabilities of knowledge share in the middle of plan approval process that involved whole production unit in the same/different division. With this centralized data system DCC, variable information share is enabled hence all engineer will be aware of certain assumption that have been made to solve the problem. This system is also provided with reciprocal import either a result or input variable in different module which shortened evaluation time. Variable sharing concept refer to Figure 3.

ID	Date modified	User id	Path
23	2015-02-06 07:29:52	82111	\\4206100066\LCfHekWVjJDKgnKZdMXhtkEwgQLhoR...
24	2015-02-06 09:58:36	89712	\\4206100066\TYPBsefRQlsOvsilugPCsmFYyTTPWaf...

Figure 2

ID	variable	value
<input type="checkbox"/>	lpp	100
<input type="checkbox"/>	lwl	100
<input type="checkbox"/>	be	20
<input type="checkbox"/>	ha	6
<input type="checkbox"/>	te	4
<input type="checkbox"/>	cb	0,9
<input type="checkbox"/>	vo	6

Figure 3

3.4 DCC security concept

Considering the importance of this system, special handling of security verification is mostly needed, which prevent unrestricted access. Security mechanism are consists of several factors as follows:

3.4 (a) Network

Dewaruci is an integrated client server application. Hence the data communication must be secured and undergo safety verification therefore the data will be considered valid only when it sourced from rightful person. This requirement demands secured means of communication.

Data communication will be carried out via VPN or Private connection through public network or internet, which happen virtually. The terms Private means that the network in concern cannot be accessed freely. All transferred data will stay encrypted which ensured confidentiality of data even by using public network. And also implement Internet Protocol Security (IPsec) VPN is a combination from tunneling technology and encryption. Illustration of VPN can be seen in Figure 4.

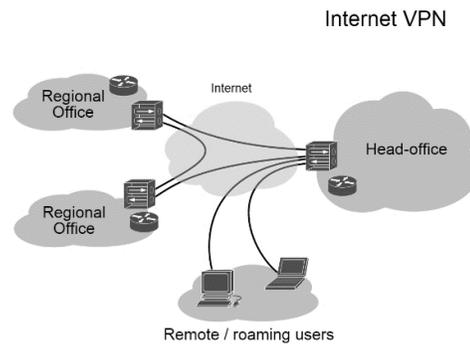


Figure 4

3.4 (b) Server

To have an access inside the server needs to passed some firewall which managed regards to condition either server to server or server to client. Firewall and Server-Client connection as illustrated in Figure 5.

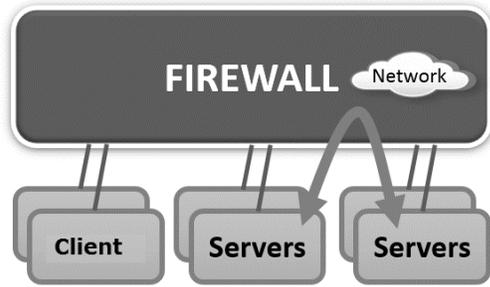


Figure 5

3.4 (c) Policy

Policy is meant to complete security system that enable clear role from its section, in other words only the rightful person can access those information. The adaptation procedure will be made with operational activity such that the dedicated device needs to be register at first. For instance, Engineer “A” have been assigned for “A” ship project of structural plan approval, therefore he/she will be granted an access and updating information inside the server according to his/her right authorities.

3.5 Mobile application

Field Surveyor that will carry on a survey or in the middle of giving evaluation comments / recommendation always needs proper data which is valid according to plan approval data or COPs data, hence this mobile application will become a link from those queried data that accelerate work process because those data will be available online for field surveyor demands. Mobile application for field surveyor tool can be seen in Figure 6.

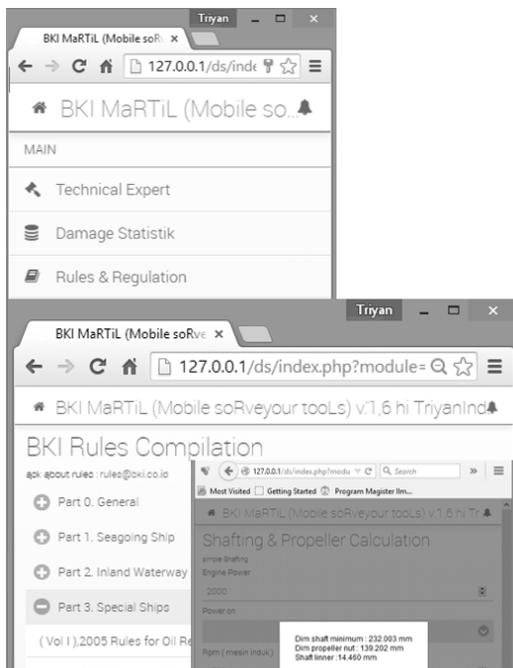


Figure 6

4. CONCLUSIONS

Based on the description above, the electronic system carried by Dewaruci indicate shorten plan approval process, made easier transfer data, secure owner data, easy to update , and more reliable.

5. ACKNOWLEDGEMENTS

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6. REFERENCES

1. BKI, ‘Rules for Machinery Installations’, 2016
2. BKI, ‘Rules for Hull’, 2013
3. Republic of Indonesia Ministry of transportation, ‘KM 65-2009, Non convention vessel standard Indonesian flagged’, 2009
4. IMO, ‘International Convention on load lines, 1996 and protocol of 1988’, 2005
5. BKI, ‘Guidelines for Determination of the Energy Efficiency Design Index’, 2014

7. AUTHORS BIOGRAPHY

Indrawan, Triyan holds the current position of Researcher at BIRO KLASIFIKASI INDONESIA (Persero). He is responsible for research of machinery and electrical of ship, technical & management software development and ship machinery incident investigation team.

Firmandha, Topan holds the current position of Researcher at BIRO KLASIFIKASI INDONESIA (Persero). He is responsible for research of strength and construction of ship, technical software development and ship structural incident investigation team.